

The evaluation of an intervention programme for reception learners who experience barriers to learning and development

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It is believed that learners who experience barriers to learning and development are at risk for formal education and that stimulation can offset these barriers, ensuring that learners are able to actualise their potential. An intervention programme was designed with the aim of improving abilities in learners who had not yet attained the learning outcomes in the areas of fine-motor and/or language development. Although many research studies support educational intervention, to date insufficient attention has been paid to researching programmes of this kind. This programme of intervention was effective in improving the Eye and Hand Co-ordination and Personal-Social subscales of the Griffiths Scales and the Draw-a-Person test scores of all the learners who experienced barriers in their fine-motor and/or language development. In male learners, improved scores on the Eye and Hand Co-ordination and Hearing and Speech subscales of the Griffiths Scales and the Draw-a-Person test were shown. The female learners improved on the Eye and Hand Co-ordination subscale of the Griffiths Scales and the Draw-a-Person test.

Keywords: *development; intervention; learning; reception learners*

Introduction

Orientation

Many learners are at a disadvantage when they enter school because they have not had the chance to develop the skills, values and attitudes expected of learners in the first grade. Until preschool education is viewed as a priority, learners who experience barriers to their language and/or motor development, including learners from disadvantaged backgrounds, will not receive the attention they deserve. These children are often retained, placed in special education, drop out of high school, or lose confidence, all unnecessarily (Weikart, 1989). The importance of early childhood development has been re-iterated in the White Paper on Education and Training (Department of Education, 1995), in the reports of the National Commission on Special Needs in Education and Training and the National Committee on Education Support Services (Department of Education, 1997), and in the Early Childhood Development Policy Regulation 5807 (Department of Education, 2001).

Arango and Nimnicht (1987) are of the opinion that the manner in which children's needs are met should not be determined by the social-political systems and available resources, but by children's needs alone. Donald, Lazarus and Lolwana (2002) report that the combined effects of malnutrition, poverty, and diseases such as Aids, have created a much higher proportion of learners who experience barriers to learning and development in South Africa than in more advantaged countries.

Golden years are being lost and the chances of recovery reduced without the availability of appropriate intervention. A rationale for early intervention for young children at risk lies in the fact that initial patterns of learning and behaviour, which influence all later development, are established during the early years. Research has shown certain critical periods when the child is more susceptible and responsive to early learning experiences (Guralnick, 1998). Ultimately, this adds up to fewer demands on the educational system, and the community. Further motivation for special assistance is that the state benefits in the long-term when early intervention ameliorates the problems of at-risk learners (McCormick & Hickson, 1996).

Grafman and Salazar (1995) maintain that support for intervention emerges from the field of neuropsychology. Studies have shown that compensatory strategies acquired during stimulation may lead to a different neural network becoming responsible for a task. Although this network may not be the most effective, it may allow for improvement in functional abilities. Relocalisation of function occurs more successfully in children than adults. This plasticity enables the development of compensatory effects (Temple, 1997).

Locally, the following researchers have shown that their early intervention programmes delivered significant results. Grobler (1993) qualitatively evaluated a home-based, parent-orientated preschool programme. Parents expressed positive opinions regarding the programme. Some programmes specifically aimed at addressing development have shown positive results. Kay (1979) confirmed the efficacy of a motor programme on the scholastic progress of primary school learners with special needs. Houston-McMillan (1988) showed a gain in Griffith Scales scores in a group of mentally challenged learners after an intensive programme of stimulation. Cloete and Kok's (1988) varied programme of stimulation produced positive results in visual-motor perceptual ability in a group of Grade 1 learners with special educational needs. Herbst (1989) found that environmentally disadvantaged learners who were stimulated improved their levels of ability.

Positive results were obtained by Behr (1997) for a programme in which parents and teachers were trained in physiotherapy activities aimed at improving the functional abilities of the children. Briedenhann (1998) reported that five out of 11 children showed an improvement in gross-motor skills after an intervention programme. Although positive findings were reported in the above studies, none of the programmes was specifically designed to improve the abilities of learners who experience barriers to learning and development in the areas of language and/or fine-motor co-ordination. As Donald, Lazarus and Lolwana (2002) report, many learners are at risk for Grade 1. It was therefore decided to develop a stimulation programme to assess whether such a programme could play a role in improving the abilities of learners who experienced barriers to learning and development in the areas of language and/or fine-motor co-ordination.

