ACCOUNTING ENRICHMENT PROGRAM FOR GIFTED HIGH SCHOOL PUPILS USING SELF-REGULATED LEARNING STRATEGIES

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Abstract: Recent research indicates that many teachers are not appropriately qualified to teach gifted pupils in the mainstream of high school education. Moreover, with the current global economic challenges, the cost of training teachers specifically to cater for gifted pupils in high schools can be astronomical. Researchers working with gifted populations concede that limited studies have been conducted thus far to examine gifted students' expertise in using self –regulated learning (SRL) strategies to assume ownership of their learning. An experiment was therefore conducted in South Africa with grade eleven pupils who were specifically gifted in Accounting. The main purpose of this experiment was to investigate whether gifted high school pupils had the ability to master subject matter of an advanced level on their own by using SRL strategies, to address the cost issues of providing teachers for them. In order to conduct this experiment, an enrichment program referred to as the Accounting Enrichment Program (AEP) in this study, was therefore developed. Findings of the empirical study strongly suggest that given the opportunity, gifted high school pupils in the mainstream of education can study an advanced level curriculum in Accounting by using SRL strategies. This significant finding connotes that SRL as an instructional strategy can address teacher deficits and consequently reduce the costs of providing specifically trained teachers for gifted pupils in the mainstream of high school education. This implies that SRL can be an important inclusion in the schools' curriculum reform measures to develop our future business leaders.

Keywords - Accounting Enrichment Program; Gifted High School Pupils; Self-Regulated Learning Strategies

I. INTRODUCTION

Self-regulated learning (SRL) is emerging as an important construct in education and is being supported by a growing body of information about the processes that self-regulated pupils use to acquire new knowledge (Boekaerts & Niemivirta, 2000; Randi & Corno, 2000; Pintrich, 2000; Zimmerman, 2000; Boekaerts, 1999). Current research has expanded to include a multidimensional construct of giftedness that incorporates several key processes of SRL (Reis & Renzulli, 2009; Sternberg & Davidson, 2005). To be self-regulated, gifted pupils in high schools should have the opportunity to be metacognitively, motivationally, and creatively active participants in their own learning processes so that they are in a position to initiate and direct their efforts to acquire knowledge and skills instead of being solely reliant on their subject teachers. An experiment was therefore conducted with grade eleven pupils who were specifically gifted in Accounting. The main purpose of this experiment was to investigate whether SRL as an instructional strategy can address teacher deficits and consequently, reduce the costs of providing specifically trained teachers for gifted pupils in the mainstream of high school education.

Researchers working with gifted populations concede that limited studies have been conducted thus far to examine gifted pupils' expertise in using the SRL processes to assume ownership of their learning (Stoeger, 2008; Steiner & Carr, 2003; Schraw, 1998; Ceci, 1996; Alexander, Carr & Schwanenflugel, 1995; Zimmerman, 1989). The research discussed in this paper hopes to address some of these concerns on SRL, as it could contribute new insights to the discussion on giftedness and mainstream education, especially about developing the potential of our future business leaders. It could be helpful in determining the role of the self-regulated processes of metacognition, motivation and creativity in reconceptualising gifted performance of these potential business leaders in our schools (Reis & Renzulli, 2009; Nota, Soresi, & Zimmerman, 2004; Steiner & Carr, 2003; Sternberg, Grigorenko & Ferrair, 2002; Zimmerman, 2000; Alexander, Carr & Schwanenflugel, 1995). This study therefore determines whether gifted pupils can be described as self-regulated to the degree that they are metacognitively, motivationally and creatively-active participants in their own learning processes of mastering an advanced curriculum in Accounting (Nota, Soresi, & Zimmerman, 2004; Steiner & Carr, 2003; Sternberg, 2000; Ceci, 1996; Sternberg, 1985).

