

IT'S PUZZLING: COMMUNICATIONS, COMPETITION, AND COOPERATION

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ABSTRACT

*"It's Puzzling" is a game designed to teach general management concepts involving communications and coordination issues, competition, cooperation, and problem solving and using the simple task of assembling of a child's puzzle. The game features a "retroactive" learning process of several rounds, each with an added dimension of difficulty and a debriefing session to help the students understand what they learned from the process. **KEY WORDS:** business simulation, decision making, communications, problem solving, competition and cooperation*

BASIC DATA

Instructional Objective: To teach problem solving skills under a variety of conditions that affect group dynamics
Game Objectives: Students assemble simple puzzles under a variety of conditions.
Target Audience: Undergraduate business and management students.
Playing Time: 50 minutes.
Debriefing Time: 20 Minutes.
Number of Players: 4 to 8 teams of 4 to 10 people per team.
Materials Required: Simple children's puzzles with 30-60 pieces each and blindfolds for half the number of players (basic Halloween masks with the eyeholes taped over from both sides work well).
Equipment/room setup required: No specialized equipment is required. A playing surface on which to assemble puzzles, such as a tabletop, is needed.

INTRODUCTION

Process learning contains a degree of intangibility that cannot always be conveyed through traditional teaching methods such as self-study, lecture, and examination (Gentry, 1990). Process learning is best accomplished by actually accomplishing the desired task (Carter, Hickman, McDonald, Patton, & Powell, 1986). Employers who use

on-the-job training understand this concept well. For some tasks the only way to learn the task is actually to perform the task. A common example is driving a car. Other examples include operating machinery, filing forms, home repair, juggling, scuba diving, parachuting, and flying an airplane. The more intangible the process, the more important it is to learn by doing.

While intangible concepts such as competition and cooperation can be taught in the abstract in books and in lectures, some of the more subtle insights are invariably lost. For managers who are likely to find themselves in emotional or confusing situations, it is good to understand these concepts prior to exposure to actual situations. Traditional classroom lectures may be descriptive, but students are unable to experience the full impact of competition and cooperation on an organization's success. To teach intangible concepts such as competition and cooperation, specialized simulations and games are required.

LEARNING OBJECTIVES

The primary learning objective of this game is to teach a variety of management process concepts involved in group dynamics. These process concepts involve communications and coordination issues, competition, cooperation, and problem solving. It is important to remember that the task of assembling puzzles serves an instrumental purpose in the context of learning the process objectives. The task of assembling puzzles is simple under normal conditions, but the conditions established in this game require students to adapt to their environment in creative ways. The debriefing is essential so that the students discover what they learned by doing.

DESCRIPTION OF THE GAME

The game consists of a single tangible task; in each of six rounds, players are asked to assemble a simple child's puzzle with between 30-60 pieces, using different rules for each round. In each subsequent round of the game, the rules are changed to constrain the set of behaviors used by the

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players in the previous round. This “retroactive” design gives the players a new process obstacle or situation in each round that must be solved. The game task is simple; teams must assemble a children’s puzzle. The different rules for each round require different levels of cooperation in a competitive atmosphere if teams are to be successful.

It is important that the players think the outcomes are significant in order to create the appropriate level of effort, competition, and emotional response. One way to assure student interest is to announce “the winners of game will have the opportunity to earn an extra 10 points on the next exam.” The wording here is important. It sets the stage for competition but gives the instructor sufficient latitude to determine the exact nature of the reward. It is often useful to alter the reward system after the game has been played so that everyone “wins”. This removes the competitive aspect of the exercise from the debriefing session and permits more open and frank discussion.

One reward that has proven to be effective is to tell the entire class after the game has been played that on the next exam there will be a 10-point question about what they learned from the exercise. The instructor may choose whether or not to let them prepare the answer beforehand. This “reward” makes each individual student reflect further on the exercise and can provide the instructor with valuable insights concerning what the students really understand and what materials need more work.

THE TASK, MATERIALS, AND SET-UP

The Task and Materials: The specific action at the center of this game is the task of assembling a child’s puzzle with between 30 and 60 pieces. Larger puzzles require a lot of attention on the task and detract from the process by which the learning objectives are achieved. Puzzles with fewer than 30 pieces do not provide the level of complexity necessary for creative problem solving. Inexpensive child’s puzzles can be obtained in local budget stores. Puzzles from one manufacturer with the same number of pieces are likely cut with the same die and permit the addition of a variety of process obstacles. For instance, as long as the puzzles are from the same die, rounds can be altered so that players can be instructed to assemble puzzles with pieces from different puzzles.