Given the above motivation and drawing on knowledge of child development and the foundation phase, an intervention programme was designed

with a view to improving the ability levels in learners who experienced barriers to learning and development in the areas of language and/or fine-motor co-ordination.

Research question

The research question that followed from the above was:

Will an intervention programme which encompasses the above foci be successful in enhancing the abilities of learners of five to six years of age who experience barriers to learning and development in the areas of language and/or fine-motor co-ordination?

Goals of the research

The study had four specific aims. The first was to test whether an intervention programme could effect an improvement in the abilities in a group of reception learners who experienced barriers to learning and development in the areas of language and/or fine-motor co-ordination. The second and third specific aims were to examine the effect of the intervention on male and female learners separately, who experienced barriers to learning and development. The fourth aim was to evaluate the programme of intervention from both Payne's (1994) and the Joint Committee on Standards for Educational Evaluation (Sanders, 1994) programme evaluation models.

Method

The methodology of the study was divided into three phases. After the initial assessment in which the learners who experienced barriers to learning and development were identified in phase 1, the Pretest-Posttest Control Group design was employed in the second phase. Phase 3 involved an evaluation of the programme.

Research design

The Pretest-Posttest Control Group design (Kazdin, 1980) was chosen to evaluate the effect of the intervention programme on learners who experienced barriers to learning and development.

Participants

Purposive sampling, in which a specific sample is sought, was used to obtain the sample of learners who were at risk for learning. Random allocation could therefore not be used. Two hundred and twenty-five learners were assessed at four different preschools to yield the sample. The four schools were selected on the grounds that there were at least 50 learners at each preschool. The learners were all aged between five and six years of age.

The sample was composed of the 43 learners achieving scores below the 50th percentile at two of the four schools. The two schools were homogeneous in many respects. Socio-economic levels were regarded as similar at the two schools. The nursery schools were run independently of the primary schools

at which many of the learners continued their formal schooling. The teachers at the two schools were qualified. The teacher to child ratio was the same at the two schools (one teacher to 25 learners). Schools were referred to as Groups 1 and 2 to maintain confidentiality and anonymity of the participants. The other two schools were regarded as less suitable for participation in the project.

Learners in Group 1 formed the experimental group who received the intervention programme and learners in Group 2 formed the control group who received the intervention programme after completion of the experiment. The allocation of the groups to experimental versus control groups was done randomly. Group 1 consisted of 21 learners and Group 2 of 22. There were 21 learners in Group 1 as one learner had left the school in the third week of the term.

The significance of characteristics of the sample lay in the influence of the characteristic on the study. Gender frequencies were disparate in the two schools. The female to male frequencies were: Group 1, 6:15, and Group 2, 8:14. Overall, the gender ratio was 32.6 % female to 67.4 % male. There were English second language learners at both schools. There were four English second language learners in both groups. In Group 1 there were two learners who spoke Tswana and two learners who spoke Xhosa. In Group 2 there were two learners who spoke Xhosa, one who spoke Venda and one learner who spoke Afrikaans. In terms of cultural affiliation in Group 1 there were five learners of Indian descent and in Group 2, there were four learners of Indian descent. The majority (85%) of the learners at both schools had attended nursery school previously.

Selection instrument

In the first phase of the research all learners at the four preschools were assessed using Sonnekus and Le Roux's (1995) Group Test for the Evaluation of School Readiness for five and a half year old Preschoolers (Group Test for the Evaluation of School Readiness). Tests Five (Language Acquisition) and Seven (Fine-Motor) were chosen to identify learners who experienced barriers to learning and development in the areas of language and fine-motor skills. This instrument was selected as it was designed to obtain a reliable estimation of a learner's ability. It had been standardised in South Africa and it had adequate reliability.

