Journal of Psychology in Africa 2009 19(2); 161-168
Printed in USA - All rights reserved

JOURNAL OF PSYCHOLOGY IN AFRICA
ISSN 1433-0237

Effects of Mediated Learning Experience, Tutor Support and Peer Collaborative Learning on Academic Achievement and Intellectual Functioning among College Students

Joseph Seabi
Kate Cockcroft
Peter Fridjhon
University of Witwatersrand

Address correspondence to Joseph Seabi, Private Bag 3, Discipline of Psychology, School of Human and Community Development, University of the Witwatersrand, 2050, South Africa, email: Joseph.seabi@wits.ac.za.

The main objective of this study was to investigate the effects of mediated learning experience, tutor support and peer collaborative learning on academic achievement and intellectual functioning. The sample comprised 111 first year engineering students (males=38, females=73, age range =16-23), who were randomly assigned to three learning conditions (Mediation: n=45, Tutor: n=36 and Peer: n=30). Data on academic achievement were based on mid-year and end-year examination results, while intellectual functioning was measured by the Ravens Advanced Progressive Matrices and the Organiser. Paired t-tests and Analysis of Covariances (ANCOVAs) were conducted to compare pre- and post- test academic and intellectual scores and comparison between the groups. Following a five-week intervention period, significant improvements in academic and intellectual functioning were found within the Mediation Group. The findings revealed that intervention involving mediation processes was more effective not only in enhancing students' intellectual functioning but also improving their academic achievements.

Keywords: Mediated learning experience, academic achievement, peer collaborative learning, intellectual functioning

Introduction

Research has long established that although students are admitted to institutions of higher learning with good academic grades, not many of them manage to maintain a high level of academic achievement (Johnston, 1997). In actual fact, they are often perceived to be under-prepared for the demands of tertiary education (Pascarella & Terenzini, 1991).

For instance, research conducted in the United States, reports that only 47 percent of first year students who start their academic career in engineering actually graduate with a degree in this field, while half of the remaining 53 percent fail and ultimately drop out, and the remaining change faculties (Astin & Alexander, 1993; Beaufait & Fred, 1991). The American College of Testing published statistics showing that more than 40 percent of all university students who fail first year ultimately drop out (Smith, 2002).

Similar trends have been reported with first year students in South Africa. There are approximately 40 to 55 percent of first year university students experiencing academic failure, particularly those from disadvantaged backgrounds. According to a recent longitudinal survey (Scott, 2008) on students in institutions of higher learning only 38 percent of students graduated within the expected time, while 17 percent of them took longer than five years to graduate, and the remaining 45 percent dropped out. Higher education failure and dropout rates have negative ramifications for the student, the institution and society at large. At a student level, they may be unable to advance with their studies and this could adversely affect their self-esteem and employment opportunities. At an institutional level, it may be considered a sign of inefficiency in relation to cost of training, loss of students, and lowering of success rates (Poellhuber, Chomienne & Karsenti, 2008).

Given the need for higher throughput rates in institutions of higher learning internationally, there are surprisingly fewer studies that investigate the effects of interventions geared towards enhancing students' academic achievement and intellectual functioning. This study sought to address this need with a sample of first year engineering students. The comparative efficacy of peer collaborative learning, mediated learning experience and tutor support in college settings is unknown, and are investigated in the current study.

Peer Collaborative Learning. Gokhale (1995) has argued that advanced learning occurs when students engage collaboratively in the process of learning. Collaborative learning (CL) refers to "an instruction method in which students work together in small groups toward a common goal" (Gokhale, 1995, p.22). Students who engage in collaborative learning are responsible for each others' learning as well as their own, and as a result, the success of one student assists other students to succeed.

Conditions for CL. Alderman (2000) reported on three conditions for CL. Firstly, "that knowledge is created through interaction and not transferred from educator to a student" (p.2); secondly, learning is student-centred, with consideration given to the students' levels of knowledge, experience and understanding; thirdly, the educator's role is that of facilitator of learning, developer of the structure, creator of the context, and provider of the learning space so that students can take control of their own learning" (p.2). It thus seems that CL entails the formation of an informal setting, whereby students work collaboratively on a particular task, to analyse, synthesize and evaluate problems together, facilitate discussion and interaction.

