

Cooperative Learning in 21st Century

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Título: Aprendizaje cooperativo en el Siglo XXI.

Resumen: El siglo XXI trae consigo cuatro grandes retos en los que la cooperación juega un papel fundamental: (1) una interdependencia mundial cada vez mayor que se traducirá en el aumento de la diversidad local, así como en conflictos más frecuentes e intensos, (2) el aumento de sistemas democráticos en el mundo, (3) la necesidad de emprendedores creativos y (4) la creciente importancia de las relaciones interpersonales que afectan al desarrollo de la identidad personal. Las herramientas para responder a estos desafíos incluyen el aprendizaje cooperativo. En este artículo se revisará la naturaleza del aprendizaje cooperativo, se discutirá la teoría de la interdependencia social que subyace, y se revisarán, brevemente, los resultados de la investigación sobre el aprendizaje cooperativo.

Palabras clave: Aprendizaje cooperativo; controversia; interdependencia global; emprendedores creativos; democracia

Abstract: The 21st century brings four important challenges in which cooperation plays a central role: (1) a rapidly increasing global interdependence that will result in increasing local diversity as well as more frequent and intense conflicts, (2) the increasing number of democracies throughout the world, (3) the need for creative entrepreneurs, and (4) the growing importance of interpersonal relationships that affect the development of personal identity. The tools for meeting these challenges include cooperative learning. In this article the nature of cooperative learning will be reviewed, the underlying theory of social interdependence will be discussed, and the results of the research on cooperative learning will be briefly reviewed. The way in which cooperative learning contributes to meeting the four challenges will then be discussed.

Key words: Cooperative learning; controversy; global interdependence; creative entrepreneurs; democracy

The Tools for Meeting Four Important Challenges of the 21st Century

Four of the important challenges of the 21st century in which cooperation will play a central role are as follows:

1. A rapidly increasing global interdependence that will result in local diversity as well as more frequent and intense conflicts.
2. The increasing number of democracies throughout the world.
3. The need for creative entrepreneurs.
4. The growing importance of interpersonal relationships.

Cooperative learning is an essential tool for training individuals how to meet these challenges. It is through building and maintaining cooperative efforts throughout the school day for 12 years or more that individuals develop the competencies they need to manage cooperation at the global level as well as the individual and societal levels.

Cooperative Learning

Cooperative learning is the instructional use of small groups so that students work together to maximize their own and each other's learning (Johnson, Johnson, & Holubec, 2013). In cooperative situations, the goal attainments of participants are positively correlated; individuals perceive that they can reach their goals if and only if the other group members also do so (Deutsch, 1949). Thus, an individual seeks an outcome that is beneficial to him- or herself and beneficial to all other individuals with whom the person is cooperatively linked. Any assignment in any curriculum for any age student can be done cooperatively. When individuals cooper-

ate, they work together to accomplish shared goals, and there is a mutual responsibility to work for one's own success. Cooperative learning is usually contrasted with competitive and individualistic learning. **Competition** is working against each other to achieve a goal that only one or a few can attain. In competitive situations, the goals of the separate participants are so linked that there is a negative correlation among their goal attainments; each individual perceives that he or she can reach his or her goal if and only if the other participants cannot attain their goals (Deutsch, 1949). Thus, individuals seek an outcome that is personally beneficial but detrimental to all others in the situation. **Individualistic efforts** exist when individuals work by themselves to accomplish goals unrelated to those of others. In individualistic situations, there is no correlation among participants' goal attainments; each individual perceives that he or she can reach his or her goal regardless of whether other individuals attain or do not attain their goals (Deutsch, 1962; Johnson & Johnson, 1999). Thus, individuals seek an outcome that is personally beneficial. In the ideal classroom, all students would learn how to work cooperatively with others, compete for fun and enjoyment, and work autonomously on their own. The teacher decides which goal structure to implement within each lesson. The conditions under which competitive and individualistic learning may be productively used may be found in Johnson and Johnson (1999). This paper deals only with cooperation.

There are four types of cooperative learning (Johnson et al., 2013): Formal cooperative learning, informal cooperative learning, cooperative base groups, and constructive controversy. Cooperative learning groups may be used to teach specific content (formal cooperative learning groups), to ensure active cognitive processing of information during a lecture (informal cooperative learning groups), and to provide long-term support and assistance for academic progress (cooperative base groups). In addition, cooperation involves intellectual conflicts known as constructive controversies.

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Formal cooperative learning consists of students working together, for one class period to several weeks, to achieve mutual learning goals and complete jointly specific tasks and assignments (such as solving a set of problems, completing a curriculum unit, writing a report or theme, conducting an experiment, or reading a story, play, chapter, or book). Any course requirement or assignment may be restructured to be cooperative. In formal cooperative learning groups the instructor:

1. Specifies the objectives for the lesson (one academic and one social skills).
2. Makes a series of decisions about how to structure the learning groups (what size groups, how students are assigned to groups, what roles to assign, how to arrange materials, and how to arrange the room).
3. Teaches the academic concepts, principles, and strategies that the students are to master and apply, and explains the (a) task to be completed, (b) criteria for success, (c) positive interdependence, (d) individual accountability, and (e) expected student behaviors.
4. Monitors the functioning of the learning groups and intervenes to (a) teach collaborative skills and (b) provide assistance in academic learning when it is needed.
5. Evaluates student performance against the preset criteria for excellence, and ensures that groups process how effectively members worked together.