Measuring instruments

The Revised Griffiths Extended Scales of Mental Development

The Griffiths Extended Scales of Mental Development (Griffiths, 1970) were revised and standardised for South African children, a project undertaken by the University of Port Elizabeth (Prof. D. Luiz, pers. comm., 2001). The Revised Griffiths Extended Scales of Development (Griffiths Scales) were used as a measuring instrument during the pre- and post-testing (Luiz *et al.*, 2000b).

The Revised Griffiths Scales consisted of the following six subscales which

constituted the General Quotient (GQ) and were equal in difficulty at each age level:

- The Locomotor Scale (A) evaluated gross-motor co-ordination.
- The Personal-Social Scale (B) assessed personal and social development.
- The Hearing and Speech Scale (C) assessed the child's ability to understand and use language.
- The Eye and Hand Co-ordination Scale (D) checked visual-motor co-ordination.
- The Performance Scale (E) examined non-verbal reasoning, skill in manipulation and speed of work.
- The Practical Reasoning Scale (F) evaluated the numerical development and solution of practical problems of children (Luiz *et al.*, 2000a).

All learners were assessed across all the subscales. The Global Quotient was not required in this study.

Draw-a-Person test (Harris, 1963)

The purpose of the test was to measure intellectual maturity, which Harris (1963) defines as the ability to form concepts of an abstract character. The abilities involved in forming these concepts are perception (discrimination of likenesses and differences), abstraction (classification of objects) and generalisation (assigning newly experienced objects to the correct class). The evaluation of the child's drawing of the human figure served as a way of measuring the complexity of his/her concept formation ability. The human figure was used because it is the most familiar and meaningful figure for the child (Sattler, 1982).

Programme of intervention

The programme of intervention included vocabulary and language, eye and hand co-ordination, visual and auditory perceptual training, numerical and alphabetical stimulation, and reasoning skills. It was designed for implementation over 20 sessions, of an hour each. The programme was completed in a school term, three sessions per week for six weeks and two in the seventh week.

Procedure

After all learners at the four schools had been assessed, two schools were selected and allocated to the two groups of the Pretest-Posttest Control Group design according to random selection performed by Statcon, Department of Statistics, Rand Afrikaans University. Pre-testing was commenced as soon as the letters of consent were returned. In order for the programme at the treatment school and post-testing at the two schools to be completed by the end of the first term, a registered psychometrist trained in the use of the Griffiths Scales was employed to assist with pre- and post-testing.

Hypotheses

The following composite hypotheses were tested in this study:

- *Composite hypothesis 1:* There are no statistically significant differences between Group 1 and Group 2 regarding the post- minus pre-test scores of the Griffiths Scales subscales and the Draw-a-Person test.
- *Composite hypothesis 2:* There are no statistically significant differences between the males in Group 1 and Group 2 regarding the post- minus pre-test scores of the Griffiths Scales subscales and the Draw-a-Person test.
- *Composite hypothesis 3:* There are no statistically significant differences between the females in Group 1 and Group 2 regarding the post- minus pre-test scores of the Griffiths Scales subscales and the Draw-a-Person test.

Statistical analysis

The Pretest-Posttest Control Group design was used to examine the effect of a single independent variable, in this case the intervention programme, across variables.

The Mann-Whitney *U* test was used to test the significance of the differences between the post- minus pre-test central tendencies of Groups 1 and 2. This test is a non-parametric test, suitable for use when the sample is small (less than 30). The Mann-Whitney statistic, *U*, was obtained by counting the number of times an observation from the group within the smaller sample size preceded an observation from the larger group (SPSS, 1999).

The statistical package used was SPSS (SPSS, 1999).

Results

Composite hypothesis 1 was a comparison of the difference scores between the post- minus pre-test scores on the Griffiths Scales and Draw-a-Person test in the learners. The results of the Mann-Whitney *U* test for subhypotheses 1.1 to 1.7 are presented in Table 1, along with the *z* score and significance level. Table 1 shows that,

- there were significant differences between the experimental and control groups on the Locomotor subscale for learners ($p = 0.026$), but these were in the wrong direction;
- there were significant differences at the 0.10 level between the experimental and control groups on the Personal-Social subscale ($p = 0.064$) for learners;
- there were no significant differences between the experimental and control groups on the Speech and Hearing subscale for learners;
- there were significant differences between the experimental and control groups at the 0.01 level on the Eye and Hand Co-ordination subscale ($p = 0.003$) for learners;
- there were no significant differences between the experimental and control groups on the Performance subscale for learners;

- there were no significant differences between the experimental and control groups on the the Practical Reasoning subscale; and
- there were significant differences at the 0.01 level between the experimental and control groups on the Draw-a-Person test ($p = 0.005$) for learners.

