

From Marbles to Instant Messenger™: Implications of Piaget's Ideas About Peer Learning

PIAGET'S THEORY IS PROPERLY ASSOCIATED with educational practices that encourage students' active participation in the teaching-learning process. This article describes some of Piaget's ideas about peer relationships, which professional educators may find useful for classroom applications. Any educational practice, including peer learning, should be systematically examined and evaluated. This article provides a framework for such an evaluation using Piaget's theory as a basis. After describing two important goals of peer learning, the point is made that teachers need to be mindful of the socio-moral context in which peer learning occurs. Teachers also need to consider the impact of peer learning on students' thoughts and feelings about school-work and their classmates. Finally, peer interactions and peer learning using modern technology are discussed.

Current Educational Practice: Why Have Peer Learning?

It has become commonplace in many schools for teachers to require that students work in teams to complete academic tasks. Such peer work might take place during class time or as part of a homework assignment. When assigned as homework, peer projects often require the students' families to coordinate their schedules so that students can

find a time and a place to do the required work. These different contexts for peer learning activities are discussed in the next section of this article. Regardless of the setting, or the specific curriculum area, the underlying idea is that student achievement will be enhanced when peer activities are part of the instructional process. The main purpose of using peer learning in schools is to sharpen academic skills such as listening and communication, and to enhance subject matter mastery by promoting deeper levels of understanding based on discussion and a free exchange of ideas.

Peer learning has a second potential educational benefit for students, namely, learning how to manage interactions with classmates in order to have an effective and successful team experience. For example, students might discover that even though classmates can have different opinions and points of view, it is still important to treat each member of the team with respect in order to maintain group functioning. As the United States becomes more heterogeneous with respect to cultural, ethnic, and language backgrounds (Schmitt, 2001), developing positive attitudes towards, and learning about, classmates who differ from one's self and how to interact with them, will become an increasingly important part of the school experience. The necessity for such preparation in the adult worlds of work and community are another driving force behind the growing use of peer work in

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modern American schools. As we turn from current practice to Piaget's theory, these two main objectives of peer learning—sharpening academic skills and managing interactions with classmates—will be explicitly addressed.

The Socio-Moral Climate: Constraint and Cooperation

Piaget (1932) studied children's relationships with parents and with peers more than 70 years ago. He identified enduring forms, patterns, or structures inherent in social relationships that merit our attention despite the many changes in children's lives that have taken place since then. In relationships that have *constraint* as their underlying form, one person has the right to dictate terms to the other, who is obligated to obey without question. The two persons in the relationship are not on equal footing, and the subordinate member is supposed to have unilateral respect for the authority-figure member. Many child-adult relationships (e.g., child-parent or child-teacher) and some child-child relationships (e.g., child-older child) have constraint as their underlying basis. In relationships that have *cooperation* as their underlying form, neither person has the right to dictate terms to the other, and neither person is obligated to obey the other. Instead, the two persons are on equal footing, and each is free to agree or disagree with the other. This type of relationship is based upon and provokes mutual respect between partners. Many child-child relationships have cooperation as their underlying basis, and many child-adult relationships have elements of cooperation.

Children's ideas about rules (in games such as marbles and of social conduct such as moral imperatives) based on cooperative relationships appeared after and were developmentally more advanced than ideas about rules based on constraint (Piaget, 1932). Notions of rules based on unilateral respect and constraint were found to be immature and misguided from an adult point of view. Children move beyond constraint when they re-invent the rules for themselves by working with partners for whom they have mutual respect. For example, a child who is forced to share his toys with a friend and only does so out of unilateral respect for his mother, is not very likely to continue to share when the mother is not around to observe

play. On the other hand, a child might re-invent the idea of sharing on his own. This could be based on seeing the spontaneous joy of a friend when a toy is freely offered, and the feeling that occurs when the act is reciprocated. A child who shares for this reason is more likely to share at a later point in time than is a child who is forced to share by an authority figure. In both cases, the child's overt behavior consisted of sharing; but in the first instance, the underlying basis was not as firmly a part of the child's repertoire as was the second instance.