Research findings on the metacognitive, motivational and creative processes of SRL in recent decades have presented compelling evidence of the importance of facilitating pupil control over the learning outcome, even more so for those pupils

with advanced abilities as compared to their average-ability peers (Steiner & Carr, 2003; Ericsson, 2002; Robinson, 2000; Monks & Mason, 1993; Shore & Kanevsky, 1993; Singh, 2010; Carter, 2010; Dresel & Haugwitz, 2005; Clark, 2002; Zimmerman, 1986; Sternberg,1985). In this paper, SRL is suggested as an alternative to herding gifted pupils in the same classroom and educating them with the same curriculum (Renzulli & Reis, 2003; Zimmerman, 1998; Gentry & Owen, 1999). These pupils must also be afforded the opportunity to devise their own rules for self-regulation. Guskey and Anderman (2008) state that once pupils decide on their rules of educational engagement, they must be held accountable for following them (p.12). As pointed out by Prensky (2006), "we can no longer decide for our students; we must decide with them, as strange as that may feel to many of us" (p.21).

II. OBJECTIVES OF THE ACCOUNTING ENRICHMENT PROGRAM

Many high school teachers in the mainstream of education lack training in gifted education pedagogy, and this result in gifted pupils being under-challenged; therefore, these high-ability pupils underachieve in traditional school settings (Reis & Renzulli, 2009; Archambault, Westberg, Brown, Hallmark, Emmons & Zhang, 1993; US Department of Education, 1993; Reis, Gubbins, Briggs, Schreiber, Richards & Jacobs, 2004; Renzulli & Park, 2000; Singh, 2010). In order to address the glaring deficits in teacher training in gifted education pedagogy and the current common curriculum, it is argued in this paper that SRL and an advanced curriculum in a specific subject such as Accounting, can be employed judiciously to cater for the gifted pupils in high schools and develop the potential of our future business leaders. SRL can also solve the budgetary constraints experienced by school managers of seeking finance to provide teachers for these gifted pupils who form a small percentage of about 3-5% of the school's population (Singh, 2010).

The AEP was designed in such a way that it would be able to provide for the gifted under the different learning conditions planned for this experiment. Mere repetition of the regular curriculum diet would not materialise since the four areas of curricular modification namely, content, process, environment and product were duly considered in designing the AEP. Gifted pupils, like any other pupils, are expected to strike a balance between their abilities and their learning strategies as this would affect their achievement outcomes. If the program for the gifted pupil is to be an integral part of the total educational process, then the entire educational program should reflect a differentiated curriculum design articulated with differentiated instructional strategies for the pupils. The experiment addressed the practical possibility of implementing an advanced level curriculum in Accounting for gifted pupils in the high school.

The AEP differed substantively from what was offered in the regular (traditional) curriculum at school. The AEP incorporated contents from the Accounting syllabuses of grades eleven and twelve as well as relevant contents from the first year university syllabus in Accounting. This was the first time that the pupils were exposed to the contents of the AEP and therefore, they were expected to be intrinsically motivated to provide alternative solutions to problems thus ensuring that divergent thinking skills came to the fore. This implied that in this study, the gifted pupils in the experimental group had to demonstrate their ability to use analytical problem-solving strategies to study complex subject matter using SRL processes. The problem-solving tasks focused on the analysis and interpretation of the financial statements of sole traders, partnerships, and limited liability companies.

The method of presenting the subject matter differed for the two groups of pupils. The control group was taught the subject matter by the specialist teacher whereas the experimental group used their own initiative to read, understand, and assimilate the contents from the books and other media (e.g. the internet) available in the university library. Unlike the control group, pupils in the experimental group were required to employ their investigative skills in order to acquire knowledge without the direct input of the teacher. Through self-regulatory processes, the experimental group had to determine themselves how to analyse and interpret financial statements of the three forms of ownership by means of financial ratios. While the core contents in the AEP was the same for both groups of pupils, the processes of acquiring the knowledge differed vastly for the pupils in the two groups.