Informal cooperative learning consists of students working together to achieve a joint learning goal in temporary, ad-hoc groups that last from a few minutes to one class period. During a lecture, demonstration, or film they can be used to focus student attention on the material to be learned, set a mood conducive to learning, help set expectations as to what will be covered in a class session, ensure that students cognitively process the material being taught, and provide closure to an instructional session. During direct teaching the instructional challenge for the teacher is to ensure that students do the intellectual work of organizing material, explaining it, summarizing it, and integrating it into existing conceptual structures. Informal cooperative learning groups are often organized so that students engaged in three-to-five minute **focused discussions** before and after a lecture and three-to-five minute **turn-to-your-partner** discussions interspersed throughout a lecture. In this way the main problem of lectures can be countered: "*The information passes from the notes of the professor to the notes of the student without passing through the mind of either one.*"

Cooperative base groups are long-term, heterogeneous cooperative learning groups with stable membership in which students provide one another with support, encouragement, and assistance to make academic progress (attend class, complete all assignments, learn). They also help one another develop cognitively and socially in healthy ways, as well as hold one another accountable for striving to learn. Base groups meet daily (or whenever the class meets). They are permanent (lasting from one to several years) and provide

the long-term caring peer relationships necessary to influence members consistently to work hard in school. They formally meet to discuss the academic progress of each member, provide help and assistance to each other, and verify that each member is completing assignments and progressing satisfactory through the academic program. Base groups may also be responsible for letting absent group members know what went on in class when they miss a session. Informally, members interact every day within and between classes, discussing assignments, and helping each other with homework. The use of base groups tends to improve attendance, personalizes the work required and the school experience, and improve the quality and quantity of learning. The larger the class or school and the more complex and difficult the subject matter, the more important it is to have base groups.

Constructive controversy exists when one person's ideas, opinions, information, theories, or conclusions are incompatible with those of another, and the two seek to reach an agreement (Johnson & Johnson, 2007, 2007, 2009b). One of the central aspects of individuals promoting each other's success is disagreement and augmentation among members of cooperative groups when they have to make a decision or come to an agreement. Constructive controversy involves what Aristotle called *deliberate discourse* (that is, the discussion of the advantages and disadvantages of proposed actions) aimed at synthesizing novel solutions (that is, *creative problem solving*). *Constructive controversy* begins with randomly assigning students to heterogeneous cooperative learning groups (usually of four members). Each group receives an issue on which to write a report and pass a test. Each cooperative group is divided in two. One half takes the con position on the issue; the other half takes the pro position. Each half receives the instructional materials necessary to define their position and point them toward supporting information. The materials highlight the cooperative goal of reaching a consensus on the issue (by synthesizing the best reasoning from both sides) and writing a quality group report. Students then (a) research, learn about, and prepare their assigned position; (b) present a persuasive case that their position is correct; (c) engage in an open discussion in which there is spirited disagreement; (d) reverse perspectives and present the best case for the opposing position; (e) agree on a synthesis or integration of the best reasoning from both sides; and (f) reflect on the process so that they may learn from the experience.

When used in combination, cooperative formal, informal, base groups, and constructive controversy provide an overall structure for school learning.

Outcomes of Cooperation

The numerous outcomes of cooperative efforts may be subsumed within three broad categories: effort to achieve, positive interpersonal relationships, and psychological adjustment. Because research participants have varied as to eco-

nomie class, age, sex, and cultural background, because a wide variety of research tasks and measures of the dependent variables have been used, and because the research has been conducted by many different researchers with markedly different orientations working in different settings and in different decades, the overall body of research on social interdependence has considerable generalizability.

Over 685 studies have been conducted over the past 195 years to give an answer to the question of how successful competitive, individualistic, and cooperative efforts are in promoting productivity and achievement (Johnson & Johnson, in press). The results are expressed in **effect sizes** that show the strength of the relationship between social interdependence and achievement. Working together to achieve a common goal produces higher achievement and greater productivity than does working competitively or individualistically. This is so well confirmed by so much research that it stands as one of the strongest principles of social and organizational psychology. Cooperation also resulted in more higher-level reasoning, more frequent generation of new ideas and solutions (i.e., *process gain*), and greater transfer of what is learned within one situation to another (i.e., *group to individual transfer*) than did competitive or individualistic learning. The superiority of cooperative over competitive and individualistic efforts increased as the task was more conceptual, the more problem solving was required, the more desirable was higher-level reasoning and critical thinking, the more creative the answers needed to be, the more long-term retention was desired, and the greater the application required of what was learned.

Individuals care more about each other and are more committed to each other's success and well-being when they work together cooperatively than when they compete to see who is best or work independently from each other. This is true when individuals are homogeneous and it is also true when individuals differ in intellectual ability, handicapping conditions, ethnic membership, culture, social class, and gender. When individuals are heterogeneous, cooperating on a task results in more realistic and positive views of each other. Cooperative learning has been demonstrated to be an essential prerequisite for successful ethnic integration and inclusion of handicapped peers (Johnson, Maruyama, & Johnson, 1983; Johnson & Johnson, 1989). As relationships become more positive, absenteeism and turnover of membership decreases, member commitment to organizational goals increases, feelings of personal responsibility to the organization increase, willingness to take on difficult tasks increases, motivation and persistence in working toward goal achievement increase, satisfaction and morale increases, willingness to endure pain and frustration on behalf of the organization increases, willingness to defend the organization against external criticism or attack increases, willingness to listen to and be influenced by colleagues increases, commitment to each other's professional growth and success increases, and productivity increases (Johnson & F. Johnson, 2013; Johnson & Johnson, 1989; Watson & Johnson, 1972).

