Gaming Technique: An Assessment and Training Tool for Individuals with Learning Deficits

(mental retardation, developmental delay, board games)

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In this article the literature on gaming technique is reviewed as applied to life simulation experiences. The gaming technique is the use or the adaptation of existing games or the development of training games. Training games are useful educational tools to teach daily living skills to the mild to moderate mentally retarded population and other individuals with learning deficits. The author discusses the application of games to a variety of training situations in the occupational therapy clinic and summarizes techniques for making an adaptation of or for constructing games. Four games are included: a pegboard game, a friendship or socialization game, a money-calculator game, and a disaster game.

Attitudes toward the mentally retarded population are continually improving; dynamic changes have occurred during the past decade. As Gold said in 1972, it is not difficult to get the retarded person to adapt, but rather, to get
society to adapt, move, and change (1). Society, whether the layman or the health care professional, has changed its understanding and appreciation for the needs of the developmentally disabled individual. The concept of normalization, an innovative approach to the management and training of the mentally retarded population characteristic of changing attitudes toward the disabled, is directed toward returning institutionalized retarded persons to the community; normalization implies making available to these individuals the patterns and conditions characteristic of normal everyday life. The goal of normalization is to provide for the disabled individual life experiences that closely match the daily activities and norms of mainstream society (2). Normalization is not defined by where one lives but rather by the quality of one's life (1).

Training programs for the handicapped, to be effective, must be designed to include experiences appropriate for the individual's level of functioning and must be compatible with his or her life situation (3). Goals of normalization can be effectively met through the motivating process of game involvement. The gaming technique that stresses a playful involvement in simulated life experiences is a useful strategy for occupational therapists. Available or adapted games can meet the challenge of substituting complex life situations or for providing normal life experiences for the disabled or disadvantaged. Game use offers a powerful tool for evaluation and for remedial intervention. This article will explore how and why games have been used as a training tool in business and education and in the health care field so as to legitimize their use in occupational therapy intervention.

**Literature Review**

A review of *The American Journal of Occupational Therapy* from 1970 to the present reveals little or no recent reference to game use for assessment or training or game development to simulate and teach daily living skills. Literature from the early 1950s acknowledged game use in the hospital setting for many purposes. The primary focus of the game in occupational therapy has been to alleviate anxiety and boredom, to divert attention from pain and discomfort, to aid in the restoration of the physically disabled, and to promote general health (4), (5). Occupational therapists with expertise in kinesiology, neurology, and mental disorders have modified games and game equipment for specific treatment needs for 50 years. Games have meant recreation to children and adults. Webster defines recreation as a mode of diversion: **play**. Game is defined as **fun**. diversion, and a contest physically or mentally in accordance with set rules (6). Play, games, and recreation are characteristically pleasurable and spontaneously initiated. Game involvement is play at a higher sequential progression and is extended with externally imposed rules. Recreation further extends playful gaming activities to group or team endeavors. All are voluntary behaviors applied to what people do with each other or what they do dyadically within themselves (7).

Eleanor Clarke Slagle described a complete occupational therapy program as including "supervised physical training and recreations, work, exercise, and play . . . all that goes to make up normal living." (8)

Occupational therapy programs have included games for bilateral exercise, for the wheelchair bound, for children with physical disabilities (9), for individuals with sensory integration problems (10), and for patients suffering psychotic and emotional disturbances (11). Games have been used to develop coordinated rhythmic movement, to encourage communication, to stimulate curiosity, and to spark self-initiative. Skills and habits that support adaptation in daily life are practiced and acquired through play activities and game experiences.

**Skill Development through Games**

To be sufficient or adequate to meet the demands of a situation or a task is to be competent (12). Occupational therapy is concerned with the quality of daily living and in providing opportunities for performance. Recent professional articles explaining the paradigm of occupational behavior emphasize the need to understand the adaptation process as a competency phenomenon (13). Exploratory behavior is a component of the competency phenomenon and is being recognized for its value in promoting effective interaction and learning. It can be generated through the introduction of novelty, complexity, and change; in turn, these elements can be designed into therapeutic game use. Games have been used to teach self-care and grooming habits (14). Piaget suggests that children acquire moral values through game play (15).