CL has long been known to be successful at improving academic achievements (Feldman & Newcomb, 1969; Guon, 1988; Kvam, 2000). Positive effects of this learning strategy include active and participative learning environments, immediate feedback, lowered anxiety with correspondingly higher self-disclosure, a greater student ownership of the learning process, positive interdependence, increased motivation and positive attitude towards academic tasks, greater commitment, and enhanced self-esteem (Cross, 1985; Greenwood, Carta & Kamps, 1990; Henderson, Fadali & Johnson, 2002). Recent experimental studies on collaborative learning further reiterate the importance of implementing this approach (Dale, Nasir & Sullivan, 2005; Van Walsum, Sanders, Fossum, Sadoski, Bramson, & Wiprud, 2004). In spite of the above advantages, there appears to be a dearth of research studies on CL in college settings. The current study aimed to engage a cohort of students in a CL process and to examine the effects it could have on academic achievement and intellectual functioning.

Tutor Support. Unlike with peer collaborative learning, Doise and Mugny (1984) argue that the learning process is more progressive when peers with different cognitive strategies work together and engage in direct conversational debate. Similarly, Vygotsky (1987) believed that children learn more sophisticated cognitive strategies through interactions with more mature and knowledgeable peers. Vygotsky (1978) thus coined the phrase "*zone of proximal development*" (ZPD), which refers to the "distance between a child's actual developmental level as determined by independent problem solving and the higher level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (p. 86). This zone is believed to be an index of the learning potential of the child (Vygotsky, 1978). It thus appears that cognitive development is facilitated in situations where the learner interacts with others of higher ability.

Accordingly, instead of peers helping each other, peer tutors seem to be more instrumental in instigating change. In the current study the term 'peer tutoring' refers to senior students (fourth year) who are involved in tutoring first year students. It involves the utilization of academically successful students, advanced in their knowledge and understanding of subject matter to provide learning assistance to less advanced students.

Mediated learning experience (MLE). MLE focuses on the ability of the student to learn from interactions or experiences that are facilitated by the teacher (Feuerstein, 1980). Its effects are achieved by drawing attention to particular aspects of the learning experience and engaging the student in extracting new applications for future tasks. In order to effectively and appropriately engage the student in a task, Feuerstein, Rand and Hoffman (1979, as cited in Feuerstein, 2003) recommend that certain parameters of mediation be adopted. Feuerstein and Feuerstein (1991) provide a list of twelve parameters which guide the mediator during the dynamic interaction with a learner. These parameters are mediation of intentionality and reciprocity, transcendence, meaning, competence, regulation and control of behaviour, sharing, individuation, goal planning, challenge, self-change, search for optimistic alternatives and mediation of a feeling of belonging.

Feuerstein et al. (1979) maintain that cognitive development of individuals is often masked, not necessarily because of distal conditions (poverty, neurological impairment, emotional disturbance in the child or low socio-economic status), but as a result of inadequate exposure to MLE opportunities (proximal condition). Feuerstein states that although distal conditions are commonly found in individuals with less optimal cognitive development that does not necessarily mean they are causal factors but rather correlational variables.

The cognitive deficiencies said to result from the inadequacy of MLE have been specified by Feuerstein et al. (1979; Skuy et al., 1996; Tzuriel, 1998) and conceptualized within the three phases of cognitive processing; namely, the input (data gathering) elaboration (data processing) and output (data expression/ communication) phases. The locus of the deficiencies may be in one or more of these phases. The conceptualization of cognitive functions and dysfunctions affords a basis from which to identify the mediatee's strengths and weaknesses and to address them appropriately through the provision of MLE.

A series of studies (Mehl, 1991; Schur, Skuy, Zietsman, & Fridjhon, 2002; Skuy, Gewer, Osrin, Khunou, Fridjhon & Rushton, 2002) documented the effectiveness of MLE in improving the cognitive and academic achievement of students. For instance, Skuy et al. (2002) investigated the effects of MLE on improving cognitive functioning of psychology college students. Another study (Mehl, 1991) investigated Physics students at the University of Western Cape to determine the effects of MLE on academic achievement. A significant MLE support difference was found on the Mechanics section of the course.