III. METHOD

Empirical Study

The empirical study comprised an experiment using the posttest-only group design. In such a design, the experimental group is only exposed to the independent variable (intervention or treatment). Both the experimental and control groups were exposed to the same curriculum, but different methodologies were used with the control group exposed to direct teaching and the experimental group exposed to SRL (independent variable). In this study, the pretest was used to determine the entry knowledge level of the pupils whereas the

statistical analysis on the posttest indicated the outcome of the experiment. The pretest and the posttest were unrelated in content and thus served different purposes altogether. Also, during the contact sessions, some form of qualitative observation and note taking was undertaken by the two teachers. The self-regulatory abilities of the pupils were not assessed prior to the experiment and hence, this was a limitation in this study. Also, the focus of the investigation was on a single high school subject. Another limitation was experimental mortality although conditions for the two groups remained unaltered as planned after the loss of three participants. Seeing that the selection of the gifted pupils was limited to a single location (Port Elizabeth, South Africa), the sample may not be representative of gifted pupils of all high schools. Despite these limitations, the researcher had control over the variables to conduct the research. Hence, the primary aim of this empirical research was to investigate the following research questions (RQs), namely:

- RQ1: Are there significant differences between the performances of the experimental and control groups in the pretest, the problem-solving exercises and the posttest?
- RQ2: Are there significant differences between the performances of the experimental, control and university student groups in the posttest?
- RQ3: Do the experimental and control groups differ with respect to their performances in the problem-solving exercises and the posttest if their pretest performance is taken into account; that is, was the experiment a success?

The nonparametric test of Kruskal and Wallis is used when small samples such as that for gifted pupils are involved and/or especially when the assumptions of other equivalent techniques are violated. Hotelling's T-squared analysis and Analysis of Variance (ANOVA) are equivalent techniques to the nonparametric test of Kruskal and Wallis. However, Hotelling's T-squared analysis and ANOVA do make stronger assumptions about the data than the nonparametric test of Kruskal and Wallis. If the results of all three techniques are consistent, in other words, if the same conclusions about RQ1 and RQ2 are drawn, then this may be an indication that the assumptions of Hotelling's T-squared analysis and ANOVA are not being violated. To investigate the group effect on the performances in the problem-solving exercises and the posttest if the effect of the pretest is taken into account, that is, to investigate RQ3, analyses of covariance with the pretest as covariate were performed on the sample data.

Participants

Sixty grade eleven gifted pupils attending high schools in Port Elizabeth, South Africa were notified of their acceptance to participate in the AEP. These pupils were selected from twenty schools in Port Elizabeth, South Africa and came from various socio-economic backgrounds. Only those pupils who had successfully passed the final grade ten examinations with a minimum percentage of seventy-five qualified for selection. In addition, teacher rating, a minimum IQ score of 130 from the school records, and performance in Accounting during their grade eleven academic year were used to finally select the participants. These pupils were defined as gifted in their schools.

Fifty-six pupils responded positively to the invitation and presented themselves on the first day of the AEP. By means of random distribution, twenty-eight pupils each were allocated to the control group and the experimental group respectively. The random assignment of pupils to the two groups based on the same rating instruments ensured that the John Henry Effect on the experimental design was kept in check seeing that both groups were equivalent in terms of aptitude and prior educational achievement (Saretsky, 1972, p.580). The mean performance of the control group in the pretest was 45.04 and that of the experimental group was 49.9. It was evident from this information that the learners had forgotten much of the knowledge that they were exposed to in their schools. However, the mean performances in the pretest suggested that the composition of the control and experimental groups did not differ significantly. There was a loss of three participants in the second session of the AEP. This meant that the control group finally consisted of twenty-seven students and the experimental group was left with twenty-six participants.

The third group comprised of thirty-six first year university Accounting students. In order to assess the relevance of the AEP as an advanced level curriculum for the gifted pupils, the posttest was also administered to these university students. They did not participate in the program at all and attended lectures at the university in Port Elizabeth, South Africa as required of them. These university students were considered by their lecturers to be highly intelligent. They excelled in Accounting with their achievement scores being well above those of their average-ability peers, and in the process, displayed overtly an aptitude for Accounting.

Instructional Design

Expository teaching strategies rely on the techniques of telling pupils what is to be done and usually emphasizes the contents of the lesson as an end in itself. SRL requires this content to develop broader and more meaningful knowledge and skills.