Cooperating on a task also results in more task-oriented and personal social support than do competitive or individualistic efforts.

Working cooperatively with peers, and valuing cooperation, results in greater psychological health and higher self-esteem than does competing with peers or working independently. Personal ego-strength, self-confidence, independence, and autonomy are all promoted by being involved in cooperative efforts with caring people, who are committed to each other's success and well-being, and who respect each other as separate and unique individuals. When individuals work together to complete assignments, they interact (mastering social skills and competencies), they promote each other's success (gaining self-worth), and they form personal as well as professional relationships (creating the basis for healthy social development). Individuals' psychological adjustment and health tend to increase when schools are dominated by cooperative efforts. The more individuals work cooperatively with others, the more they see themselves as worthwhile and as having value, the greater their productivity, the greater their acceptance and support of others, and the more autonomous and independent they tend to be. Cooperative experiences are not a luxury. They are an absolute necessary for the healthy development of individuals who can function independently.

There are bidirectional relationships among efforts to achieve, quality of relationships, and psychological health (Johnson & Johnson, 1989). Each influences the others. First, caring and committed friendships come from a sense of mutual accomplishment, mutual pride in joint work, and the bonding that results from joint efforts. The more students care about each other, on the other hand, the harder they will work to achieve mutual learning goals. Second, joint efforts to achieve mutual goals promote higher self-esteem, self-efficacy, personal control, and confidence in their competencies. The healthier psychologically individuals are, on the other hand, the better able to they are to work with others to achieve mutual goals. Third, psychological health is built on the internalization of the caring and respect received from loved-ones. Friendships are developmental advantages that promote self-esteem, self-efficacy, and general psychological adjustment. The healthier people are psychologically (i.e., free of psychological pathology such as depression, paranoia, anxiety, fear of failure, repressed anger, hopelessness, and meaninglessness), on the other hand, the more caring and committed their relationships. Because each outcome can induce the others, they are likely to be found together. They are a package with each outcome a door into all three. And together they induce positive interdependence and promotive interaction.

Because of the amount and consistency of research supporting its use, cooperative learning will always be present in 21st century educational practice.

Four Crucial Challenges of the 21st Century

Cooperative learning is essential for meeting the four crucial challenges unique to the 21st century. These strategies provide students with the essential skills necessary to address each of these challenges in the more collaborative school and work environment. The four challenges discussed are not the only challenges that require competencies in structuring and maintaining cooperative efforts, but they are major ones that must be addressed.

Challenge 1: Global Interdependence

The 21st century is characterized by increasing technological, economic, ecological, and political interdependence among individuals, communities, organizations, countries, and regions of the world. There is an increasing need for the countries and regions of the world to coordinate their activities and cooperate with each other. British Prime Minister Gordon Brown believed that the nations and regions of the world urgently needed to (a) stop viewing their relationship as one of competing interests to one of common interests and (b) launch new international rules and institutions to enhance their cooperative efforts. Both beneficial and harmful effects, however, may result from increasing world interdependence. Global interdependence accelerates the development of countries and increases incomes and living standards through heightened world trade. In contrast, global interdependence increases vulnerability of each country to all other countries. The economies of countries are no longer autonomous. Internal economic prosperity or disruptions in one country affect the economy of many other countries. Inflation can spread across national borders. Drastic actions by one country to save its economy can quickly translate into economic hardships for another. Countries are far more vulnerable to outside economic disruptions. Thus, while positive interdependence creates greater worldwide prosperity and productivity, it also increases the capability of each country to influence the events within other countries. They become more interdependent.

Global interdependence also means that the solution to most major problems individual countries face (for example, disease, hunger, environmental contamination, global warming, terrorism, nuclear proliferation) are increasingly ones that cannot be solved by actions taken only at the national level. This internationalization of problems blurs the lines between domestic and international problems. The international affairs of one country are the internal affairs of other nations. Therefore, future citizens and world leaders must understand the nature of interdependent systems and how to operate effectively within them. In the 21st Century people need the skills to launch and maintain cooperative efforts to manage the increasing interdependence among regions, countries, organizations, communities, and individuals. Schools may be the primary setting in which individuals will learn how to do so, primarily through participating in coop-

erative learning activities. In order to understand the interdependence increasing among the various levels of human interaction, the nature of social interdependence needs to be explained and the five essential elements for structuring cooperative need to be defined. Then two of the implications of global interdependence, diversity and conflicts within decision making situations, are discussed.

Nature of Social Interdependence

The use of cooperative learning has its roots in the creation of social interdependence theory. Theorizing on **social interdependence** began in the early 1900s, when one of the founders of the Gestalt School of Psychology, Kurt Koffka, proposed that groups were dynamic wholes in which the interdependence among members could vary. One of his colleagues, Kurt Lewin refined Koffka's notions in the 1920s and 1930s while stating that the essence of a group is the interdependence among members (created by common goals) which results in the group being a "dynamic whole" so that a change in the state of any member or subgroup changes the state of any other member or subgroup. For interdependence to exist, there must be more than one person or entity involved, and the persons or entities must have impact on each other in that a change in the state of one causes a change in the state of the others. **Social interdependence**, therefore, exists when the outcomes of individuals are affected by each other's actions (Johnson & Johnson, 1989). Social interdependence may be differentiated from dependence and independence. **Social dependence** exists when the outcomes of Person A are affected by Person B's actions, but the reverse is not true. **Social independence** exists when individuals' outcomes are unaffected by each other's actions. The absence of social interdependence and dependence results in individualistic efforts.