Goals of the Study. The aims of the present study were twofold. Firstly, to determine whether the intervention would result in improved intellectual functioning (as measured by the RAPM and Organiser) and academic achievement (as measured by all academic variables); secondly, to determine whether there is a difference between the Mediation, Tutor and Peer groups on intellectual and academic achievement. The hypotheses of this study were that: 1) the Mediation group would reveal greater significant improvement in intellectual functioning and academic achievement than the Tutor and Peer groups; and 2) that statistically significant differences would be found between the groups in favour of the Mediation group.

Methods

Participants and setting. The sample comprised 111 (88 percent) of 126 first year Chemical and Metallurgical Engineering students at a large South African university. The participants consisted of 73 (66 percent) males and 38 (34 percent) females with the age ranges from 16 to 23 years old. It consisted of four racial groups, namely, Coloured 2 percent (n=2), White 6 percent (n=7), Indian 17 percent (n=19) and Black 75 percent (n=83).

Instruments. The instruments used to assess intellectual functioning were the Raven's Advanced Progressive Matrices and the Organiser. Academic achievement was measured at mid-year and end of year.

The Raven's Advanced Progressive Matrices (RAPM). The RAPM assess the capacity to reason by analogy, to form comparisons and to organize spatial perceptions into systematically related wholes, using abstract figures (Raven, Court & Raven, 1977; Tzuriel & Feuerstein, 1992). Raven, Raven and Court (1998) report an internal consistency of 0.91, with split-half reliability coefficients between 0.83 and 0.87. Although the RAPM has not been standardized on a South African sample, several studies confirm its utility as a measure of intellectual functioning with South African university populations (Grieve & Viljoen, 2000; Skuy, Rushton, Fridjhon & Seabi, 2002).

The Organiser. The Organiser is a verbal test with numerical components, which measures inferential thinking strategies,

the gathering and application of logical evidence, summative behaviour and individual learning potential. It comprises 22 problems, where each problem has a set of items, which have to be organized and placed in positions relative to one another based on a determined attribute or condition (Feuerstein et al., 1979). The Organiser was chosen as a measure of intellectual functioning because of its demonstrated reliability, validity and utility with South African adolescents (Skuy & Schmukler, 1987; Skuy, Mentis, Arnott & Nkwe, 1990). Given the diverse backgrounds (i.e., in terms of language and socio-economic status) of the students in the present study, it was considered important to use both non-verbal and verbal measures of intellectual functioning.

Academic Achievement and student demographics. The mid-year and end-year examination results for the engineering students were obtained from the administrative records of the Engineering Department. Academic achievement of students was measured by performance in seven courses, namely, Physics, Mechanics, Mathematics, Chemistry, Process and engineering materials (PRME), Core aggregate (Physics, Mathematics, Chemistry) and Aggregate (average mark from all courses). Data on student demographics were also gathered from the same records.

Procedure. All first year engineering students from the Department of Metallurgical and Chemical Engineering were informed of the purpose of the study and invited to participate. They were aware of the voluntary nature of the study. Permission for participation was also obtained from the Faculty of Engineering.

Systematic sampling was used to compose the Mediation, Peer and Tutor groups. The mid-year academic aggregates of these participants were arranged from the lowest mark to the highest, in an effort to balance the groups. These were then divided into three levels, namely, the upper, middle and bottom levels, based on their academic achievement. From the upper and middle levels, participants were randomly selected on a 1, 2, 3 systematic procedure to form the Mediation, Tutor and Peer groups. Participants from the bottom level were randomly allocated to the Mediation and Tutor groups only. The latter participants were not allocated to the Peer group, as this was considered unfair in terms of the absence of any support in that group. Thus, the Mediation (n=45) and Tutor (n=36) groups consisted of students from all three academic levels, while the Peer group (n=30) only had participants from the upper and middle levels.

