

*The International Journal of Special Education*  
2005, Vol 20, No.2.

## **EDUCATIONAL GAMES: A TECHNIQUE TO ACCELERATE THE ACQUISITION OF READING SKILLS OF CHILDREN WITH LEARNING DISABILITIES**

**Beryl Charlton**  
**Randy Lee Williams**  
and  
**T. F. McLaughlin**  
*Gonzaga University*

*This study evaluated the effects of educational games on the performance of eight elementary school students with learning disabilities. The effects of educational games were evaluated in a multiple baseline design across students. The results indicated that each student improved their performance on reading when educational games were in effect. These differences were also educationally significant. Practical considerations and implications of educational games for adoption in the classroom were discussed.*

Learning to read can be a discouraging experience for children who have difficulty grasping concepts and skills. Such students may need practice in order to master what some children do after one trial. Carnine, Silbert, Kameenui, and Tarver (2004) have postulated the more highly motivated a remedial reader is, the greater the student's success. Unmotivated students will not receive the benefit of increased instructional time, careful teaching, and a well-designed program. These children may become discouraged with difficulties they encounter in their reading experiences. Unless some element of fun is introduced along with instruction such students may become bored and *turned-off*. (Koran & McLaughlin, 1990).

Games may relieve the drudgery of drill (Baker, Herman, & Yeh, 1981; Koran & McLaughlin, 1990) and can introduce an element of fun helping to motivate the learning disabled child. Among those supporting the role of educational games in the learning process has been Harris (1968). Harris noted that many kinds of drill, disguised as games become play rather than distasteful drill and practice. Golick (1973) felt that for those children who need more time and extra help to master a skill there is the challenge to find activities that are novel and interesting. Ginsburg and Opper (1972), that children take an active part in the learning process. Through games that they play, they practice the skills they are in the process of learning. This, Golick says, is an important aspect of play and subsequently of games.

The first part of this study was designed to determine if poor readers' acquisition of consonant digraphs and consonant blends could be accelerated when teacher instruction was combined with educational games. The second part of the study evaluated the effects of educational games on elementary students' acquisition of *vowel variable* skills.

### **Method**

#### *Participants and Setting*

Eight elementary students served as the participants. These children were chosen for the study because each experienced learning and/or social/emotional problems confirmed by the school psychologist's assessments. The subjects were five boys and one girl ranging in age from 7.0 to 10 years of age. A description of each of the students can be seen below.

Participant	Age	Full Scale WISC-R IQ	Disability Designation	Reading Problems	Teacher Reports
Bud	7.0	95	LD/ADHD	Visual Discrimination and poor word recognition	A wide variety of behavior problems are seen in the classroom
Katie	7.0	95	LD	Visual memory word analysis, and word recognition deficits	Shy and withdrawn
Ray	7.3	120	LD	Blending and auditory and visual deficits	Letter reversals with b and d, p and q
Hector	7	89	Ld/Language Delayed	Auditory processing, blending, and visual discrimination deficits	Articulation disorders due to physical problems of an enlarged tongue and too many teeth
Bill	7.10	72	LD	Poor visual memory	Highly motivated
Moe	10.0	94	LD	Severe auditory and visual deficits	Stubborn and non-compliant
Gus	7.0	91	LD	Visual memory deficits	Non-compliant
Joe	10	116	LD	Visual Memory word analysis, and word recognition deficits	Short attention span, high rates of off-task behaviours

Bud, age 7, (I.Q. 95 WISC-R), a grade-two student with a variety of behaviour problems, was diagnosed as ADHD, and had apparent low motivation. Bud's blending and auditory discrimination were good, but his visual discrimination and word recognition were poor.

Katie, age 7, (I.Q. 95 WISC-R), was a shy withdrawn grade-two student. She had a positive attitude toward school but had low motivation. Her blending and auditory discrimination were also good, but visual memory, word analysis, and word recognition were weak.

Ray, age 7, (I.Q. 120 WISC-R), was a pleasant, cooperative grade-two student. Despite high motivation he experienced difficulties in the reading program. He added, omitted, and substituted words and letters within words. He made frequent reversals with the letters, *b*, *d*, *p*, and *q*. Ray blended with difficulty and there was little generalization of reading skills. Both the auditory and visual modalities were weak although the visual channel was stronger.