In the late 1940s, one of Lewin's graduate students, Morton Deutsch, extended Lewin's reasoning about social interdependence and formulated a theory of cooperation and competition (Deutsch, 1949, 1962). Deutsch conceptualized two types of social interdependence: positive interdependence (cooperation) and negative interdependence (competition). He later added no interdependence (individualistic efforts). The basic premise of social interdependence theory is that the type of social interdependence structured in a situation determines how individuals interact with each other that, in turn, largely determines outcomes (Deutsch, 1949, 1962; Johnson, 1970; Watson & Johnson, 1972). Positive interdependence tends to result in promotive interaction where individuals promote each other's success, negative interdependence tends to result in oppositional or contrient interaction where individuals block or obstruct each other's efforts to succeed, and no interdependence results in an absence of interaction.

Depending on whether individuals promote or obstruct each other's goal accomplishments, there is substitutability (i.e., the degree to which actions of one person substitute for

the actions of another person), cathexis (i.e., an investment of psychological energy in objects outside of oneself, such as friends, family, and work), and inducibility (i.e., the openness to being influenced and to influencing others) (Deutsch, 1949). In cooperative situations, collaborators' actions tend to substitute for each other, collaborators invest positive emotions in each other, and collaborators are open to being influenced by each other. In competitive situations, competitors' actions do not substitute for each other, competitors invest negative emotions in each other, and competitors are closed to being influenced by each other. In individualistic situations, there is no substitutability, cathexis, or inducibility.

What Makes Cooperation Work

Not all group efforts are cooperative. Simply placing individuals in groups and telling them to work together does not in and of itself result in cooperative efforts. There are many ways in which group efforts may go wrong. Seating students together can result in competition at close quarters (pseudo-groups) or individualistic efforts with talking (traditional learning groups). Whenever two individuals interact, however, the potential for cooperation exists. Cooperation, though, will only develop under a certain set of conditions: positive interdependence, individual accountability, promotive interaction, social skills, and group processing (Johnson & Johnson, 1974, 1978, 1989, 2005, 2009a). In order to build and maintain cooperative effects, these five essential elements must be carefully structured into the situation.

The heart of cooperative efforts is positive interdependence (Deutsch, 1949). Positive interdependence is the perception that one is linked with others in a way so that one cannot succeed unless they do (and vice versa) and that groupmates' work benefits you and your work benefits them (Deutsch, 1949, 1962; Johnson & Johnson, 1992). There are three major categories of interdependence: outcome interdependence, means interdependence, and boundary interdependence (Johnson & Johnson, 1989, 1992). When persons are in a cooperative or competitive situation, they are oriented toward a desired outcome, end state, goal, or reward. If there is no outcome interdependence (goal and reward interdependence), there is no cooperation or competition. In addition, the means through which the mutual goals or rewards are to be accomplished specify the actions required on the part of group members. Means interdependence includes resource, role, and task interdependence (which are overlapping and not independent from each other). Finally, the boundaries existing among individuals and groups can define who is interdependent with whom. Boundary interdependence consists of abrupt discontinuities that separate and segregate groups from each other, as well as unify the members of any one group. The discontinuity may be created by environmental factors (different parts of the room or different rooms), similarity (all seated together or wearing the same color shirt), proximity (seated together), past history together,

expectations of being grouped together, and differentiation from other competing groups. Boundary interdependence thus includes outside enemy (i.e., negative interdependence with another group), identity (which binds group members together as an entity), and environmental (such as a specific work area) interdependence (which are overlapping and not independent from each other).

The second basic element is individual accountability, which exists when the performance of each individual student is assessed and the results given back to the group and the individual (Johnson & Johnson, 1989). Each group member has a personal responsibility for completing one's share of the work and facilitating the work of other group members. Group members also need to know (a) who needs more assistance, support, and encouragement in completing the assignment and (b) that they cannot "hitch-hike" on the work of others. The purpose of cooperative learning is to make each member a stronger individual in his or her right. Students learn together so that they can subsequently perform higher as individuals. To ensure that each member is strengthened, students are held individually accountable to complete assignments, learn what is being taught, and help other group members do the same. Individual accountability may be structured by (a) giving an individual test to each student, (b) having each student explain what they have learned to a classmate, or (b) observing each group and documenting the contributions of each member.

The third basic element is promotive interaction (Johnson & Johnson, 1989). Students promote each other's success by helping, assisting, supporting, encouraging, and praising each other's efforts to learn. Doing so results in such cognitive processes as orally explaining how to solve problems, discussing the nature of the concepts being learned, teaching one's knowledge to classmates, challenging each other's reasoning and conclusions, and connecting present with past learning. It also results in such interpersonal processes as modeling appropriate use of social skills, supporting and encouraging efforts to learn, and participating in joint celebrations of success.

The fourth essential element is the appropriate use of social skills (Johnson & Johnson, 1989). Contributing to the success of a cooperative effort requires interpersonal and small group skills. Leadership, decision-making, trust-building, communication, and conflict-management skills have to be taught just as purposefully and precisely as academic skills. Procedures and strategies for teaching students social skills may be found in Johnson (2014), Johnson and F. Johnson (2013), and Johnson and R. Johnson (1997).