**Important new research** is emerg-
ing on the cognitive implication of play (16), on teaching through game simulation, and on interactive behavior through game play (17,18).

Play is the nonthreatening learning arena that provides the foundation for future goal-oriented involvement of gaming. Play has been described by Avedon and Sutton-Smith as pre-adaptive, that is, play prepares the individual to respond in a general manner rather than in a specific way. Play provides the opportunity to combine responses and to experience novelty so that when an adaptive reaction is required the player has more resources at hand to use (7). Reilly describes play as a strategy that Man uses to perceived the unknown. It is a vehicle for social growth and change. Play develops the rational resources to strengthen adaptive behavior (16). Games imply a more systematic, goal-oriented involvement with some opposition with the self for an opponent. Abt defines a game as "an activity among two or more independent decision makers trying to achieve their objectives in some limiting context." (18, p 96) Players need not be opponents but may be cooperative players working toward a common aim.

While play is exploratory, spontaneous, and preadaptive behavior, game involvement is a higher level of play progression. It introduces constraints by the addition of rules or procedures (7), and is an adaptive process leading toward competency behavior.

**Game Usage**

The source of instructional games is recreational games. Military games evolved from table games. Business and industry derived their game use from military science games. Educational games are closely related to military, business, and industrial game techniques. As described previously, health-related programs use recreational games for a variety of therapeutic purposes. Social and behavioral sciences use available games but are adding the new technique of game simulation to their game repertoire. Simulation games are considered an innovation in the educational field because they incorporate *life* experiences into the game process (17).

Business games developed differently than war games did. Business incorporated *educational* objectives and business components into the game experience. American Telegraph and Telephone developed a game to assist first-level personnel in the transition to management. General Electric used a game to train personnel in the skill of master scheduling and loading. Pillsbury used a game to train sales managers. Business games used in this decade are designed for planning, education, or research needs. Other games teach or evaluate the decision-making process of individuals. Some are used for procurement, whereas others are used for employee relations (7).

Games used in the educational process proved to be effective teaching and training devices for students of all ages. Using games as a training medium is motivating and enjoyable, and can represent dramatically real life problems that are being studied or experienced. Players must take the part of realistic roles, must make decisions, must formulate strategies upon which to act, may experiment with alternatives, and are able to get quick feedback on the results of their actions (18). Professional journals and texts for teachers and educators are rich with game information as teaching tools. Several publishing houses provide game equipment for classroom use (7).

Simulation games are being studied and developed to teach problem-solving and decision-making techniques in the area of banking, business management, community response to disaster, and other complex social situations. Systems engineers, sociologists, anthropologists, mathematicians, curriculum specialists, and teachers are a few of the specialists contributing to simulation game technology (7).

**Appropriateness of Game Use for the Developmentally Disabled**

Retarded individuals characteristically lack the opportunity to experiment with roles. They have limited experiences with community living and thus lack social skills. For retarded persons, listening or attending for long periods of time is difficult or impossible. When faced with a worrisome or threatening situation, they may respond with withdrawal or apathy.

At the University Affiliated Program, Children's Hospital of Los Angeles, occupational therapy training programs for retarded adults have included a variety of game activities to teach daily living skills. Game involvement has been found to supply immediate satisfying social experiences for the participants. Games generally require active participation and, consequently, serve to capture player interest and attention. Skills and concepts taught may be repeatedly reviewed and practiced to reinforce learning; this repetition is particularly important for the retarded individuals who need excess exposure and practice to integrate training material. Once engaged within a game, a player is not likely to withdraw. An environment can be
adaptation as "something that is experiences can be tailored into created to encourage participants to assist one another by game adaptations or rule modification. Through role playing in a simulated game situation, players can be introduced to graded problems outside their personal experience. Normalizing experiences can be tailored into game content and designed to the particular level of intelligence of participants. If the game captures life situations and skill tasks that are appropriate for the individual's personal needs, playing will seem important to the participants and will result in increased concentration for longer periods of time.