Null hypotheses were therefore accepted for subhypotheses 1.3, 1.5, and 1.6. The null hypotheses for subhypotheses 1.1, 1.2, 1.4, and 1.7 were rejected as differences were apparent.

Table 1 Significance of difference between Group 1 and Group 2 regarding scores on post-minus pre-tests

Variable	Group	N	\bar{x}	SD	Mean rank	Sum of ranks	Mann-Whitney Z	p
Griffiths Locomotor Subscale	1	21	4.00	9.61	17.64	370.50	139.50	-2.23
	2	22	11.45	9.71	26.16	575.50		
Griffiths Personal-Social Subscale	1	21	4.19	9.62	25.62	538.00	155.00	-1.85
	2	22	-2.36	12.48	18.55	408.00		
Griffiths Speech and Hearing Subscale	1	21	12.67	11.96	25.14	528.00	165.00	-1.61
	2	22	7.14	10.56	19.00	418.00		
Griffiths Eye-Hand Co-ordination Subscale	1	21	11.71	9.89	25.74	582.50	110.50	-2.94
	2	22	2.14	10.95	16.52	363.50		
Griffiths Performance Subscale	1	21	6.00	10.29	20.00	420.00	189.00	-1.02
	2	22	8.81	15.89	23.91	526.00		
Griffiths Practical Reasoning Subscale	1	21	5.71	7.71	22.88	480.50	212.50	-0.45
	2	22	8.04	12.32	21.16	465.50		
Draw-a-person	1	21	7.48	5.38	27.52	578.00	115.00	-2.84
	2	22	7.00	8.12	16.73	368.00		

* significant at 0.10 level; ** significant at 0.05 level; *** significant at 0.01 level

Composite hypothesis 2 was a comparison of the difference scores between the post- minus pre-test scores of the Griffiths Scales and Draw-a-Person test in male learners. The results of the Mann-Whitney U test for subhypotheses 2.1 to 2.7 are presented in Table 2, along with the z score and level of significance. Table 2 shows that,

- there were no significant differences between the experimental and control groups on the Locomotor subscale for male learners;
- there were no significant differences between the experimental and control groups on the Personal-Social subscale for male learners;

Table 2 Significance of difference between Group 1 and Group 2 regarding scores on post-minus pre-tests for male learners

Variable	Group	N	\bar{x}	SD	Mean rank	Sum of ranks	Mann-Whitney	Z	p
Griffiths Locomotor Subscale	1	15	3.80	10.33	13.07	196.00	76.00	-1.27	0.205
	2	14	10.40	11.13	17.07	239.00			
Griffiths Personal-Social Subscale	1	15	3.00	10.68	17.30	259.50	70.50	-1.51	0.131
	2	14	-5.36	11.60	12.54	175.50			
Griffiths Speech and Hearing Subscale	1	15	14.40	13.09	18.03	270.50	59.50	-1.99	0.047**
	2	14	6.36	9.88	11.75	164.50			
Griffiths Eye-Hand Co-ordination Subscale	1	15	9.80	9.99	18.27	274.00	56.00	-2.15	0.032**
	2	14	1.64	13.33	11.50	161.00			
Griffiths Performance Subscale	1	15	6.47	10.84	14.53	218.00	98.00	-0.31	0.760
	2	14	6.71	18.08	15.50	217.00			
Griffiths Practical Reasoning Subscale	1	15	4.93	7.62	16.23	243.50	86.50	-0.81	0.418
	2	14	8.29	13.80	13.68	191.50			
Draw-a-person	1	15	7.20	5.91	18.07	271.00	59.00	-2.02	0.044**
	2	14	6.00	9.32	11.71	164.00			

** significant at 0.05 level

- there were significant differences at the 0.05 level between the experimental and control groups on the Speech and Hearing subscale ($p = 0.047$) for male learners;
- there were significant differences between the experimental and control groups at the 0.05 level on the Eye and Hand Co-ordination subscale ($p = 0.032$) for male learners;
- there were no significant differences between the experimental and control groups on the Performance subscale for male learners;
- there were no significant differences between the experimental and control groups on the Practical Reasoning subscale for male learners; and
- there were significant differences at the 0.05 level between the experimental and control groups on the Draw-a-Person test ($p = 0.044$) for male learners.