The fifth essential element is group processing, the examination of the process members are using to maximize their own and each other's learning so that ways to improve the process may be identified (Johnson & Johnson, 1989). Instructors need to focus students on the continuous improvement of the quality of the processes students are using to learn by asking group members to (a) describe what member actions are helpful and unhelpful in ensuring that

all group members are achieving and effective working relationships are being maintained, and (b) make decisions about what behaviors to continue or change. Group processing may result in (a) streamlining the learning process to make it simpler (reducing complexity), (b) eliminating unskilled and inappropriate actions (error-proofing the process), (c) improving continuously students' skills in working as part of a team, and (d) celebrating hard work and success.

Understanding how to implement the five essential elements enables instructors to (a) structure any lesson in any subject area with any set of curriculum materials cooperatively, (b) fine-tune and adapt cooperative learning to their specific circumstances, needs, and students, and (c) intervene to improve the effectiveness of any group that is malfunctioning. These five essential elements, furthermore, are the heart of cooperation in family, community, organizational, societal, and global interdependence. At every level in which cooperation occurs, these five essential elements need to be structured systematically. It is as important to structure the five essential elements among nations as it is to structure them among individuals. As global interdependence increases, furthermore, two of the issues that people will face are increasing diversity and increasing conflicts embedded in decision making.

Diversity and Pluralism

More intense global interdependence is increasing diversity and pluralism on the local level, due to advances in transportation and ease of moving from one country to another. Working cooperatively among diverse individuals will become a more commonplace need. Cooperative learning is especially helpful for capitalizing on the benefits of diversity (Johnson & Johnson, 1989) and ensures that all students are meaningfully and actively involved in learning. Active, involved students tend not to engage in rejecting, bullying, or prejudiced behavior. Cooperative learning ensures that students achieve their potential and experience psychological success so that they are motivated to continue to invest energy and effort in learning. Those who experience academic failure are at risk for paying no attention and acting up, which often leads to physical or verbal aggression against stereotyped classmates. *Cooperative learning* promotes the development of caring and committed relationships among students, including between majority and minority students. Students who are isolated or alienated from their peers and who have no friends are at risk for being targets or sources of physical or verbal aggression. The negative impact of isolation may be even more severe on minority students.

Cooperative learning groups provide an arena in which students develop the interpersonal and small-group skills needed to work effectively with diverse schoolmates. These interpersonal skills enable students to engage in discussions in which they share and solve personal problems. As a result, students' resilience and ability to cope with adversity and stress will tend to increase. Children who do not share

their problems and who do not have caring, supportive help in solving them are at more risk for physical or verbal aggression toward stereotyped classmates. Students in cooperative learning groups academically help and assist diverse groupmates and contribute to their well-being and quality of life. This behavior promotes a sense of meaning, pride, and self-esteem. Finally, the systematic use of cooperative learning provides the context for resolving conflicts in constructive ways, which is essential for positive relationships among diverse individuals.

International, National, Intergroup, and Interpersonal Decision Making

As interdependence increases at the international, national, community, intergroup, and interpersonal level, so does the frequency and intensity of conflicts in collective decision making. Conflict results when nations and organizations have to make decisions about how to work together to solve mutual (e.g., global) problems. When different parties have different views as to which alternative courses of action need to be followed, constructive controversy results. Parties can disagree about the nature and cause of the problems, have different values and goals, and disagree about how much each should contribute to solving the problem. How effectively such decisions are made becomes a central issue in how effectively global interdependence is managed.

Examples of the issues on which decisions have to be made are the impact of global warming and over population of the environment. Population estimates predict more than nine billion humans will inhabit the planet by 2050, and the ecosystems of the Earth will likely be unable to sustain such large numbers, especially if humans continue to deplete natural resources, pollute the environment, and reduce biodiversity. With increased population will come economic and social conflicts that could devastate the health and well-being of current and future human populations. The World Commission on Environment and Development recognized these difficulties in 1987 when it stated, "The Earth is one, but the world is not." The prevention of such population growth or the dealing with its effects will require cooperation among most nations of the world. The competencies students need to learn to deal effectively with such disagreement and conflict are those contained in constructive controversy and integrative negotiations. Teachers can help students learn how to make effective collective decisions and they can teach the constructive controversy procedure and the competencies needed to do so.

Engaging in constructive controversies in school teaches students the procedures and attitudes necessary for effective decision making about difficult issues with other cooperators. It begins with randomly assigning students to heterogeneous cooperative learning groups of four members (Johnson & Johnson, 1989, 2007, 2009b). Each group receives an issue on which to write a report and pass a test. Each cooperative group is divided into two pairs. One pair

takes the con position on the issue; the other pair takes the pro position. Each pair receives the instructional materials necessary to define their position and point them toward supporting information. The materials highlight the cooperative goal of reaching a consensus on the issue (by synthesizing the best reasoning from both sides) and writing a quality group report. Students then (a) research, learn about, and prepare their assigned position; (b) present a persuasive case that their position is correct; (c) engage in an open discussion in which there is spirited disagreement; (d) reverse perspectives and present the best case for the opposing position; (e) agree on a synthesis or integration of the best reasoning from both sides; and (f) reflect on the process so that they may learn from the experience.