In contrast to the experimental group, pupils in the control group were not handed any study guides for the duration of the AEP. The teacher assigned to the control group had the specific task of teaching them the subject matter without the pupils initially studying it themselves. The control group had the services of the teacher in a traditional classroom setting. This meant that their queries could be addressed immediately by the teacher during the contact sessions whereas the experimental group had to use their self-regulatory skills to seek the information from the relevant media available. Hence, SRL and direct teaching were sharply contrasting instructional design processes in this experiment.

The services of only two teachers were required for the program. The facilitator assigned to the experimental group (comprising students working on a self-regulatory basis) was a qualified primary school teacher with twenty-three years of experience. He was reading for a master's degree on the mentally handicapped pupil. His primary task was to ensure that pupils in this group were actively engaged in their learning tasks. Since he had no Accounting knowledge, in the formal sense of the word, he was not able to teach the pupils or even assist them in comprehending the subject matter. The researcher assumed responsibility of the control group. His qualifications are appropriate since he also has a major in Accounting. Furthermore, the researcher taught Accounting at senior high school level for well over a decade. Naturally, the control group was exposed to direct teaching as is the situation in the regular classroom. Activities were predominantly teacher-initiated, characteristic of pupil dependence on the guidance and directives of the specialist subject teacher. In direct teaching, pupils know precisely what is expected of them and, also, what to expect from the teacher. Mosston (1972) points out that the command style creates the "belief or the pretence that the one on top knows more and better; that the one below must accept, obey, and follow; that one must not doubt, question, or change" (p.35). No contact was made with the university students. These students were recommended by the dean of the Faculty of Commerce based on their outstanding performance in Accounting during the course of their current academic year. A lecturer in the department of Accounting administered the posttest to these students. However, the assessment of the students' performance was done by the researcher.

In SRL, the teacher's role function undergoes a metamorphosis. Self-regulated study eradicates the regimentation and standardisation that is traditionally associated with formal education. Self-involvement, self-discovery, self-pacing, self-directedness and other self-motivated activities contribute to self-regulation of cognition and behaviour in learning and achievement (Reis & Renzulli, 2009; Nota, Soresi, & Zimmerman, 2004; Clark, 2002; Sternberg & Grigirenko, 2002). Furthermore, self-monitoring, self-evaluation and self-reinforcement are key sub-processes of metacognition that intrinsically motivated gifted pupils can employ to enable them to engage in divergent thinking and other creative activities (Mooij, 2008; Boekaerts & Niemivirta, 2000; Randi & Corno, 2000; Pintrich, 2000; Zimmerman, 2000; Boekaerts, 1999; Carr, Alexander, & Schwanenflugel, 1996). All the pupils were given the opportunity to make maximum use of the facilities of the university library. The Faculty of Education buildings are adjacent to the library.

IV. RESULTS

Various techniques were employed to assess the progress of the pupils in the AEP. A pretest was administered to the pupils on their first day prior to their being exposed to any enrichment activity. In this test, pupils were required to draw the Income Statement and the Balance Sheet of a sole trader. Since this section was completed early in the first term, pupils were expected to know the subject matter. However, the mean performance of group A in the pretest was 45.04 and that of group B was 49.9. Using a fifty percent cut-off point as a benchmark to analyse the pupils' performance, it was evident that a large degree of forgetting had taken place. The pupils even conceded to this outcome and they pointed out that traditional classroom work is highly compartmentalized and there is very limited integration between the topics. The different sections of the curriculum are treated as separate topics by their teachers and this does not contribute effectively to the development and expansion of the pupils' knowledge base. This is one area that the AEP took into consideration: growth of knowledge was promoted in the absence of rigid compartmentalization of information. However, the mean performances in the pretest suggested that the composition of both groups did not differ significantly. This meant that the criterion of similarity in ability groupings was satisfied.