Null hypotheses were therefore accepted for subhypotheses 2.1, 2.2, 2.5, and 2.6. The null hypotheses for subhypotheses 2.3, 2.4, and 2.7 were rejected as differences were apparent.

Composite hypothesis 3 was a comparison of the difference scores between the post- minus pre-test scores on the Griffiths Scales and Draw-a-Person test in female learners. The results of the Mann-Whitney U test for subhypotheses 3.1 to 3.7 are presented in Table 3, along with the z score and level of significance. Table 3 shows that,

Table 3 Significance of difference between Group 1 and Group 2 regarding scores on post-minus pre-tests for female learners

Variable	Group	N	\bar{x}	SD	Mean rank	Sum of ranks	Mann-Whitney	Z	p
Griffiths Locomotor Subscale	1	6	4.50	8.36	5.00	30.00	9.00	-1.94	0.052*
	2	8	13.75	6.58	9.38	75.00			
Griffiths Personal-Social Subscale	1	6	7.17	5.98	8.83	53.00	16.00	-1.04	0.300
	2	8	2.88	12.97	6.50	52.00			
Griffiths Speech and Hearing Subscale	1	6	8.33	7.79	7.67	46.00	23.00	-0.13	0.897
	2	8	8.50	12.25	7.38	59.00			
Griffiths Eye-Hand Co-ordination Subscale	1	6	16.50	8.55	10.92	65.50	3.50	-2.66	0.008*
	2	8	3.00	5.32	4.94	39.50			
Griffiths Performance Subscale	1	6	4.83	9.60	5.92	35.50	14.50	-1.23	0.219
	2	8	12.50	11.24	8.69	69.50			
Griffiths Practical Reasoning Subscale	1	6	7.67	8.31	7.00	42.00	21.00	-0.40	0.696
	2	8	7.63	10.08	7.88	63.00			
Draw-a-person	1	6	8.17	4.17	10.33	62.00	7.00	-2.21	0.027**
	2	8	8.75	5.90	5.38	43.00			

* significant at 0.10 level; ** significant at 0.05 level

- there were significant differences between the experimental and control groups on the Locomotor subscale at the 0.10 level ($p = 0.052$) but these were in the wrong direction;
- there were no significant differences between the experimental and control groups on the Personal-Social subscale;
- there were no significant differences between the experimental and control groups on the Speech and Hearing subscale;
- there were significant differences between the experimental and control groups at the 0.01 level on the Eye and Hand Co-ordination subscale ($p = 0.008$);
- there were no significant differences between the experimental and control groups on the Performance subscale;
- there were no significant differences between the experimental and control groups on the Practical Reasoning subscale; and
- there were significant differences between the experimental and control groups on the Draw-a-Person test at the 0.01 level ($p = 0.027$).

Null hypotheses were therefore accepted for subhypotheses 3.2, 3.3, 3.5, and 3.6. The null hypotheses for subhypotheses 3.1, 3.4, and 3.7 were rejected as differences were apparent.

Discussion

Fuchs *et al.* (2002) make the point that many interventions are tested on populations who do not experience barriers to learning and development and that learners who experience barriers are omitted from the studies. In this study we researched the programme on learners with special needs.

Results showed that the intervention programme was consistently effective in improving the Eye-Hand Co-ordination subscale of the Griffiths Scales and the Draw-a-Person test scores of all the learners who experienced barriers to learning and development.

In this study we demonstrated the effectiveness of an intervention programme in improving the visual-motor co-ordination skills and intellectual maturity (Goodenough, 1926; Harris, 1963; Richter, Griessel & Wortley, 1989) in a group of reception learners who experienced barriers to learning and development. According to Grové (1984) visual-motor co-ordination is important in the attainment of the learning outcomes and assessment standards for Grade 1.