The research on constructive controversies (compared with concurrence seeking, debate, and individualistic efforts) indicates that it results in higher achievement, greater retention, more creative problem solving, more frequent use of higher-level reasoning and meta-cognitive thought, more perspective taking, greater continuous motivation to learn, more positive attitudes toward learning, more positive interpersonal relationships, greater social support, and higher self-esteem (Johnson & Johnson, 1989, 2007, 2009b). Engaging in constructive controversy can also be fun, enjoyable, and exciting.

Challenge 2: Increasing Number of Democracies

Due to increasing global interdependence, the spread of technology and information, and the increasing power of international organizations such as the United Nations, the number of democracies will increase throughout the world in the 21st century. In 1748, Charles de Secondat, Baron de Montesquieu, published *The Spirit of Laws* in which he explored the relationship between people and different forms of government. He concluded that while dictatorship survives on the fear of the people and monarchy survives on the loyalty of the people, a free republic (the most fragile of the three political systems) survives on the virtue of the people. Virtue is reflected in the way a person balances his or her own needs with the needs of the society as a whole. Motivation to be virtuous comes from a sense of belonging, a concern for the whole, and a moral bond with the community. The moral bond is cultivated by deliberating with fellow citizens about the common good and helping shape the destiny of the political community.

A number of important parallels exist between being an effective member of a cooperative learning group and being an effective citizen in a democracy (Johnson & Johnson, 2010). A cooperative learning group is a microcosm of a democracy. A *democracy* is, after all, first and foremost a cooperative system in which citizens work together to reach mutual goals and determine their future. Similarly, in cooperative learning groups, individuals work to achieve mutual goals, are responsible for contributing to the work of the group, have the right and obligation to express their ideas,

and are under obligation to provide leadership and ensure effective decisions. All group members are considered equal. Decisions result from careful consideration of all points of view. Group members adopt a set of values that include contributing to the well-being of their groupmates and the common good. All of these characteristics are also true of democracies.

Thomas Jefferson, James Madison, and the other founders of the United States of America considered the heart of democracy to be political discourse: the formal exchange of reasoned views on which of several alternative courses of action to take to solve a societal problem. Societal problems can involve, among other things, poverty, crime, drug abuse, poor economic health, or racism. Political discourse is a method of decision making in a democracy. The intent of political discourse is to involve all citizens in the making of the decision, persuade others (through valid information and logic), and clarify what course of action would be most effective in solving the problem. The expectation is for citizens to prepare the best case possible rationale for their position, advocate it strongly, critically analyze the opposing positions, step back and review the issue from all perspectives, and then come to a reasoned judgment about the course of action the society should take. The clash of opposing positions is expected to increase citizens' understanding of the issue and the quality of decision making, given that citizens keep an open mind and change their opinions only when logically persuaded to do so. Engaging in political discourse involves both short-term and long-term positive interdependence. The short-term positive interdependence is the immediate creation of consensus among citizens as to which course of action will best solve the problem. The long-term interdependence is the improvement of the political process and the maintenance of the health of the democracy. Cooperative learning and constructive controversy have been used to teach elementary and secondary students how to be citizens in a democracy in such countries as Armenia, Azerbaijan, the Czech Republic, and Lithuania (Avery, Freeman, Greenwalt, & Trout, 2006; Hovhannisyán, Varrella, Johnson, & Johnson, 2005).

Digital Citizenship Skills

Being a citizen in a democracy not only includes knowing how to engage in political discourse with diverse participants and make effective decisions on major issues, but also to do so electronically as well as face to face. More and more, participation in a democracy will require citizens to interact with each other electronically. Having digital citizenship skills may someday be as important as having interpersonal skills. Digital citizenship skills enable individuals to engage in cooperative efforts and political discourse and constructive controversies. Much of technology is used to achieve mutual goals and is, therefore, a tool for cooperative endeavors. Technology allows individuals and teams from many different locations to coordinate their activities and

access information and other resources almost instantly. Technology also provides access to multitudes of potential cooperators and shared spaces. People's behavior online can even define their identity in their online relationships. The next wave of social networking will move technology systems away from restricting users to walled-off membership in a few sites, such as Facebook, toward a more open and flexible sharing among numerous niche communities. This will help individuals to make visible their network of people they know and are related to independent of any given address book or networking system. Digital citizenship skills thus become an essential aspect of individuals' lives in the 21st century, especially cooperative digital skills.

Challenge 3: The Need for Creative Entrepreneurs

The economic future of societies depends on their capability to grow, attract, and support talented, innovative, and creative entrepreneurs (Florida, 2005). Because creative entrepreneurs are highly mobile, countries with the highest quality of life will attract the highest number of creative entrepreneurs. The challenge for educational systems in each country is to produce creative entrepreneurs who will then contribute to the future economic health of the country.

Nations must first ensure their educational system is socializing students into being creative, productive people who believe that they can better their life through being entrepreneurs. Nations must also ensure that their quality of life is sufficient to attract and keep creative entrepreneurs. Two factors that largely determine quality of life are the absence of poverty and its resulting social problems and the ability of individuals potentially to better their lives through becoming entrepreneurs. Education is the key mechanism for individuals to rise from one social class to another. Thus, schools have the responsibility to teach all students how to be creative problem solvers and maximize their achievement as well as ensuring that they go on to post-secondary and graduate programs.