Cooperation in the classroom

Using Piaget's theory as a foundation, DeVries (1997, 2000, 2001) emphasized the need for teachers to attempt to foster cooperative relationships with their students. It is unrealistic and unnecessary to expect classrooms to be similar to playgrounds in their underlying socio-moral context. However, DeVries maintains that student learning is optimized when teachers create an atmosphere of mutual respect in their classrooms. Underscoring DeVries's point, it is important to consider the larger socio-moral context in which peer learning occurs. A classroom that is largely teacher-directed and based on obedience and constraint is unlikely to reap the intended benefits from peer learning activities. In such a context, the team is likely to focus on trying to please the teacher and will be less willing to share ideas in an open-ended fashion. Neither the academic nor the social benefits of peer experiences are likely to be realized if the larger context in which learning occurs is constraint and unilateral respect.

Conversely, if the general classroom context is one in which the teacher and student have mutual respect for each other, than it is more likely that peer team members will also have mutual respect for each other. In this context, peer team members are more likely to feel comfortable with a free exchange of ideas that can lead to both deeper levels of understanding and an appreciation of another person's individuality.

Cooperation outside the classroom

When teachers require that peer learning activities occur outside the classroom, the nature of the larger socio-moral context might differ from the one

that the teacher has designed in the classroom. The context might shift from one based largely on mutual respect and cooperation to one based largely on unilateral respect and constraint. For example, if parents must be involved in order to see that the team members have a time and a place to work together, then the underlying form of the child-parent relationship can come into play. Some parents might be annoyed and resentful of having to coordinate peer assignments and communicate these feelings to their child. In this case, students might feel pressured to complete the assignment as quickly as possible to avoid making further demands of an irritated parent. This introduces an element of unfairness in terms of evaluating learning outcomes. For these reasons it is better to have peer learning occur in the classroom rather than require that students meet for extended periods of time outside of the classroom. Teachers can monitor and support peer learning activities when they occur in school. Students can be required to do the individual parts of peer projects as homework and to bring the fruits of those efforts to the classroom for peer reaction. Students can be asked to read and evaluate another student's work at home, but face-to-face discussion of reactions should occur in school so that the socio-moral context is consistent with the teacher's expectations.

Possible Learning Outcomes From Peer Experiences

Piaget (1985) described developing knowledge as a relationship between the child's current cognitive system and the particular object, task, or problem at hand. Let us first consider this knowing relationship for situations in which a child works alone on a problem, and then consider the complexities introduced by two or more students working together to solve the same problem.

Students working alone

The components of the knowing relationship, the child's cognitive system and the problem at hand, can be thought of as similar to a balance beam, with three general possibilities as depicted in Figure 1. When the child's cognitive system and problem elements are in balance as depicted in Figure 1(a), concept differentiation and deeper levels of understanding may emerge from the problem-

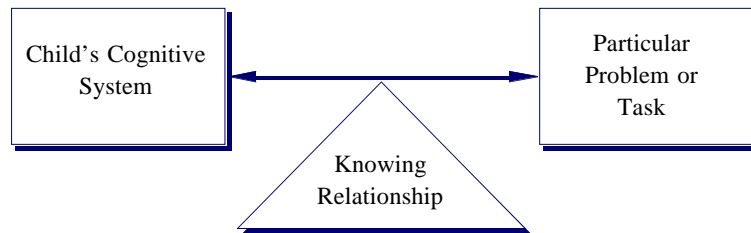
solving experience. This is the type of relationship that teachers hope to foster for their students in school settings. A balanced relationship implies that the child's cognitive system is fully engaged and takes account of important components of the problem. Note that the degree of balance is always relative to the individual student and the type of task at hand. A student's cognitive system is more likely to be fully engaged when: (a) she feels that her learning efforts are respected and valued by teachers and by classmates, (b) she has positive feelings about the learning situation, and (c) the curriculum tasks and problems are developmentally appropriate. If even one of these three elements is missing, imbalances in knowing relationships can occur.