Game play often draws the shy and withdrawn individual into action. Communication increases when players become interested and absorbed in the game process. Relationships and risk taking are less threatening within the context of the game than in real life. Games make it possible to teach the concepts of time and the skills of adapting to time demands, both particularly difficult for the mentally retarded population.

The role of the therapist when using the gaming technique is one of arbiter, coach, or possible player. This role is more supportive than that of a teacher.

Using Games to Develop Adaptive Behavior

Robert White described human adaptation as "something that is done by living systems in interaction with their environment." (19) He argues that there is a gradation of adaptive strategies ranging from simple ways to deal with small problems to more complex responses for the more complicated problems of life. Examples of complex adaptive strategies might include defensive devices, mastery, and coping responses. He proposes that "adaptation does not mean either a total triumph over the environment or total surrender to it, but rather a striving toward acceptable compromise." (19, p 52) White described three variables needed to behave adaptively. These include: 1. information about the environment, 2. internal organization to permit the individual to organize adaptive behavior, and 3. autonomy to exercise freedom of action or the opportunity to experiment. The simultaneous management of these three variables is required for adaptive behavior. The variables are developed and progressively modified during the course of time. The gaming technique meets the specification of each of these variables by modifying information input; by controlling anxiety, disappointment, or embarrassment; and by providing time and space for the player to experiment with his or her actions. For the developmentally disabled who have a deficit in life experiences and who lack awareness of the community opportunities available, the game process can be designed to simulate these critical experiences.

Securing adequate information at a certain rate of input is "conducive to unconfused, straight-forward action." (19, p 56) Information can be modified within the game design to accommodate the appropriate rate of information to be assimilated and to fit the functioning levels of the participants. The structure of the gameboard may be developmentally designed to present information and challenges ranging from simple to complex and by expanding concepts during an extended training period over weeks or months to meet the individual's or group's learning needs. Information may be repeated in a variety of ways and be expanded and sophisticated as the players' abilities increase.

The game setting provides an arena to expose the handicapped player to momentary disequilibrium. Simulated risk taking adds zest to learning and offers opportunities to try alternatives, to experiment with roles, and to make errors without the unpleasant, prolonged effects of anxiety, grief, or shame associated with real life situations. Such feelings are personal attacks on the individual's internal organization, which, White warns, must be in balance; internal disorganization can seriously hamper adaptive behavior (19).

One dimension of game play is the chance determination of success where skill does not determine game success. Luck games have an important place in game design for the developmentally disabled because they displace the personal focus of success or failure. The disorganizing affects of anxiety may be controlled by minimizing the player's feelings of internal causation through the use of chance. Chance or luck games distribute the opportunities for success and winning with those of losing and experiencing frustration. Protecting the individual's internal organization results in the protection of alertness, curiosity, willingness to try, and autonomy to exercise freedom of action.

Game procedures that incorporate securing information, that maintain satisfactory internal conditions for the player, and that protect some degree of autonomy address the variables needed for adaptive behavior acquisition. Games should be acknowledged as a medium for training the handicapped population, and occupational therapists should report their research, development, and refine-
PEGBOARD GAME

**OBJECTIVES**
- To practice the concepts of spatial judgment.
- To practice quantity judgments.
- To exercise the skill of matching objects by property cognition and pairing.

**PROCEDURE**
- Pegboard with large pegs presented to participants. A red, yellow, blue, and green peg placed in each corner hole.
- Instruction cards stacked beside spinner numbers. Each player must carry out the instructions given per card. If successful, he may then cover the bingo card number matching the spinner number.
- Players who successfully execute correct responses to instruction card may keep peg in pegboard position, 2-4 players may participate. No-winner situations may be preferred where players cooperatively give assistance to participants having difficulty.