Teaching students to be creative is not something many schools have achieved in past eras. When schools emphasize a model of education as transmission of facts and procedures by teachers in a regimented and structured manner (such as lectures) with the expectation that students will acquire and memorize the information and later recall the information in an examination situation. What results is a creativity deficit in students. *Creativity* is the capability to create or invent something original or to generate unique approaches and solutions to issues or problems (Johnson & F. Johnson, 2013; Johnson & Johnson, 1989). Creativity is usually a social product advanced through mutual consideration of diverse ideas in a cooperative context; it does not emerge very well in a competitive or individualistic context. There are two steps in promoting the development of creative entrepreneurs. The first is to place students in cooperative learning groups and giving them a series of higher-level rea-

soning problems to solve and projects to complete. The second is for students to engage in constructive controversy.

Step One of teaching students in ways that promote their becoming creative entrepreneurs is to structure learning situations cooperatively and give assignments that require higher-level reasoning and problem solving. Cooperative learning, compared with competitive and individualistic learning, tends to increase the number of novel solutions to problems, results in the use of more varied reasoning strategies, generates more original ideas, and results in more creative solutions to problems (Johnson, 2003; Johnson & Johnson, 1989, 2005, 2009a). In addition, cooperative learning encourages group members to dig into a problem, raise issues, and settle them in ways that show the benefits in a wide range of ideas and result in a high degree of emotional involvement in and commitment to solving the problems. Clearly, a requirement for creativity is to be a member in a supportive group that encourages creativity.

In addition to creativity, more frequent discovery and development of high-quality cognitive reasoning strategies occurs in cooperative environments than in competitive or individualistic situations (Johnson, 2003; Johnson & Johnson, 1989, 2005, 2009a). Studies on Jean Piaget's cognitive development theory and Lawrence Kohlberg's moral development theory indicate that cooperative experiences promote the transition to higher-level cognitive and moral reasoning more frequently than competitive or individualistic experiences (Johnson & Johnson, 1989). Furthermore, when members of a cooperative group express differences of opinion, according to Piaget as well as controversy theory, they enhance the level and quality of their cognitive and moral reasoning. Finally, in cooperative situations, students tend to engage in more frequent and accurate perspective taking than they do in competitive or individualistic situations. This accurate perspective taking enhances members' ability to respond to others' needs with empathy, compassion, and support.

Step Two is to structure constructive controversies (that is, students disagreeing with each other and challenging each other's conclusions) within the cooperative learning groups. Constructive controversies tend to increase the number of ideas, quality of ideas, feelings of stimulation and enjoyment, and originality of expression in problem-solving tasks (Johnson & Johnson, 2007, 2009b). In constructive controversies, participants tend to invent more creative solutions to problems, be more original in their thinking, generate and utilize a greater number of ideas, generate more high-quality ideas, analyze problems at a deeper level, raise more issues, experience greater feelings of stimulation and enjoyment, become more emotionally involved in and committed to solving the problem, and experience more satisfaction with the resulting decision (Johnson & Johnson, 2007, 2009b).

Challenge 4: Changes in Interpersonal Relationships

In the 21st century, the emphasis on friendship formation and positive interpersonal interactions will continue to increase. An example is the rise in popularity of social networks. Positive relationships will take place with increasing intensity in two settings: face-to-face interactions and online. The meaning of friendship may be quite different in the two settings. Cooperation will, however, play a vital role in building positive relationships in each setting, whereas competition and individualism will tend to result in negative relationships in each setting (Johnson & Johnson, 1989, 2005, 2009a).

Face-To-Face Relationships

The history of human effectiveness is one of groups of humans working together cooperatively to achieve mutual goals. While such cooperation has almost always been face-to-face, there is growing emphasis on on-line relationships. There is reason to believe, however, that on-line relationships will never take the place of face-to-face relationships. Studies of business teams and teams in other settings indicate that the most valuable form of communication in increasing team effectiveness is face-to-face (Johnson & F. Johnson, 2013). The more face-to-face interaction among team members, the more effective and higher performing the team tends to be. Face-to-face interaction typically requires more engagement, energy, focus, and attention than do texting, email, talking on the phone, or making entries in social networking sites (Pentland, 2012). It is these requirements, however, that make face-to-face interaction so valuable and necessary.

Online Relationships

Current trends seem to indicate that in the 21st century, relationships may develop online with increasing frequency. Relationships started and maintained through such avenues as websites such as Facebook and MySpace, email, blogging, texting, tweeting, and online multiplayer games, all of which facilitate connections among individuals. Online interaction can be the setting in which new relationships form, supplement face-to-face relationships, or maintain previous face-to-face relationships as people move to different geographic locations. There are several characteristics of online relationships.

First, online relationships tend not to be random, but rather built around mutual goals and a common purpose. People read a blog for a purpose, find people with similar interests for a reason, and engage in games to have fun and test their skills. The fact that online relationships are built on a common purpose makes them by definition cooperative. The more people know about cooperative efforts and the more skilled they are in cooperating, the more successful their online interaction and relationships will be.

Second, online relationships are real relationships. Actual people read email messages, respond to comments on a blog, receive and send Twitter messages, post messages on Facebook, and so on. Not only are they real, but they are important. Relationships reflect the time individuals spend interacting with one another. Many individuals are spending more and more relationship time online, often more than they spend on face-to-face relationships. More and more people are spending as much or more of their relationship time online than face-to-face.