Pupils were assigned problem-solving exercises in the second, third and fourth weeks of the program. The objective of this activity was to expose students to higher levels of thinking using differential instructional strategies as explicated. After completion, the tasks were collected and evaluated by the researcher. A posttest was administered at the end of the program. The three groups, namely, the experimental and control groups, and the university students, attempted the

same test that comprised five major questions based on the analysis and interpretation of financial statements. It was not just a question of recall and regurgitation of information since the participants had to use their creativity and demonstrate high levels of self-efficacy and intrinsic motivation to derive answers. The design of the posttest was such that the pupils and university students were afforded the opportunity to apply their metacognitive as well as divergent thinking skills.

The mean performance of students in the problem-solving exercises (Table 1) shows that the experimental group scored higher than the control group in two of the three sessions. The experimental group had a mean score of 54.67 in the posttest compared to the 53.11 obtained by the control group while the university students obtained a mean score of 56.08.

Group	Session 1	Session 2	Session 3
Control (C)	75.56	51.03	61.85
Experimental (E)	78.7	55.37	61.11

Table 1: Mean Performance of Pupils in the Problem-Solving Exercises

A statistical analysis was conducted to determine the significance of these scores. The computer program BMDP3S (Dixon & Brown, 1985) was used to perform the Kruskal-Wallis analysis of variance tests to investigate RQ1 and RQ2. The corresponding results are shown in Table 2.

Variable	Groups[1]	KWTS[2]	P-Value
Pretest	E,C	1.16	0.2816
Problem-solving exercises	E,C	6.30	0.0121
Posttest	E,C	1.32	0.2497
Posttest	E,C,US	1.57	0.4572

Table 2: Kruskal-Wallis One-Way Analysis of Variance Test Results

1. E refers to the experimental group, C to the control group, and US to the group of Accounting 1 university students.
2. KWTS refers to the value of the Kruskal-Wallis test statistic.

From Table 2 it follows that:

- There is no significant difference between the mean performances of the 2 groups in the pretest, since the value of the Kruskal-Wallis test statistic was found to be 1.16 with a p-value of 0.2816;
- There is a significant difference between the mean performances of the two groups in the problem-solving exercises with the value of the KruskalWallis test statistic being 6.3 with a p-value of 0.0121;
- There is no significant difference between the mean performances of the two groups in the posttest since The Kruskal-Wallis test statistic was found to be 1.32 with a p-value of 0.2497;
- There is no significant difference in the mean performances of the three groups, namely, control, experimental and the university students, in the posttest. This is deduced from the fact that the value of the Kruskal-Wallis test statistic was found to be 1.57 with a p-value of 0.4572.

The investigation of RQ1 and RQ2 was repeated using Hotelling's T-squared analysis. In the case of Hotelling's T-squared analysis, the computer program BMDP3D (Dixon & Brown, 1985) was used. In contrast to the Kruskal-Wallis test, Hotelling's technique facilitates comparison of only two groups at a time (see Table 3).

Variable	Groups	T-value	P-Value
Pretest	E,C	-0.82	0.4142
Problem-solving exercises	E,C	-2.38	0.0213
Posttest	E,C	-0.97	0.3373
Posttest	C,US	-0.90	0.3703
Posttest	E,US	0.25	0.8006

Table 3: Hotelling's T -Squared Analysis

Notwithstanding this, the findings of the non-parametric tests are confirmed by using Hotelling's T-squared analysis. A significant difference existed only between the mean performances of the control and experimental groups in the problem-solving exercises, seeing that the t-statistic was found to be -2.38 with a p-value of 0.0213. In all the other cases, as is evident from Table 3, there was no significant difference between the mean performances of the two groups involved. When an

analysis of variance was performed on the data by using the computer program SAS PROC GLM (SAS Institute, Incorporated,1988) to investigate RQ1 and RQ2, the findings were similar to those of the other two statistical techniques already employed. It was found that the experimental group performed significantly better in the problem-solving exercises than the control group, the F-statistic being 5.65 with a p-value of 0.0213. As Table 4 clearly shows, ANOVA confirms the findings of the other 2 statistical methods.