Instruction using MLE was provided to the Mediation group for five weeks. The Mediation group was exposed to five weeks of mediation, while the Tutor and Peer groups received tutor and peer support, respectively. In the MLE condition, the lecturer mediated the engineering concepts to the participants in a manner that was process-oriented though content focused in order to elicit participants' own understanding and application of the material. In the Tutor group, participants worked on the same engineering problems as in the mediation condition, but had to solve these independently. Unlike the Mediation group, the tutor assisted participants who experienced difficulties, and the approach was not that of intentionally and actively eliciting cognitive functions to be developed, as in the Mediation condition. Rather, the approach in the Tutor group was product-focused, as it was aimed at the solution of problems.

Within the Peer group, the participants were not exposed to the mediation or the tutor conditions. They worked collaboratively on the same engineering problems. They engaged in discussion, and took responsibility for their own learning (Totten, Sills, Digby & Russ, 1991). A week after the intervention, the whole sample was again given the same measures as at pre-test.

Data Analyses. Statistical Analysis System (SAS) version 8 was utilized to conduct statistical analyses. To determine the distribution of the pre-test scores for the RAPM and Organiser the Kolmogorov-Smirnov test of goodness fit was conducted and it yielded a normal distribution for all the variables. For the post-test scores, a review of the distributions did not indicate serious violation of the normality assumption. As a result, parametric tests were employed. To determine whether significant improvement resulted, paired t-tests were conducted within the Mediation, Tutor and Peer groups on the pre-and post-test means of intellectual functioning and academic achievement.

To test whether there was significant difference between the Mediation, Tutor and Peer groups, separate Analysis of Covariances (ANCOVAs) were conducted with the pre-test scores of academic achievement (Chemistry, Physics, Mechanics, PRME, Mathematics, Core and Aggregate) and intellectual functioning (RAPM and Organiser) as the covariates and post-test scores of these variables as dependent variables.

Results

Descriptive Analyses. The pre-and post-test means and standard deviations on the two measures of intellectual functioning are presented separately for the Mediation, Tutor and Peer group in Table 1. Although all the pre-test scores of the Mediation, Tutor and Peer groups on the RAPM fell within the average IQ range (85-115), only the post-test scores of the Tutor group improved significantly to render them to just above average IQ (116).

Comparative Analyses. As already mentioned, the mid-year examination results served as a pre-test measure of academic achievement, while end-year examination results served as a post-test measure. A score greater than 75 percent is considered to be above average, while a score between 50 and 74 percent is considered to be within the average range. Consequently, a score below 50 percent is considered to be below the average and also constituted a fail. As shown in Table 1, the pre-and post-test mean scores for Mathematics, Chemistry, PRME, Physics, Mechanics, Core and Aggregate within the Mediation, Tutor and Peer groups were within the average range. The pre-test mean scores for Physics in all the three groups were below the average range.

As demonstrated in Table 2, the t-tests revealed statistically significant differences between the pre-and post-test scores of the RAPM for each of the groups. Although the t-test yielded significant difference ($t = -2.19$; df: 44; $p < .05$) between the pre-and post-test scores of the Mediation group on the Organiser, no statistically significant difference was found within the Tutor or the Peer group on this variable.

The results suggested statistically significant improvement of scores from pre- to post-test on the intellectual variables (RAPM and Organiser), in all the groups. However, improvements were demonstrated explicitly within the Mediation and Tutor groups as reflected by statistical significance ($p< .01$) on the RAPM. The Peer group demonstrated significant improvement also ($p < .05$) on the RAPM.

Academic achievement. On the academic achievement measure, statistically significant improvements were demonstrated on the dependent variables, namely, Mathematics, Physics, PRME, Mechanics, Core and Overall within the Media-