When the knowing relationship is overweighted in favor of the child's cognitive system, as shown in Figure 1(b), concept development and attainment of deeper levels of understanding are not as likely to occur. Instead, the child tends to have overly personal and individualistic interpretations but may be unaware of this imbalance. Important problem elements are either ignored or misinterpreted in favor of the child's current level of understanding. As a result, change in understanding is not likely to occur.

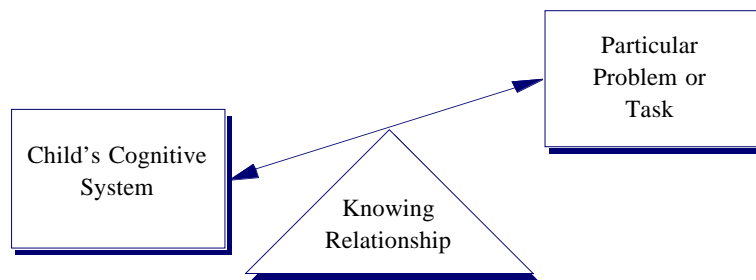
When the knowing relationship is overweighted in favor of problem elements, as illustrated in Figure 1(c), concept development and attainment of deeper levels of understanding are not likely to occur. When problem elements dominate a knowing relationship, the child's cognitive system is only minimally or superficially engaged. This occurs whenever a student memorizes material that is not well understood. Although problem elements must be attended to in order for memorization to occur, the student is not thinking deeply about the material. Much of school learning requires that problem elements be beyond the current cognitive capacity of students. It is precisely in these circumstances that students need to engage their cognitive systems to the maximum. Students will not take the time and effort to think deeply about a task when they feel disrespected by a teacher or classmates and when genuine efforts at learning are not rewarded.

Before describing what can occur in peer learning situations, let us consider an example that encompasses each of the three possible knowing

(a) A Cognitive System and Problem Elements in Balance



(b) Imbalance Favoring Cognitive System over Problem Elements



(c) Imbalance Favoring Problem Elements over Cognitive System

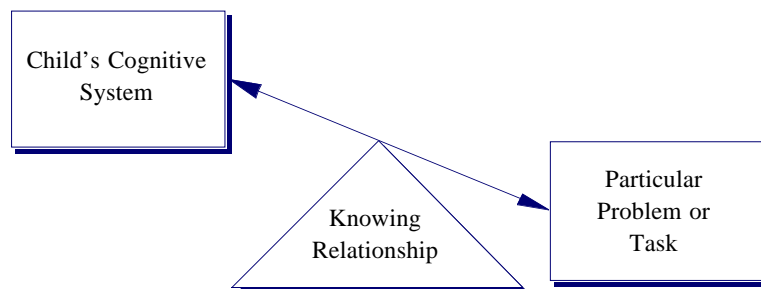


Figure 1. Three possible relationships between a child's cognitive system and the elements of problem situation.

relationships. Suppose students are required to locate and read sources for a research report. Many students will read material that is at or slightly above their (individual) grade level. These students are likely to comprehend the text they selected. Having read for comprehension, these students are in a good position to create a written report that reflects both their personal understanding and the author's intention. This would be an example of a balanced relationship as depicted in Figure 1(a). Unfortunately, some students will select material that far exceeds their reading ability. In this situation, some may use general knowledge information or attempt to fabricate ideas in a report in such a way that the author's intention is not represented at all. Here there is an imbalance in favor of the child's cognitive system that does not do justice to the text [Figure 1(b)]. If the textual material is too difficult, some other students may feel a need to copy the text word for word without really comprehending the author's intention. Now we have the other kind of imbalance: the problem elements outweigh the child's understanding, as shown in Figure 1(c). In each of these situations, students have prepared a report with some level of understanding. Only in the first situation, however, is there a healthy balance between the student's ideas, the author's textual content, and the teacher's learning objectives for the report.

Students working together

One of Piaget's enduring themes concerning the importance of peer relationships in a child's development was the potential for peer experiences to help a child realize that his understanding was overly personal and individualistic (Inhelder & Piaget, 1958, Chapter 18; Piaget, 1932). By having peers respectfully contradict a child's interpretation, a shift toward a more balanced knowing relationship can occur, [i.e., movement from Figure 1(b) to 1(a)]. Similarly, by having peers respectfully ask that an unclear statement be explained "in your own words," a shift from a Figure 1(c) to a Figure 1(a) relationship can occur. The act of explaining to a peer often highlights gaps in understanding that can then be clarified.