Six Rounds: The simplicity of the basic task allows for a specific learning objective to be built into each of the progressively more difficult rounds that follow. These learning objectives can be tailored to the specific course objectives by altering the constraints in each round. This gives the instructor the flexibility to adapt the game to his or her specific needs. It is suggested, however, that the game be played as described prior to making any modifications. In its current form, the game is quite robust and demonstrates a number of important concepts and processes.

Group Structure: Players are grouped into teams depending on class size, the number of puzzles, and number of pieces per puzzle. The game can be managed with between four to eight teams. Fewer than four teams prevents competitive dynamics from forming between teams and managing more than eight teams is quite difficult. Teams should be sufficiently large enough for individual dynamics to develop. There should be from four to ten persons per team. Teams with more than ten people become too large for individual dynamics to occur. There should be an even number of players on each team even if this means that teams are of different sizes. Team size should be set so that each player will have the opportunity to perform the task at least four to six times. Effective limits for class sizes are between 16 (4 groups, 4 people, 30 piece puzzles) and 80 (8 groups, 10 people, 60 piece puzzles) players. A good rule-of-thumb is to use puzzles with a number of pieces per puzzle that is close to the number of students in the class.

General Comments: The puzzle pieces should be positioned in boxes or bowls on a table at one end of the room. The puzzle assembly areas should be designated at the opposite side of the room so that players will have to move back and forth and that the distance traveled is similar for each team. This creates a transportation problem for the teams and gives the instructor a chance to watch the dynamics of the teams. A distance of 15-25 feet is sufficient to slow the play enough to allow relevant observations of group and individual dynamics.

Problem solving behaviors such as teams moving furniture, rearranging the room, moving the buckets of pieces, etc., should also be allowed to develop as they. Competitive and anti-competitive behaviors, both within and between teams, unless specifically excluded by the rules, should be allowed to develop. Learning and cooperating behaviors both within and across teams should also be allowed to develop as they occur and not be discouraged. The instructor should note where and when such behaviors begin to occur for discussion in the debriefing. While the idea here is to allow all sorts of behaviors to develop in order to determine which are successful, it may be necessary to restrict some actions. For example, if in one round the teams move the buckets holding the puzzle pieces close to the work sites, it might be desirable to restrict this action in later rounds so that the pace of action can be contained and controlled.

PLAYING “IT’S PUZZLING”

General Rules That Apply to All Rounds

1. Puzzles must be assembled in the location specified by the instructor for each round.
2. No player may handle more than one puzzle piece at any one time.
3. All round-specific rules apply only to the round for which they are described.

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4. Round-specific rules apply to each round and must be followed exactly. If any of the specific rules contradict the general rules, they will do so only for the round to which they apply. The general rules will resume after the round to which they apply.
5. The score for each round should be prominently posted. Towards the end of the game, teams with low scores may become more aggressive if they are constantly reminded of their position.

Round 1

This round is worth 5 points. Round 1 is the introductory round. It is intended to familiarize the players with the game task and introduce process constraints. It is important that the instructor enforces the process constraints and the players develop the expectation that constraints will be enforced.

Rules for Round 1

1. During Game play, all players must use their non-dominant hand. Right-handed can only use their left hands to handle puzzle pieces and vice versa. Ambidextrous students should use their non-writing or least preferred hand. The dominant hand should be put in a pocket, placed behind the head, or otherwise immobilized. The instructor must watch carefully to make sure this rule is enforced.
2. When the game starts, players go to the container that holds the puzzle assigned to their team and return to the assembly site with a single puzzle piece.
3. When players return from the container, they will place their puzzle piece in the puzzle area and connect it to any pieces that are already there. If there is no existing connectable piece, the non-contiguous piece should be placed in the general location where it would fit in the fully assembled puzzle. Puzzle pieces are allowed to accumulate in the assembly area.
4. As new pieces are brought to the assembly area, they are connected to existing pieces until the puzzle is complete. Only the person who brought the piece to the assembly area is allowed to touch that piece. Players may not touch pieces brought to the assembly area by other players.
5. As a penalty for violating any rule, the team member that broke the rule will return remove a correctly placed piece from the puzzle and return it to the puzzle piece container.
6. The first team to finish assembling its puzzle shouts, "We have it!" At that point all other teams freeze in place until the instructor verifies that the puzzle is indeed assembled correctly. If the puzzle is incorrect or if a penalty needs to be invoked, the instructor says, "Resume play", and the round continues until a team has correctly completed the task.

Round 2

This round is worth 10 points. This round is intended to add an additional level of process constraints which will make the task more difficult, add to player frustration, and increase the perception of rivalry between groups. These new constraints require a different level of intragroup planning and cooperation in order to complete the task.