Remediation within a group was demonstrated successfully in this intervention study. This was cost-effective in terms of resources and time. Group intervention is an Outcomes Based Education (OBE) approach and enables more learners to receive the help they need especially as there are so many learners who enter formal education at risk (Luiz, 1999).

The Draw-a-Person test proved consistently sensitive in showing significant differences in scores for the combined group of learners, and for the male and female learners. According to Goodenough (1926), Harris (1963) and Richter, Griessel and Wortley (1989), the Draw-a-Person reveals the progression in intellectual development toward greater conceptual complexity and maturity. The intervention programme therefore contributed to the intellectual maturity of the learners. That a programme is able to enhance cognitive ability has been demonstrated in many other international and local studies, for example, the Cognitive Curriculum for Young Children (Haywood, Brooks & Burns, 1991) and in Herbst's (1989) study.

A rationale for early intervention is that initial patterns of learning and behaviour, which influence later development, are established during the early years. Early intervention programmes have been shown to be more effective in helping a child who experiences barriers to learning and development rather than later remedial assistance (Guralnick, 1998).

The results gained as a result of the intervention programme confirmed the effectiveness of an instructivist perspective in child development. The mediation provided in an instructivist programme is an endorsement of Vygotsky's (1978) theory of cognitive development which proposes that learning is socially mediated.

Contemporary theories of development emphasise the dynamic interaction of the child with the environment (Bronfenbrenner, 1979) as opposed to the child who matures passively (Gardner, 1982). The bi-directional interaction of the intervention with the children mirrors Bronfenbrenner's (1979) theory.

The valuable role parents can play in the development of their children

has been documented (Clarke & Clarke, 2003). Pelletier and Brent (2002) add that learning is a developmental task of adaptation for both the child and the parents.

The intervention programme was also successful in improving the personal-social abilities in the combined male and female group. These skills are deemed important for the successful adaptation to formal schooling (Meisels, 1999).

The biological (Gardner, 1982) and sociological (Beckett, 2002) perspectives in gender development play a fundamental role in the establishment of gender identity in the young child. With regard to the male learners, positive results were demonstrated on the Hearing and Speech and Eye and Hand Co-ordination subscales of the Griffiths Scales and the Draw-a-Person test. With regard to the female learners, the intervention programme improved the scores on the Eye and Hand Co-ordination subscale of the Griffiths Scales and the Draw-a-Person test. The gender differences obtained confirmed that differences existed between the genders at this stage of development.

It could be concluded that male learners benefited more from the intervention than female learners. A possible reason for this is that more boys than girls are identified with special educational needs (Kolb & Whishaw, 2003) which accounts for a lower baseline enabling better improvement than a higher baseline. This can be attributed to differences in brain physiology (Hyde & McKinley, 1997). Males are reported to have greater spatial and mathematics ability and females greater verbal ability (Kolb & Whishaw, 2003). Brant and Holt (1986) have noted that language development in girls is superior to that of boys. These facts may account for the males' improvement on the Speech and Hearing subscale as opposed to the girls who already had better developed language ability. If this programme of intervention decreased the impact of barriers to learning and development of boys, it could be regarded as a valuable and timeous tool in preventing male learners from being at risk for education (Guralnick, 1998), especially as more boys are identified as having special needs than girls (Kolb & Whishaw, 2003).

Negative results were obtained on the Locomotor subscale for the combined group and for female learners, separately. This subscale measures gross-motor co-ordination. The programme did not address gross-motor, but fine-motor co-ordination.

Programme evaluation

The study was finally evaluated using Payne's (1994) model of programme evaluation and the Program Evaluation Standards (Sanders, 1994). Regarding Payne's (1994) model of programme evaluation, which involved an evaluation of the research design, data collection, data analysis, results and cost effectiveness, the study could be judged positively. Positive affirmation for the study was further obtained in applying the Program Evaluation Standards (Sanders, 1994) of Utility, Feasibility, Propriety and Accuracy.