In a peer learning activity, different members of the peer team can be in different cognitive balances as illustrated in Figure 1. For example, in

a two-person team, one member might be engaged in the optimal, balanced relationship depicted in Figure 1(a), while the other member of the team might be following along and merely copying or imitating the first person's work. This second member would be in the type of relationship shown in Figure 1(c)—problem elements dominate the student's cognitive system. In such a situation, the first student would be more likely than the second student to have a positive learning outcome from the peer activities. Obviously, if this type of arrangement were repeated over time, the second student might be better off working alone, or working with a different partner. Peer learning activities do not guarantee Figure 1(a)-type knowledge relationships. Students can still act individualistically and not really communicate with each other [Figure 1(b)], or some can take the lead while others merely imitate and follow along without really understanding [Figure 1(c)]. Alternatively, when properly designed, peer learning activities can help each member of the team to be fully engaged with the task at hand. Again, the larger classroom socio-moral context will play a part in determining how the peer team reacts to a given assignment.

De Lisi and Golbeck (1999) provide a summary of laboratory studies of peer learning conducted from a Piagetian perspective. Schwarz, Neuman, and Biezuner (2000) present a recent classroom study showing that two students working together can make learning gains even though both students entered the peer learning situation with low levels of competence. The thrust of the research on peer learning shows that when peers engage in dialogues and discussions (even arguments) that are relevant to both the task at hand and to initial misconceptions, cognitive gains can result from the peer interactions.

Thoughts and Feelings About Peer Learning

In any given situation, students will have both thoughts and feelings about their experiences (Piaget, 1981). Thoughts are important because they delimit the child's capability in a given situation. Feelings are important because they provide the motive force for thinking and acting. Peer learning activities give rise to the general thoughts (cognition) and feelings (affect) depicted in Figure 2.

If the major goal of peer learning is to enhance mastery of academic content and skills, then there is a clear lesson to be drawn from Figure 2. Teachers must ensure that the social-interactive aspects of peer learning are well designed so they can be smoothly executed by the participants. If the peer interactions are dysfunctional, then at least some of the participants will be unhappy; these feelings can interfere with success and with understanding. Dysfunctional interactions might also interfere with success and understanding because such interactions would require participants to direct their cognitive efforts to an analysis of the interactions rather than the academic content and skills in question. Obviously, interactions that are largely dysfunctional and cannot be repaired work against the goal of teaching children to respect each other and to accomplish tasks in teams. Note that disagreements and conflicts are an inevitable part of the peer learning experience. Such disagreements and conflicts are more likely to be intellectually and emotionally healthy when negotiation strategies and conflict resolution are explicitly taught (DeVries, 1997, 2001). Designing effective peer

learning activities is a complex task for even the most experienced of teachers.

Another general principle from Piaget's theory that is relevant to the discussion of cognition and affect in peer learning is the notion that children reconstruct in thought what they have previously experienced in direct action (Piaget, 1976, 1978). Students will form ideas or concepts about peer learning based on their previous peer learning experiences. These ideas will have both a cognitive and an affective component, and, as such, will influence students' behavior in subsequent peer learning activities. Teachers who respect their students will take the time to learn about their students' ideas about peer learning activities and attempt to address general concerns. This feedback may be based on experiences from previous years, from other classes in the current year, or from the present class. Teachers can expect to have middle- and high-school students raise concerns about the relationships among the assignment instructions, individual and group effort, and final project grades (both group and individual). Dealing with these concerns directly communicates that the students'