Hector, age 7, (I.Q. 89 WISC-R), was a Japanese boy for whom English was a second language. He was a highly motivated grade-two boy. He was pleasant and cooperative. Hector's problems were complex. He experienced a serious articulation problem due to under-bite and enlarged tongue, requiring speech therapy. He experienced considerable difficulty with auditory processing. This raised the question that there might be a hearing (acuity) problem caused by periodic swelling of adenoids. Auditory discrimination and blending were weak as was visual discrimination, word analysis and word recognition. Two of his few strengths were visual memory and high motivation.

Bill, age 10, (I.Q. 72, WISC-R), was a grade-three boy with low motivation. He put little effort into his work, was defiant, and related poorly to peers and adults. Bill's auditory discrimination was good, and he blended sounds well. Word analysis was good, but visual memory was poor.

Moe, age 10, (I.Q. 94, WISC-R), a recent arrival from Ireland was a grade-three student. He was a gentle boy in speech and behaviour, although competitive. A recent psychological report stated that Moe was emotionally upset due to his father's death prior to his move to Canada. Testing revealed that Moe experienced severe disabilities in both auditory and visual modalities. Auditory discrimination and sound blending were weak. Visual discrimination, word analysis and word recognition were poor. His strength was in the visual channel.

During the second part of the study two students, Gus and Joe, were additional participants. Gus, age 7, (I.Q. 91 WISC-R), was a grade-two student with low motivation., He vacillated between cheerful cooperation and stubborn resistance. Auditory discrimination and sound blending were good. Visual memory, visual discrimination, and word analysis were not as strong.

Joe, age 10, (I.Q. 116 WISC-R), was a good-humoured grade-three student with a stutter since age four. He was easily distracted, was off-task often, and did not put a consistent effort into his work. His auditory discrimination and sound blending were weak. Visual discrimination, word analysis, and word recognition were not strong, but visual memory was good.

Each day the students in both experiments received one hour of remedial reading instruction in a resource program. The grade-two students attended at one period of the day, while grade-three students attended at a later period.

#### *Classroom and Personnel*

The resource room was bright and cheerful. It was located centrally, facilitating movement to and from the classrooms. There was one Special Education Teacher in charge of the students' program and instruction. During this study three grade-12 Special Project students helped with preparing such materials as charts, flashcards, and educational games. Their presence made it possible for the teacher to give more individual attention to the children participating in the program. The experimenter spent a considerable amount of time training the Special Project students before they could work with the children.

#### *Materials*

The materials used in this study were carefully selected to supplement teacher instruction, to meet the needs of the students and to provide adequate practice and review of the skills (e.g. consonant blends). Speech-to-Print Phonic lessons (Durrell & Murphy, 1972) were supplemented by self-correction practice on the same skills. Sets of Dolch Phonic cards were used along with such teacher-made materials as flash cards and Language Master Programs. Two booklets of Spirit Duplicating Masters (Creative Teacher Press, 1979) provided additional practice in learning the blends and vowels variables.

*The New Open Highways* (Gage, 1974) was designed to meet the needs of children who experienced problems in reading. The accompanying consumable workbooks provided practice in decoding and generalization of skills. To supplement *The New Open Highways* series, Addison Wesley, series, *Big Boy*, was employed. This series is especially developed for slow moving groups of students. Although there is no accompanying workbook for each basal, the manuals provide the extra suggestions for skills development and enrichment needed for learning different children.

#### *Teaching Procedures*

In planning remedial instruction, we strove to give as much remedial instruction as possible, initiating this instruction as soon as possible for the learning disabled students participating in this study. Our aim was to move them quickly through the basal readers, starting with *Rolling Along*, level 11, *More Power*, Level 2<sup>1</sup> *Moving Ahead*, Level 2<sup>2</sup>. (Gage, 1974). The sequence

of the basal series (Addison Wesley, 1974) was; *New Friends for Big Boy*, level 1<sup>2</sup>, *Do Some New Things*, level 2<sup>1</sup> (transition), *For the Birds*, Level 2<sup>1</sup>, *Hi, Ho, Hortense*, 2-2

Across all experimental conditions the students received teacher-instruction alone. A systematic approach to teaching phonic skills (e.g. blends) was implemented with the Speech-to-Print approach (Durrell-Murphy, 1972). These teacher-led lessons help students develop the basic visual-auditory skills necessary for success in reading. This approach was used to teach the students to attach the sound of speech to printed letters. Through this technique the children are made aware of each initial sound (e.g., *ch*) by hearing and seeing a list of words containing those phonemes. The students repeat the words, emphasizing the phonemes. Attention is called to the position and action of the lips, teeth and tongue in making the sounds. An awareness of the phoneme is established, the student listens for it in the new words, indicating his/her recognition by holding up a multiple response card.