Third, electronic media offer the opportunity to expand the number of relationships a person has very quickly and very easily. There are few barriers for entry into online relationships, and the opportunity to do so is high. A person can use the Internet to find easily other people who have similar interests and beliefs. Entering one website may provide access to dozens of people with whom to interact about an area of mutual interest. Having such immediate access to large numbers of potential friends is difficult if not impossible in face-to-face situations. The ease of creating relationships online enhances individuals' ability to find collaborators and identify people who have resources essential for completing cooperative projects.

Fourth, in internet relationships, personal geography tends not to be relevant. No matter where an individual lives, it is possible to find friends all over the world. Thus, diversity of community may be unimportant to many people because, regardless of who their neighbors are, they can find a community of like-minded people on the internet. Or, if a neighborhood is too homogeneous for an individual's tastes, he or she can use the internet to find diverse friends and a wide variety of perspectives. Because diverse perspectives and resources enhance cooperation and constructive controversy, internet relationships can enhance the quality of cooperation and constructive controversy considerably.

Fifth, it is easy to interact with lots of people simultaneously on the internet. A person can send the same email to dozens, even hundreds, of people. What a person posts on a Facebook page can be accessed by friends from all over the world who can then respond. In contrast, most face-to-face relationships are one-on-one. The speed at which communication takes place online enhances cooperation and coordination of efforts in most cases as long as messages are phrased cooperatively. If competitive messages are sent, the speed of communication may alienate more people more quickly.

Sixth, in online relationships, people primarily know others through what they disclose about themselves. There can understandably be much scepticism about what people say about themselves online. In cooperative situations, trust may be higher, as individuals tend to be open, accurate, and honest in their communications and disclosures. Generally, however, the 21st century will no doubt see the development of new ways for assessing individual's online personas and honesty, such as assessing speed of keyboarding and responding, cleverness in phrasing responses, patterns of

wording in messages, sense of humor, creativity in writing, and so on.

Seventh, online relationships can be highly positive and fulfilling. The arrival of email can bring joy. The honest disclosure of thoughts and feelings can be liberating. Support from online friends can be quite powerful. Not all online relationships, however, are positive. Cyber-bullying and other negative interactions occur online. Nonetheless, the vast majority of online relationships seem to result in laughter, good humor, cheerfulness, joy, and fun.

Material posted on the Internet spreads rapidly and widely and may be available to interested parties for decades. That means people must concern themselves more with what they post on the internet and its impact on their privacy in public and face-to-face relationships. For example, behavior with a friend can be recorded on a cell phone and sent to dozens of people, and even end up posted on YouTube. Pictures of a teenager at a party can show up on a company website twenty years later.

Finally, online relationships focus attention on ethics, manners, and values. When people develop online relationships, they develop new systems of ethics and manners due to the nature of the technology. What is polite and what is rude, for example, may be different in online than in face-to-face relationships. Online relationships can also affect individuals' value systems. A recent study found that in the United States, Japan, Singapore, and Malaysia, the more people played a prosocial online game, the more they tended to engage in prosocial behavior afterward, and when they played a violent online game, they were more likely to behave in competitive, obstructive ways afterward.

The Impact of Online Interaction on Face-to-Face Relationships

The increasing ease of building and maintaining online relationships in the 21st century will have considerable impact on face-to-face relationships (Johnson, 2013). First, the majority of face-to-face interaction individuals may experience may take place in school. While at home, many individuals may be on the computer communicating with electronic friends and even walking down the street or standing in line at a store they may be on the phone or texting friends. It may be that the most face-to-face interaction in children and adolescents' lives is within schools.

Second, as the amount of time spent in face-to-face relationships declines, the face-to-face interactions that do occur may increasingly include touch. Online relationships devel-

oped through voice chat and video provide some nonverbal cues such as tone of voice and facial expressions, but they do not provide touch (although touch-technology is under development). Touch is central to human social life. At birth, touch is the most developed sensory modality, and it contributes to cognitive, brain, and socio-emotional development through infancy and childhood. Individuals deprived of human touch may develop serious psychological and developmental problems. Touch is essential to the emotional experiences in a relationship, because it communicates and intensifies emotions. Touch is especially important in communicating positive emotions, such as love, affection, caring, gratitude, empathy, and sympathy. As a person has fewer and fewer face-to-face relationships, the amount of touch in each relationship may tend to increase.

Coping With the Challenges

In the 21st Century there will be so many technological changes and unforeseen problems that predicting what will occur is difficult. It is safe to predict, however, that increasing economic, technological, and environmental global interdependence will continue to increase and that the result will be a need for greater cooperation and coordination of efforts to deal with the challenges it poses. Issues such as global warming, overpopulation, scarcity of water, mass migrations, and so forth will require most of the world to join in cooperative efforts to cope with the resulting issues. Knowing how to build and maintain cooperative systems in a diverse world will more and more be a requirement, not an option. Making democracy work in a wide variety of countries with markedly different historical heritages will also be a challenge. An essential skill for all citizens and especially for leaders is constructive political discourse. In order for a country to prosper economically, it must develop, attract, and hold onto creative entrepreneurs. Finally, the rise in technology and the prevalence of on-line relationships will focus new attention on face-to-face high-quality relationships and the need for actual contact with other humans. In all of these challenges, cooperative learning, including constructive controversy, will play a central role in teaching children, adolescents, and young adults the competencies and values they need to cope with these and other challenges and lead productive and fulfilling lives during the 21st century.

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