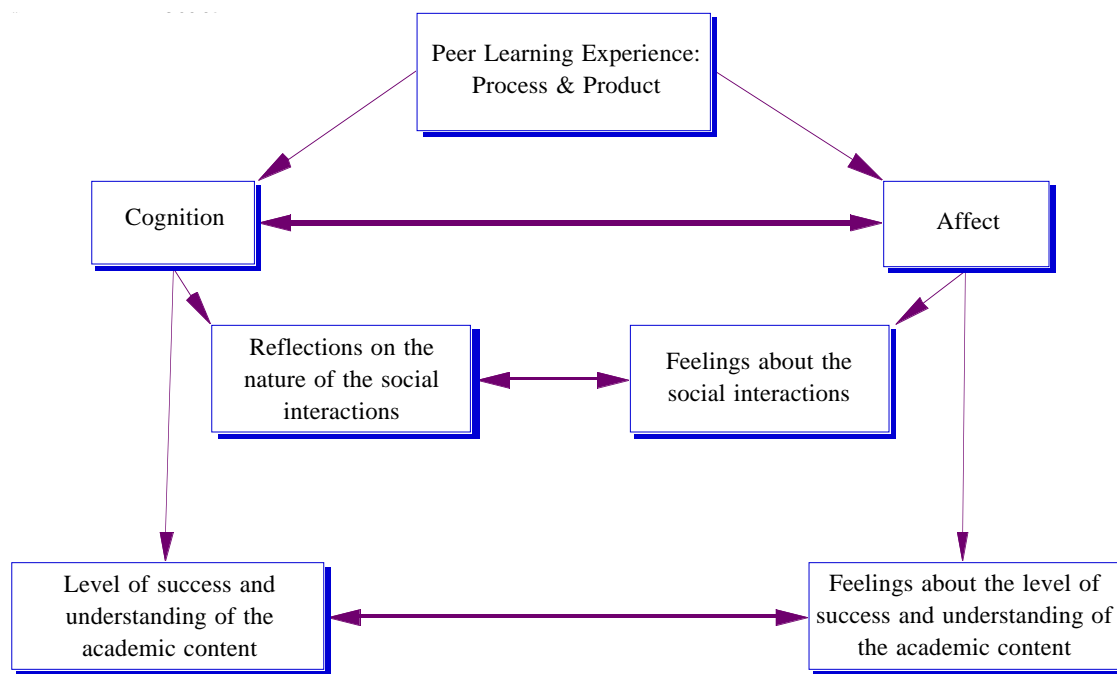


Figure 2. Cognitive and affective aspects of peer learning experiences.

ideas are important to the teacher. If modifications are made in the design of peer activities, then the students' experiences in peer teams and their subsequent beliefs and feelings might be enhanced. This point underscores the importance of the larger socio-moral classroom context for successful peer learning.

Technology and Peer Learning

Throughout the United States, educational systems have been infusing computer technology into classrooms, libraries, and laboratories during the past 10 years. For example, the State of New Jersey recently reported that in 1997-1998 only 36.5 percent of all secondary public school locations had access to the Internet, but in 1999-2000 that figure had increased to 74.1 percent (State of New Jersey, 2001). This infusion of technology into schools has been paralleled by computer purchases in homes. In a country as wealthy as the United States, it appears that virtually every school-aged child will soon have access to the Internet for at least part of the school day, and perhaps outside of school as well.

Although the Internet can be used to make learning a solitary endeavor or one in which face-to-face contact with teachers and peers is reduced (Guernsey, 2001), it is also possible for students to have additional opportunities to interact with peers over the Internet. A ubiquitous example of a new form of communication and peer interaction using the Internet is chatting via programs such as AOL Instant Messenger™. With AOL Instant Messenger, a pop-up dialog box appears that allows the user to type messages to others who are connected at the same time. The last set of postings and replies is visible to the user's screen. Because it is possible to run one computer application and be connected simultaneously with one or more others via an instant message program, students can do their homework while on-line (i.e., while composing a paper using a word processing program) and simultaneously chat with a friend or classmate (i.e., about homework or a non-school topic). Instant message communications are usually not conducted with standard English spelling and grammatical conventions. As such, they are an example of Figure 1(b) in which the participants' style of communication pays little heed to the elements of

standard grammar. This does not mean, however, that the form of communication is without educational value. When left to their own devices, students will invent forms of communication that would not be accepted in most classrooms. Instant messaging communications are an example of peer exchanges when the element of adult constraint is removed or minimized.