A visual-tactile approach was used along with the above technique. This procedure substitutes symbols for letters. The 26 letters of the alphabet were divided into two groups, each group given its own colour--orange and green. The Cuisenaire Rods were used in this study: orange representing consonants and green vowels. The arrangement of these symbols provides formulas for producing words. The consonants and vowels are represented in such a manner to try to make the task of associating sound to symbol easier for the child.

When teaching a word containing a consonant blend (e.g., *brim*), the word is printed on the blackboard by the teacher. The students construct the words, i.e., an orange rod is positioned where each consonant would go and a green rod where each vowel would go. In the case of blends and digraphs two orange rods are placed on top of each other to indicate one sound or a blend of sounds. When teaching a short vowel sound, as in the consonant-vowel-consonant pattern, the teacher selects a list of tri-grams containing a short vowel sound (e.g., *bat*, *pat*, *cap* etc.). The children make the word pattern with the Cuisenaire Rods. With the consonant-vowel-consonant patten, the green rod standing for the vowel lies flat, indicating that it is a short vowel sound (see Appendix E). When making the consonant-vowel-consonant plus and *e* pattern, the middle green rod, standing for the vowel is upright, indicating that the vowel sound is on. The signal or silent *e* lies flat. This visual-tactile technique allows students to act upon the learning situation. Through such visual-tactile-kinesthetic techniques there is greater possibility of transfer to take place.

#### *Testing and Reliability*

Each day the children were tested. They were given a list of 20 partial words to complete. This they did as a response to the teacher's oral cues. A sample of a partial word included in the testing for consonant blends might be, \_\_\_*op*, which might become, *chop* or *blop* according to the teacher-dictated prompt (teacher might say *chop* as the prompt). A different list of partial words was prepared to test the students' mastery of the vowel variable sounds. A sample of a partial word included in this quiz might be, *h*\_\_\_*t*, which might become, *hat*, *hate*, *hart*, etc., according to the teacher-dictated cue. The order of cues employed each day varied. However, the same list of partial words was given each day.

Reliability checks were taken on a weekly basis. All three Special Project students took turns checking the test results, using an answer key. On the day that there was to be a reliability check, the teacher corrected the papers, keeping the results on a separate sheet, so that there were no marks or scores on the actual quiz paper. The two grading results were then compared. There was total agreement during both parts of the study.

*Educational games.* With the initiation of educational games the time structure was reorganized to allow 15 minutes daily of game playing. The game designs and purposes were similar for both parts of the study. There were card and board games whose purposes were to teach, reinforce, and motivate the students. Both teacher-made and commercially prepared games were employed. Card games were made to teach and give further experience with blends, digraphs, and/or vowel variables. Words containing skills being currently taught were printed on two and one-half by

three inch cards. A multiplicity of games were placed with these words and others. When the enthusiasm waned with one card game, a new card game was begun. The game, *Go Fish*, could be changed for *Concentration* or *Old Maid*. Many other card games were also used. Card games were used to help the children learn a skill. They provided the practice learning disabled children need and they provided an element of fun. Often children possess knowledge, but do not use it. Playing card games was employed to create an atmosphere where the child would use the skill in order to win. Card games have a quick pace and seem to keep motivation high. The children must attend to the play or lose out. As each card is played, the skill being taught is more controlled.

*Word puzzles.* This game design stresses visual analysis, blending, and visual memory. Words were printed on two and one-half by three inch cards and these were cut neatly into two parts. The students were to fit the word parts together, correctly. The word list was printed on the back of an envelope, so that the children could check their completed word-puzzle with it. The puzzle was stored in this envelope.

*Word Dominoes.* Words containing such phonic skills and the vowel variables were printed on *domino-shaped* cards. The children matched a specific skill, e.g., short and long vowel sounds. The purpose of the game was to improve blending, word-analysis and the transfer of phonic skills.

*Word Classification.* Words containing examples of blends, digraphs, and/or vowel variable sounds were printed on small cards. The children classified these into their proper categories: short vowels in one group, long in another, and those controlled by an *r* in a third group. Classification games were used to teach students the similarities, and properties that denote one class from another, and to help them perceive the utility of it, e.g., to perceive the utility of a grapheme used in different words, in different situations.