**ABILITIES NEEDED**
- The ability to read instruction on cards. Help may be given. Directions may be given in rhesus symbols, which are communicative illustrations.
- Pegboard, varied colored pegs, 20 instruction cards, bingo card with numbers 1-4, spinner or die.

**EXAMPLES OF INSTRUCTION CARDS:**
- Put a peg in the middle of the board.
- Touch the peg farthest from the red peg.
- Put a peg almost next to the green peg.
- Put a peg into a row that has some but not many pegs in it.
- Put a peg into the third space from the blue peg.

FRIENDSHIP GAME

**OBJECTIVES**
- To assess ability to initiate interaction with others.
- To assess ability to collaborate with another person in decision-making situations.
- To practice socialization skills.

**PROCEDURE**
- A board with 24 squares around the perimeter presented to players. 18 squares have pictures depicting leisure time or social activity (pizza parlor, beach, zoo); 6 contain the word FRIENDSHIP. At each corner is a colored house. Players use dice and must solve advantageous moves to place self into a square with another player. Poker chips are earned for appropriate verbal interaction with other players and for decision making with others.
- Each player selects their own house as the starting position for their marker. Players may move backward, forward, or sideways on squares as indicated on the die roll. Goal is to accumulate chips, accomplished by:
  1. Landing on the same space as another player with an attempt at or appropriate verbal interaction
  2. Landing on a FRIENDSHIP space necessitating taking a message card and appropriately acting upon it
  3. Landing on home space when the owner is on it. 4 players are recommended for increased verbal and social interaction. Player with most chips is the winner.

**ABILITIES NEEDED**
- Ability to read card situations. Help may be given. Adequate expressive language for verbal exchange with others and for self-expression.
- Playing board 20 X 32 inches, 12 FRIENDSHIP cards, 4 PARTY POOPER cards, 2 dice, markers or playing pieces, poker chips.

**EXAMPLES OF SQUARE SITUATIONS:**
- Dancing, Mexican restaurant, circus, zoo, bicycling, picnic, bowling, beach, museum

**EXAMPLES OF FRIENDSHIP CARDS:**
- You invite a person to bicycle, but he must pick up a party pooper card.
- Invite everyone to a party at your home. Plan a time that is best for all to come.
- Invite a person to a picnic. Decide who brings salad, chicken, potato chips, and drinks.

**EXAMPLES OF PARTY POOPER CARDS:**
- You have the flu and must stay in bed 3 days.
- You have a dental appointment and unable to go.
- A relative is visiting and you are busy entertaining him.
ment of game techniques and the use of games as part of the therapeu
tic armamentarium.

**Game Construction**

Redly, Gump, and Sutton-Smith identified 30 dimensions of games (20). A few examples of dimensions suggested were body contact, body activity such as passive versus active involvement, manipulative versus vocal expression, time considerations, interdependence of players, and spread of winnership. The presence or absence of these dimensions becomes the determinant for selection and appropriate use for varied participant needs. The developmentally disabled need sensorimotor experiences, practice in communication, opportunities for risk taking, development of imaginative and creative skills, and socialization. The game dimensions that seem particularly applicable when designing or selecting games for training the disabled or disadvantaged include:

- the opportunity to manipulate props or game objects, such as board markers and varied game pieces;
- requirement for some measure of vocal expression (such as barter ing) and verbal interactions, rather than silent participation;
- exercise of skill requirements, which include concentrated thought, creative imagination, eye-hand coordination, and reaction time;
- involvement in competitive actions, such as reaching a goal first or defeating the opponent (this dimension determines the intensity of the competition and what creates the intensity);
- the presence of chance through the use of spinner, dice, or cards;
- time required for game gratification;
- the complexity of games rules that can increase the demands on the understanding and comprehension of the participants can enrich the game experience, and can create unexpected gains or reversals for the player;
- the suspense involved in game play;
- the spread of winnership (one winner, one winner with second and third-place runner-up, all winners except for one loser);
- the existence of challenges that move participants into various relationships to one another (18).