Although technological advances, such as virtual communication on the Internet, seem to introduce a new form of communication and interaction, much of the analysis discussed in this article holds. Communications occur in the contexts of relationships that have elements of constraint as well as cooperation. It is important that students learn to treat others with respect, whether they communicate face-to-face or "virtually." Given recent problems of serious threats being transmitted over the Internet, parents and teachers may have to exercise greater control over students' use of the Internet in order to protect them. If teachers want to require that students use the Internet to communicate and work together, they would do well to monitor the postings as carefully as they would monitor face-to-face interactions. As was mentioned earlier in this article, the nature of the socio-moral context in which schoolwork is completed can change dramatically when work is done at home. Teachers need to ensure that the climate they have created in their classrooms is maintained when work is done over the Internet.

Conclusions

Piaget's developmental theory has long signaled the need for educational objectives to be focused on developing creative, independent thinkers (Kohlberg & Mayer, 1972). An important way to work toward this objective requires that teachers be mentors to students, posing problems that are at appropriate levels of difficulty for each individual student (Piaget, 1973). Introducing deliberate peer learning activities into the instructional design process has great potential benefit but complicates matters considerably. Having students work together is surely not a "magic bullet." Opportunities for students to fail to have meaningful learning experiences and/or experiences that are affectively painful are present regardless of whether peer learning is used. Classrooms in which teachers and students develop a

feeling of mutual trust and respect have the best chance for peer learning experiences to be successful (DeVries, 1997, 2000, 2001). In such classrooms, teachers take the time to assess students' thoughts and feelings about the peer learning experience and make modifications where possible. This experimental-evaluative approach to teaching and learning not only communicates respect for learners, but also provides a model of critical inquiry that students can emulate. This type of reflective practice is at the heart of a Piagetian approach to education.

References

- De Lisi, R., & Golbeck, S.L. (1999). The implications of Piaget's theory for peer learning. In A. O'Donnell & A. King (Eds.), *Cognitive perspectives on peer learning* (pp. 3-37). Hillsdale, NJ: Erlbaum.
- DeVries, R. (1997). Piaget's social theory. *Educational Researcher*, 26, 4-17.
- DeVries, R. (2000). Vygotsky, Piaget, and education: A reciprocal assimilation of theories and educational practices. *New Ideas In Psychology*, 18, 187-213.
- DeVries, R. (2001). Constructivist education in pre-school and elementary school: The sociomoral atmosphere as the first educational goal. In S.L. Golbeck (Ed.), *Psychological perspectives on early childhood education. Reframing dilemmas in research and practice* (pp. 153-180). Hillsdale, NJ: Erlbaum.
- Guernsey, L. (2001, February 15). School time, minus the face time. *The New York Times*, pp. G1, G8.
- Inhelder, B., & Piaget, J. (1958). *The growth of logical thinking from childhood to adolescence*. New York: Basic Books.
- Kohlberg, L., & Mayer, R. (1972). Development as the aim of education. *Harvard Educational Review*, 42, 449-496.
- Piaget, J. (1932). *The moral judgment of the child*. London, UK: Kegan Paul.
- Piaget, J. (1973). *To understand is to invent. The future of education*. New York: Viking Press.
- Piaget, J. (1976). *The grasp of consciousness*. Cambridge, MA: Harvard University Press.
- Piaget, J. (1978). *Success and understanding*. Cambridge, MA: Harvard University Press.
- Piaget, J. (1981). *Intelligence and affectivity. Their relationship during child development*. Palo Alto, CA: Annual Reviews, Inc.
- Piaget, J. (1985). *The equilibration of cognitive structures: The central problem in intellectual development*. Chicago: University of Chicago Press.
- Schmitt, E. (2001, March 23). Tally of students equals number at boomer peak: Hispanic and Asian percentages increase. *The New York Times*, p. A17.
- Schwarz, B.B., Neuman, Y., & Biezuner, S. (2000). Two wrongs may make a right . . . if they argue together! *Cognition and Instruction*, 18, 461-494.
- State of New Jersey. (2001). *New Jersey School Report Card. Secondary-1999-2000*. Trenton, NJ: Author.

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