Variable	Groups	F-Value	P-Value
Pretest	E, C	0.68	0.4142
Problem-solving exercises	E,C	5.65	0.0213
Posttest	E,C	0.94	0.3373
Posttest	E,C,US	0.01	0.9114

Table 4: Analysis of Variance Results

In the investigation of RQ3, the focus was on the performance of gifted pupils when they were placed in a group which received direct teaching as opposed to the effect on performance of another group of gifted pupils who had to be mostly reliant on SRL strategies. In these analyses the possible effect of the pretest performance on the dependent variables was ignored. Analyses of covariance with the pretest as covariate were also performed on the sample data. These analyses were performed by using the computer program SAS PROC GLM (SAS Institute, Incorporated, 1988). The results of the analysis of covariance with the performance in the problem-solving exercises as dependent variable and the pretest performance as a covariate are listed in Table 5. From this table it follows that the group still has a statistically significant effect (t = -2.22 with a p-value of 0.0306) on the performance of students in the problem-solving exercises. More specifically, it appears that the experimental group performed significantly better in the problem-solving exercises than the control group even if the effect of their pretest is considered.

Variable	Coefficient	T	P (2 tail)
Pretest	0.4887919	3.95	0.0002
Group	-5.872111	-2.22	0.0306

Table 5: Analysis of Covariance Results: Problem-Solving Exercises

The results of the analysis of covariance with the performance in the posttest as dependent variable and the pretest performance as a covariate are listed in Table 6.

Variable	Coefficient	T	P (2 tail)
Pretest	0.8888429	5.46	0.0001
Group	-0.87900776	-0.58	0.5656

Table 6: Analysis of Covariance Results: Posttest

From Table 6 it follows that organising students in groups where they have either teacher-directed inputs or apply SRL strategies still does not have a statistically significant effect (t = -0.58 with a p-value of 0.5656) on the performance in the posttest. It seems that the experimental group did not perform significantly better in the posttest than the control group even if the pretest performance of both groups is taken into account.

IV. DISCUSSION

The conclusions reached in the three statistical methods regarding RQ1 are the same. In other words, consistent results have been obtained. This may be an indication that the assumptions made by techniques two and three (Hotelling's T-squared analysis and ANOVA respectively) are not being violated. Furthermore, it appears that there is a significant difference between the experimental and the control groups with respect to their mean performance in the problem-solving exercises. More specifically, it appears that the experimental group performed significantly better than the control group in the problem-solving tasks which students were required to accomplish, using to the maximum the resources available for each group.

The posttest results of the three groups, namely experimental, control and the university students show that gifted pupils cope well with an advanced level curriculum in Accounting which includes subject matter usually attempted at university level. This strongly suggests the need for an advanced level curriculum in Accounting for gifted pupils in order to develop their potential as future business

leaders. If the principle is accepted that pupils should be confronted with learning content that will challenge them intellectually, then the posttest results suggest that the present Accounting curriculum being implemented in high schools in South Africa (and other countries with similar challenges) is inadequate for gifted pupils. It is evident that such pupils can work on higher conceptual levels using a problem-solving approach.

The analysis of covariance results indicates that the organisation of students into groups did not have a statistically significant effect on their performance in the posttest. No matter in which group students were placed, it did not affect the outcome of their performance in the posttest. Furthermore, the analysis of covariance results suggests that students employing the self-regulatory processes of metacognition, creativity and motivation performed significantly better in the problem-solving exercises than those students who were exposed to direct teaching even after the effects of the pretest were taken into consideration. Hence, the analysis of covariance results suggests that the experiment was a success.

V. CONCLUSION

The results of this study strongly suggest that self-regulation can be employed to overcome a narrow, rigid approach that limits the education of the gifted pupil in Accounting in the regular classroom of the high school. Further, an advanced level curriculum in Accounting can be implemented in high schools to develop our future business leaders even though there is a dire shortage of adequately trained teachers in gifted education. The findings of this experimental study suggest that an advanced level curriculum for the gifted with a concomitant change in the role of the specialist teacher can become a reality in these high schools. Significantly, in contemporary terms, SRL perspective shifts the focus of educational analyses from pupil abilities and environments at high schools as fixed entities to pupils personally initiated problem-solving strategies as potential business leaders, designed to improve learning outcomes within flexibility as opposed to rigidly scheduled environments.

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