Rules for Round 2

1. All teams will switch puzzles with another team.
2. During Game play, all players must use their non-dominant hand to handle puzzle pieces.
3. Except for the first piece returned from the piece bucket (the starting piece), all puzzle pieces must connect to either the starting piece or the pieces branching off from the starting piece. Players will be required to return non-contiguous pieces to the piece container before proceeding. Puzzle pieces are NOT allowed to accumulate at the assembly site. Any non-contiguous piece found at the assembly site is a violation of the rules.
4. Players may only touch those pieces that they bring to the assembly site.
5. The punishment for violating any rule is the same as in Round 1.
6. The procedure for determining the winner is the same as in Round 1.

Round 3

This round will be worth 15 points. This round is structurally the same as Round 2, but it highlights the difference between visual and oral communications in the accomplishment of the task.

Rules for Round 3

1. All rules from Round 2 apply.
2. No speaking is allowed. Any spoken word is considered a violation of the rules and will merit the appropriate level of punishment. The first violation will require that one piece be returned to the piece container, the second violation will require that two pieces are returned to the piece container, and so on.

Round 4

This round is worth 20 points. This round examines oral and tactile communications and eliminates direct visual communications in the accomplishment of the task.

Rules for Round 4

1. All rules from Round 2 apply.
2. Half of the players on each team are blindfolded; these are the only players who may touch the puzzle pieces. The "sighted" players serve as guides to the "blind" players. "Sighted" players may not touch any puzzle pieces. "Sighted" players can guide their partners by voice and touch, but any touching must be above the elbow; the "sighted" player may not under any

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circumstances touch the “blind” player’s hand or forearm.

3. Any inappropriate touching is considered a violation of the rules and will merit the appropriate level of punishment. The first violation will require that one piece be returned to the piece container, the second violation will require that two pieces are returned to the piece container, and so on.

Round 5

This round will be worth 25 points. This round further examines all forms of communications by eliminating both oral and direct visual communications in the accomplishment of the task.

Rules for Round 5

1. All rules from Round 4 apply.
2. Players who were blindfolded in Round 4 will give their blindfolds to their former guides and exchange roles. The rules for “guiding” remain the same except there can be no oral communications. Everyone must be silent until a team indicates it has completed the puzzle.
3. Any spoken word or inappropriate touching is considered a violation of the rules and will merit the appropriate level of punishment. The first violation will require that one piece be returned to the piece container, the second violation will require that two pieces are returned to the piece container, and so on.

Round 6

This round is worth 100 points. This is the hypercompetitive round. The combination of congestion, mixed pieces, unassigned puzzles, high points, and lack of time to coordinate should result in confusion and frustration leading to competitive interactions between groups. The point level is high enough that the team that wins this round wins the game, so teams that have fallen behind in the point total will have this one last chance to win. After the puzzle pieces have been mixed in a common container, the rules should be read quickly and the game started without giving the teams the opportunity to discuss or coordinate their actions.

Rules for Round 6

1. All puzzle pieces from all the puzzles will be placed in a common container and mixed thoroughly.
2. Teams will not be assigned a specific puzzle. The assignment dilemma is an aspect of this round that the teams will need to resolve.
3. All teams will assemble their puzzles within a single, confined area. The puzzle assembly area should be placed in one small, congested corner of the room with sufficient obstacles in the way to impede easy movement of team members. (At the discretion of the instructor, assembling the puzzles on the ground can add additional difficulty and stress.) The assembly area

must be chosen so that the teams will get in each other’s way and will have the possibility of disrupting another team’s assembly process.

4. All rules from Round 1 apply, except there are no punishments for rule violations.

DEBRIEFING

As Wolfe and Byrne point out, most important part of this game specifically, and experiential learning and general, is the debriefing (1975). In this game, the debriefing is where the majority of the learning takes place. The debriefing takes the recent physical actions experienced by the students and puts them into a theoretical framework. It is absolutely essential that sufficient time be allocated for a thorough debriefing. If there is not sufficient time for a debriefing on the day of the game, the game should be stopped and debriefed and then resumed at a later time.

It is important to emphasize that the purpose of the game was to be able to participate meaningfully in the debriefing, not to earn points or obtain course credit. It is therefore essential to reward all students equally for their participation in the game and debriefing. Player comments can be solicited from students on evaluation instruments such as papers or exams can provide valuable insights into the success of the game and suggest possible future modifications.

The debriefing should be lead by the instructor, but all answers should come from the students. Sample debriefing questions that can be used to help guide the players toward discovering what they learned are presented in Appendix A. This listing is by no means exhaustive and is intended only to start the conversation. The instructor can direct the questions in any direction appropriate for the class.

The importance of the debriefing session cannot be overemphasized. It is the debriefing that turns the game into an educational experience. It provides the structure for understanding actions and their results. All students should be encouraged to contribute to the conversation. The use of a written instrument that allows for individual reflection can also be quite valuable.