In this study all games were employed to provide the necessary practice of the skills. In addition, the games were to furnish the opportunity, through discussion, and actively acting upon the learning situation to help the child to understand the usefulness of the skills being learned.

#### *Educational Games*

##### *Card Games*

These were played with similar rules designed to teach and reinforce the consonant blends, digraphs, and vowel variable sounds.

##### *Picture Cards and Spinners*

The purpose of these games is to develop sound-symbol relationship of consonant digraphs by associating the sound represented by such digraphs as *ch*, *sh*, *th*, or *wh*, with the written symbol.

The child spins the spinner, names aloud the picture the arrow points to, as *chick*. Finds a card having a picture with the same digraph sound and makes a match. If the player makes a match he or she then discards from the number of cards which have been dealt. The winner is the player who first discards all of his/her cards. (See Appendix M)

##### *Controlled Board Games*

Such games were used to provide the opportunity for practice and strengthening of skills taught in this study. The skills, such as digraphs, were printed directly on the game board. A die was required for the play. Upon throwing the die the student moved the number of spaces indicated by the toss, naming the word or grapheme in the space at which they stopped.

##### *Open Board Games*

Open Board Games had no skills printed on the face of the board. One such board could be used to give further practice in a variety of skills. All that was required for the play was a die and a deck of cards. Each deck was designed to teach and strengthen a specific skill.

**Results**

The number of correct blends and digraphs for the six children across experimental condition produced a grand mean score of 7.0 for the six students at the end of baseline I

After the initiation of educational games there was a substantial increase in correct responses. The mean score for each child exceeded the criterion score of 19 correct. The children reached the mastery criterion between 6 and 14 days after Educational Games were introduced.

With the return to baseline there was a decrease in correct responses. The mean score of the six students was 11 points out of a possible 20. With the reintroduction of the games the score rose quickly to criterion level. For five of the six children the criterion score of 19 was reached within five to eight days. Hector's achievement improved to 18 out of 20.

The number of vowel variable sounds correct for the eight children across experimental conditions are. The mean score of the eight students during baseline I was 10. After initiation of educational games, seven of the eight children reached mastery criterion score of 19 points within 3 to 12 days. Hector did not reach mastery criterion. He did improve from about three problems correct in baseline to about 10 correct with the games.

During follow-up, on all three skills studied, spot-checking was done on a weekly basis. A mean criterion score of 19 was maintained during the five week follow-up period in the first part of the study. During follow-up in the second part of the study a mean criterion score of 19 was maintained over a period of seven out of eight subjects. Hector's mean score during follow-up was 9.0.

**Discussion**

The results indicate that games can accelerate learning when they are combined with teacher-instruction. The students did profit from a carefully planned program, and their progress was more rapid once the games were introduced. Seven of the eight students achieved 95 percent mastery of the reading skills taught.

The study also showed that the educational games need not be expensive. Although commercial games were used in the study, they need not have been. Teacher-made games can be constructed quickly and economically. It seems that those developed by a teacher can relate more closely to the student's need. If a child should require help with a skill, e.g., blends, a game can be made to strengthen the blend sounds. The cost is minimal so that when one game is no longer needed it can be replaced as soon as the need for change is indicated.

This study shows that children learning disabilities can benefit greatly from additional instruction. The opportunity provided through playing games, to experience the needed practice induces overlearning. Hovland (1959), suggested that prior learning is not transferable to new learning tasks until they are first over-learned. Brophy and Evertson (1976), reported that mastery learning levels of 80% to 85% seemed to produce significant learning gains without negative student attitudes toward instruction.

The criterion level of correct answers to be given for the skills dealt with in this study was 95 percent. The results across follow-up conditions, from four to seven weeks, showed that the skills were mastered and maintained by seven out of eight students. Teacher observation indicated that the students' enthusiasm toward their remedial program remained high. The concentrated teaching and regular testing did not produce any negative comments or apparent negative attitudes toward instruction.