Avedon reviewed the literature to identify structural elements common to all games. By combining the work from mathematicians and behaviorists, he found seven common elements: 1. purpose of the game (the aim, goal, or intent of the game); 2. procedures for action; 3. rules; 4. number of required players; 5. roles of participants; 6. participant interaction patterns; 7. results or pay-off. Other disciplines have added: 8. abilities and skills required for participation; 9. physical setting; and 10. equipment needed (21).

Avedon and Sutton-Smith relate that authors of books and articles of educational games address procedures, rules of the game, and the value of the specific game but rarely speak to the relationship of teaching objectives to the learning experiences (7). These elements are guidelines for a training plan when using the game technique in clinical practice.

**Clinical Application**

The Occupational Therapy Department of the University Affiliated Program at Childrens Hospital of Los Angeles has been particularly interested and active in providing service to adolescents and to adults with developmental disabilities. Approximately 15 adult and 10 adolescent mentally retarded individuals are trained in socialization skills, money management, cooking, grooming, personal hygiene, use of public transportation, and other skills needed for semi-independent or independent living arrangements within the community. Skills are taught through role play, gaming, simulation experiences, and on-site practice.

Four game boards that have proved useful as training tools are described. They are easily modified for individual learning differences; information may be repeated in a variety of ways, life situations may be presented for the player to experiment and select choices of action, and the element of chance provides a distribution of winning and losing. Presentation format includes objectives, procedure, rules, abilities required, and materials needed.

The pegboard game has proved enjoyable and effective in the practice of spatial concepts, quantity judgments, and matching objects through property recognition and pairing. Spinner and bingo games are valuable methods for teaching money concepts and calculator use. Participants can be exposed to many daily life problems in a "chance" and nonthreatening manner through spinner and dice games. A gameboard to teach socialization skills has been useful, flexible for many needs, and effective for periodic practice sessions. The Monopoly board is adaptable and can be used to teach multiplication and division calculator tasks. Board games with removable tokens enable participants to practice emergency situations, money challenges, leisure time use, cooking skills such as measurements, and temporal judgments.

The game technique of adapting...
Figure 3

**GAME**

**OBJECTIVES**
- To exercise money skills; emphasis on making change and understanding varied coin combinations.
- To practice use of calculator in addition, subtraction, multiplication, and, particularly, division.
- To translate monetary problems into decision-making solutions using a calculator for problem solving.

**PROCEDURE**
A Monopoly gameboard with all game parts and pieces. Players provided with equal quantities of money (coins and currency). Participant advances around board landing on 1 of 7 spaces: CHANCE, COMMUNITY CHEST, JAIL, WATER WORKS, ELECTRIC COMPANY, RAILROAD, or real estate. Players landing on COMMUNITY CHEST or CHANCE pull a Monopoly card from that category. Players landing on JAIL, WATER WORKS, ELECTRIC COMPANY or RAILROAD pull card from that specific group and follow task directions. A land on FREE PARKING may collect the cumulative cash collected in center of game-board. All bills, debts, and cash outlay are placed into center “fund.” Winner is first around the board or one winning most money. Winner-loser role may be negotiated by players prior to game play.

**RULES**
If player lands on real estate, must pay monthly rental equal to purchase price indicated. One die rolled to determine number of individuals sharing the living quarters and rent expense. Calculator used to compute this division problem. Exact change required to pay all bills; checks may be written, 2-4 players may play. Players may opt for no-win game involvement.

**ABILITIES NEEDED**
- Ability to read card situations. Help may be given. A workable understanding of coin and dollar values. An elementary knowledge of division and multiplication. Ability to manipulate calculator keys.