Educational evaluation differs from pure research or the evaluation of learning in a number of ways. The objectives involve a greater range of pheno-

mena and are oriented primarily towards process and behaviour rather than subject matter. The complexity of outcomes that stretch across the cognitive and psychological divide increase the factors that need to be analysed in educational research. Individual learners need to be monitored as well as the sample. The fact, that the context of education is an uncontrolled setting where unpredictable variables may be playing a role and their influences need to be considered, leads one to consider the limitations of the study (Payne, 1994).

Limitations

This group programme could not address all individual needs. Non-controllable variables may have influenced findings. This study did not investigate social and emotional outcomes. Research with children poses difficulties due to their immaturity, limited language and attention. Cultural differences pose further challenges for assessment.

Although these limitations influenced this study, Lichtenstein and Ireton (1991) still endorse the value of early identification and intervention in assisting at risk learners.

Recommendations

As recommended by Louw (2000), a study of programme theory and programme evaluation and use of a pilot study is suggested before embarking on a study involving the evaluation of an intervention programme (Murray & Lawrence, 2000).

Long-term research needs to be carried out into the consequences for learners experiencing barriers to learning and development who do, or do not, receive appropriate intervention. The concept of delayed cognitive increments after termination of intervention (Clarke & Clarke, 2003) may shed new light on so-called non-responders (Fuchs *et al.*, 2002).

Long-term follow-up of participants with and without continued intervention could be included in a study. This would confirm earlier results or expose reasons why gains are not sustained.

Possible samples could include, for example, younger children, learners of different cultural groups, learners with supportive parents and learners diagnosed with attention-deficit disorder. Different groups of learners may respond differently to intervention.

In this particular intervention, the duration of the programme could have been extended to maximize its possible positive effects. An intervention programme should be implemented in the last term. The first part of the day should be the time to introduce new learning and the sample groups should be as homogeneous as possible.

A Solomon Three or Four Group design could be employed. A qualitative design could be used to examine other variables such as personality aspects of the learners and success of the programme. A phenomenological study on how learners respond to an intervention could be undertaken.

The positive outcomes of this study were:

- All the learners who experienced barriers to learning and development who received the intervention programme showed a significant improvement on the Personal-Social and Eye-Hand Co-ordination subscales of the Griffiths Scales and the Draw-a-Person test. Personal-social development, visual-motor co-ordination and emotional and intellectual maturity are important for the attainment of learning outcomes and assessment standards in Grade 1.
- This is an important plus for intervention research and confirms its value in the domain of preschool education.
- Although this instructivist programme proved successful in improving the abilities of learners who experienced barriers to learning and development, the constructivist perspective in which the influence of an ecological or systems approach on the dynamic developing child was also endorsed.
- This study proved that remediation in a group was successful. It was innovative and cost-effective in terms of manpower and time. It enabled all learners who experienced barriers to learning and development to receive help. In a country with limited resources it could provide preventative treatment before a learner is identified with special needs.
- This study endorsed the value of early intervention programmes which have been shown more successful in helping a learner than later remedial assistance (McCormick & Hickson, 1996).
- The biological, sociological and ecological perspectives with regard to gender development was upheld and supported by the results obtained in the study. The genders responded differently to the intervention programme.
- The Griffiths Scales assessment reports helped to identify learners with special needs whom teachers and parents would help prepare better for formal education.
- The intervention programme had a positive effect on the learners as they enjoyed the activities. The intervention prepared the children for formal education as they learned to work with a different teacher and complete formal educational tasks independently.

Conclusion

In the light of the large numbers of South African learners who are at risk for Grade 1 it is recommended that the educational authorities address the issue of learners receiving little or no stimulation by mostly unqualified staff. It is recommended that all learners receive a year of quality reception education by qualified teachers.

Learners who experience barriers to learning and development require a longer programme and appropriate intervention. Resources, for example, psychologists (especially educational), occupational and speech therapists, and physiotherapists, need to be made available to the wider community.

Finally, preschool programmes benefit all learners in cognitive and non-cognitive ways. Flowing from this are cost benefits to society from an econo-

mic, psychological and social perspective. This study endorsed the value of the intervention programme in improving the abilities of learners who experienced barriers to learning and development.

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