USE OF ITS PUZZLING TO TEACH THEORIES AND CONCEPTS FOR A VARIETY OF COURSES

The instrumentality of this game allows it to be used to teach or reinforce a variety of specific learning objectives related to decision making and human behavior. Several examples will help to illustrate how this can be done.

If the instructor wants to illustrate concepts related to resource dependency theory (Pfeffer & Salancik, 1978; Thompson, 1967) or competition (Gibbons, 1992), the game can be used to illustrate behaviors consistent with this theory. For example, the final round in which puzzles are unassigned creates intense competition for puzzle pieces. By considering puzzle pieces as resources during the

debriefing, the instructor can highlight student behaviors during that round that are consistent with resource dependency theory.

If the instructor wants to highlight concepts related to cooperation (Axelrod, 1984; Milgrom & Roberts, 1992), the game can be used to illustrate behaviors consistent with this theory. For example, student behaviors from rounds 4 and 5 used to compensate for the lack of sight and speech can be used to highlight implicit and explicit cooperation.

If the instructor wants to highlight concepts related to organizational incentives (Jensen & Meckling, 1976), the explicit rules of the game and incentives created by omissions can be used to illustrate the effect of incentives on individuals, small groups and large organizations. For example, the effect of the reward structure on group strategy and individual behavior can be discussed in the context of the various rounds of the game. The variety of incentives found in the different rounds helps the students extrapolate how varying incentives systems might influence group performance in other situations.

The variety of different theories that can be addressed by this game highlights its usefulness as an activity oriented template. Almost any theory dealing with the behavior of individuals, groups, and organizations can be illustrated in this game or other properly designed game.

GAME USE THROUGHOUT THE SEMESTER

“It’s Puzzling” provides students with the opportunity to experience some of the group dynamics related to competition and cooperation that exist in real organizations. In the debriefing, they can be shown ways to think about and understand the events and organizational situations that they experienced. This can help them begin to perceive, articulate, and solve organizational problems.

As the students discuss cases, current events, and other organizational situations, they should be able to apply their experiences from “It’s Puzzling”. The game will help remind students that some decisions are made with insufficient time, information, and resources. In this fashion, “It’s Puzzling” can serve as a touchstone throughout the semester for any number of topics. The use of a single class period to play an appropriately designed game can provide benefits for the entire term.

CONCLUSION

It’s Puzzling can be used as a platform for teaching higher order concepts in a way that is memorable and fun. It can be completed in a single class period and requires no prior preparation by student which makes it ideal for introductory classes. It’s Puzzling can also be used to complement more advanced material and topics related to subjects such as team building, competitive dynamics, and game theory. It involves a modest investment in easily obtained children’s games.

While the game is played for points, the instructor lead discussion that follows can be used to pull together insights from each player. The simple dynamics of the game allow for multiple lessons to be learned related to competition, cooperation, and communications.

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APPENDIX A: SAMPLE DEBRIEFING QUESTIONS

1. Was the task difficult? What made the task difficult?
2. What environmental obstacles or threats existed? How might you have altered your environment to better accomplish the task?
3. What obstacles existed in the form of constraints that prevented you from performing the task? How might you have overcome or reduced the effect of those constraints?
4. Were the constraints difficult?
5. What would have happened if you had been asked to do Round 5 first? Did the progression of the rounds prepare you adequately for Round 5? What more would have helped?
6. Were you frustrated, and if so, when? What made you frustrated? Would you recognize the signs of frustration induced by organizational problems if they happened again in the future? How might you have reduced your frustration?
7. Were you angry, and if so, when? What made you angry? Would you recognize the signs of anger induced by organizational problems if they happened again in the future? How might you have reduced your anger?
8. Recognition and coping strategies are useful skills for dealing with anger and frustration; how might this exercise help you in the future?
9. Did you notice cooperation within groups?
10. Did you notice cooperation between groups?
11. What specific cooperative behaviors did you observe?
12. Did you notice competition within groups?
13. Did you notice competition between groups?
14. What specific competitive behaviors did you observe?
15. How was team performance measured?
16. What was the effect of the incentives on your team's perception of the task? Did the increasing points cause you to invest more effort in later rounds? Did early poor performance cause you to lose hope and reduce effort?
17. Did anyone withdraw from the task, either because of group dynamics within your team or between teams? If so, why?
18. What would have happened if two or more groups had finished the task at the same time?
19. How might you have boosted your team's performance? Is there any way that every group could have gotten all the points?
20. How did our culture prepare or bias your performance in this game? If our culture were more communitarian, focused on the needs of society in preference to the needs of the individual, how might your actions and their outcomes have been different? If our culture were more individualistic, focused on the needs of an individual in preference to the needs of society, how might your actions and their outcomes have been different?