**MATERIALS**
- Monopoly gameboard, real and artificial money, dice, game cards, hand calculators, paper-pencils.
- Examples of INSTRUCTION cards:
  - JAIL: Pay 7 times the throw of the die
  - ELECTRIC CO: Your iron cord is frayed. To prevent a fire you must buy a new cord for $.87 plus .06 tax. Figure this sum and pay.
  - RAILROAD: Ticket costs $17.50. You give the clerk $20.00. How much change will he give back?
  - WATER WORKS: Sink pipe is broken and will take 4 hours to replace. Plumber charges $15.00 per hour. What will this repair cost? Pay.

Figure 4

**DISASTER GAME**

**OBJECTIVES**
- To help players learn appropriate behaviors to use during an emergency.
- To provide practice in problem solving everyday living situations in the event of a disaster.

**PROCEDURE**
Players move along squares as indicated by die roll. Squares decorated with question mark figures, blank spaces, tornados, fire, earthquakes, and lightning illustrations. QUESTION MARK spaces require player to pull a PROBLEM card. Disasters require pulling a DISASTER card. Player reads problem to the group and responds with best solution. If this is difficult, player may pick a HELP card, which indicates who within the participating group may provide suggestions to help problem solve. Solutions are discussed for group consensus. PROBLEM cards expose players to situations involving kitchen fires, cooking problems, personal illness, electrical problems, encounters with strangers, other emergencies. DISASTER cards pose problems characteristically found during earthquakes, fire, and accidents.

**RULES**
Players advance along track complying with demands of each square situation. Participant shares ideas for safety and emergency procedures; he or she may elect to pull a HELP card for ideas or support from other players. Winner is first to advance around board. This game more adaptable to the no-win involvement.

**ABILITIES NEEDED**
- Ability to read card situation. Help may be given. Adequate expressive language for verbal exchange with others and for self-expression.

**MATERIALS**
- Gameboard, track insert, die, HELP cards, PROBLEM cards, DISASTER cards, markers.
- Examples of INSTRUCTION cards:
  - HELP: Help from two friends
  - PROBLEM: You pick up a hot pan without using a potholder and burn your hand. What to do? You forgot to turn off stove-back 2 spaces.
  - DISASTER: A match in your trash catches fire. What to do? Watching TV, room starts to sway! What to do?

This game needs supervision to move smoothly, to encourage communication, and to create a supportive atmosphere for sharing ideas.
existing board games or construction of new training games as a therapeutic medium is only one method for teaching normal life experiences to children, adolescents, and adults. It has proved to be a useful strategy to introduce daily living concepts, to review those concepts, and to assess the presence or change of skill acquisition. These experiences are most effective when followed by real life exposures within the home and community. Adults participating in the occupational therapy program mentioned above were those beginning, or soon to begin, apartment living alone or with companions. Concern with money management and safety was emphasized by the patients themselves and by their families. Ineptness in socialization skills was a major deficit expressed from referral agencies. Poor time management and use of leisure time have been identified as key issues for families and caretakers of latency to adult clients with retardation problems. These issues required training and were found relevant material for game use content.

Charting records from the University Affiliated Program reveal documentation of spontaneous patient reactions that helped patients avoid misfortune. One individual automatically recognized a medication overdose and correctly used the telephone to secure immediate help. Another met the crisis of a small kitchen fire. Several individuals ranging in age from 30 to 40 years attempted grocery shopping for the first time and discovered their potential and ability to succeed. These were not assigned tasks for the new shoppers but, rather, the clients’ choice to step beyond the simulated game experience into “normalization.”

Conclusion

Game use has been, and is continuing to be, recognized for its value in evaluation, remediation, and training. Simulation games are a technique to enable the participant to practice roles, to confront life problems in a safe environment, and to experience important concepts repeatedly. With the demand for health care to focus on the total well-being of the individual, rather than an emphasis on disease, the occupational therapist must train the disabled and the disadvantaged with procedures and methods that capture the motivation of these individuals. The game technique is particularly adaptable for the developmentally disabled population. Game play provides many of the variables and the tools necessary to teach adaptive behavior skills.

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