While it is important to teach and to teach well so that the skills are mastered, it is equally important to understand the value of what has been taught. We have suggest the value of over-learning for there to be a transfer of learning to new material, it seems that the student may need to see the utility of what he learns or there will be little or no generalization (Conley, Derby, Roberts-Gwinn, Weber, & McLaughlin, T. F. 2004). Several of our studies have stressed the importance of improving the fluency of students in reading as a way to improve the generalization of treatment outcomes over time (Falk, Band, & McLaughlin, 2003; O'Donnell,

Weber, & McLaughlin, 2003. Flavell (1970), indicated the difference between *production deficiency* and *mediation deficiency*. He noted that a child may fail in a task because he has not yet understood the relations that are needed for it; but he may fail despite having attained information because he is still unable to perceive their usefulness. Carnine et al., (2004), suggested that games can serve as supplementary or reinforcing agents in gaining mastery of skills. For children who need help the games can function as a new and effective means of practice for learning. However, the practical value should not detract from the fun of playing the games.

The procedures could be utilized in both the resource room and/or classroom., It might be useful to enlist the aid of volunteers. Carnine et al., (2004), suggested that the more severe the student's deficit, the more careful the instruction must be. They caution, therefore, that the volunteers should not assume too large a responsibility unless they are well-trained and are monitored. In this study, there were tutors who received careful training by the Special Education Teacher. They worked with four students who were in the resource room at the same time as the teacher worked with the children involved in the study. This study was concerned with teaching the learning disabled child so that the child masters and maintains specific skills. One important question unanswered is whether what has been learned will be transferred to a new situation, and to what degree, e.g., will the long vowel sound learned be recognized in new sight vocabulary words. It seems that more research needs to be conducted in area of prior knowledge being transferred to new materials and situations.

The task of teaching reading, and teaching it well, is a complex one. It places a heavy responsibility on the teacher. As Special Education teachers we must not become so involved with teaching skills that we overlook the necessary element of fun; an important ingredient in learning. The educational games can provide this element of fun. The dramatic improvement across all students, involved in this study, shows clearly that when educational games are combined with teacher instruction, learning can be accelerated.

## References

- Brophy, J. & Evertson, C. (1976). *Learning from teaching: A developmental perspective*. Boston: Allyn & Bacon.
- Bucicin, T. & Howenstine, D. (1979). *Spirit duplicating masters. Blends*. Huntington Beach, CA: Creative Teaching Press.
- Carnine, D., Silbert, J., Kameenui, E. J., & Tarver, S. G. (2004). *Direct instruction reading* (4<sup>th</sup> ed). Upper Saddle River, NJ: Pearson.
- Conley, C. M., Derby, K. M., Roberts-Gwinn, M., Weber, K. M., & McLaughlin, T. F. (2004). An analysis of initial and maintenance of sight words following picture matching and copy, cover, and compare teaching methods. *Journal of Applied Behavior Analysis*, 37, 339-350.
- Durrell, D. & Murphy, H. *Teacher's manual for speech-to-print phonics*. New York: Harcourt Brace Javonovich, Inc.
- Falk, M., Band, M., & McLaughlin, T. F. (2003). The effects of reading racetracks and flashcards on sight word vocabulary of three third grade students with a specific learning disability: A further replication and analysis. *International Journal of Special Education*, 18(2), 51-57.
- Flavell, J. (1970). *Developmental studies of mediated memory*. In H. W. Reese & L. P. Lipsit (Eds.), *Advances in child development and behaviour*, Vol 5 (pp.217-247) New York: Academic Press.
- Gibson, E., & Levin, H. (1970). *The psychology of reading* (3rd ed.) Cambridge, MA: MIT Press. .
- Ginsburg, H., & Opper, S. (1971). *Piaget's theory of intellectual development*. Englewood Cliffs, NJ: Prentice-Hall.
- Golick, M. (1973). *Deal me in! The use of playing cards in teaching and learning*. New York: Jeffrey Norton Publishers.
- Harris, A. (1968). Research on some aspect of comprehension. Rate of flexibility and study skills. *Journal of Reading*, 25, 123-145.
- O'Donnell, P., Weber, K. P., & McLaughlin, T. F. (2003). Improving correct and error rate and reading comprehension using key words and previewing: A case report with a language minority student. *Education and Treatment of Children*, 26, 237-254.
- Open Highways Reading Series. (1974). Glenview, IL: Scott Foresman and Co: Author.
- Platt, P. (12974). *Big Boy Reading Series*. Menlo Park, CA: Addison-Wesley Publishing Company. .
- Van Derford, J. (1979). *Duplicating masters: Vowel sounds*. Huntington Beach, CA: Creative Press.