Table 1. ***Means and Standard Deviations on all Measures by Group***

	Mediation Group (n = 45)				Tutor Group (n = 36)				Peer Group (n = 30)			
	Pre		Post		Pre		Post		Pre		Post	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
RAPM	25.2	4.6	28.4	4.2	25.7	4.6	29.3	4.2	24.6	4.9	27.3	8.3
Organiser	17.6	3.1	18.6	2.1	17.6	3.8	17.4	4.4	15.9	3.9	16.4	5.4
Maths	57.4	17.0	60.3	17.6	55.6	20.3	58.6	19.1	56.5	20.7	57.8	21.2
Chemistry	63.3	13.0	60.5	13.2	64.3	10.3	60.1	12.5	64.7	14.9	58.5	17.8
Physics	45.9	12.5	51.8	12.3	48.8	13.4	54.2	12.5	48.7	15.3	50.3	17.4
Prme	52.7	14.1	56.8	12.0	51.7	12.8	56.3	12.4	54.7	13.7	57.7	12.4
Mechanics	50.9	14.8	56.0	13.6	54.1	11.4	57.3	11.0	52.6	14.0	57.4	14.4
Core	51.2	14.3	56.0	13.6	66.3	20.3	56.4	14.1	52.6	15.3	55.0	17.4
Aggregate	54.7	12.9	57.1	13.0	54.4	12.1	57.6	12.3	56.6	13.3	56.2	17.2

tion group, with the exception of the Chemistry variable. Although no improvement in post-test Chemistry mean was demonstrated, statistically significant decrease in this post-test mean was yielded. Physics and PRME were the only variables within the Tutor group that demonstrated statistically significant improvements from pre-test means. However, Chemistry and Core courses yielded statistically significant decrease in the post-test means within the Tutor group. Although no statistically significant improvement on any of the academic achievement variables was demonstrated within the Peer group, a statistically significant decrease in the post-test mean was yielded. Table 3 presents pre- and post-test results of academic achievement.

The results of Analysis of Covariances (ANCOVAs) revealed no statistically significant difference (p>.05) between the Mediation, Tutor and Peer groups on Mathematics, Chemistry, Physics, PRME, Mechanics, Core course and Overall. Once again, no statistically significant difference (p>.05) was found between the Mediation, Tutor and the Peer groups on the RAPM and the Organiser.

Discussion

The current study investigated the effects of mediation in comparison to tutor support and peer collaborative learning on intellectual functioning and academic achievement.Although it was anticipated that the Mediation group would perform significantly better than the Tutor and Peer groups on the RAPM, the results suggest that the effects of mediation by the mediator and tutor support were equally effective in enhancing intellectual functioning of students. These results are unusual in the sense that the support provided by the tutor, was not process-oriented aimed at heightening awareness as in the Mediation group, but instead was product-orientated and focused on obtaining solutions to the given problems. However, since tutors in the current study constituted a group of successful students advanced in their knowledge and experience of engineering problems, it appears that in assisting students to arrive at the solution to a problem, they seem to have inadvertently mediated critical thinking skills. This seems to be consistent with Vygotsky's (1978) notion of the ZPD, where actualization of cognitive development depends on the individual's experience in social interaction with a more competent or capable person.

The results in the present study revealed statistically significant improvement in the post-test academic achievement scores (Mathematics, Physics, PRME, Mechanics, Core and Overall course) within the Mediation group following the intervention, while significant improvement in the Tutor group was only obtained on Physics and PRME. No statistically significant academic improvement was observed in the Peer group. Demonstration of significant improvements in almost all academic variables within the Mediation group, with the exception of the Chemistry suggests the effectiveness of the mediation intervention in improving academic achievement of students.

These results propose that, although students of similar academic ability may assist each other academically, no significant improvement may be yielded unless a person of advanced knowledge and experience provides meaningful learning experience (mediation). This postulation is based on the fact that within the Mediation group, the quantity of significantly improved academic variables were higher (six) than that of the

Table 2. ***Comparison between Pre- and Post-Test Mean Scores on the intellectual Functioning within each Group***

Group	Variable	df	t
Mediation	RAPM	44	-6.70**
Tutor	RAPM	35	-7.34**
Peer	RAPM	29	-3.15*
Mediation	Organiser	44	-2.19*
Tutor	Organiser	35	NS
Peer	Organiser	29	NS*

*p < .05 ; ** p < .01; NS = Not Significant*

Table 3. ***Comparison between pre- and post-test mean scores of Academic Achievement within the Mediation, Tutor and the Peer group***

Group	Variable	df	t
	Mathematics	44	-2.65*
	Chemistry	44	3.60*
	Physics	44	-8.62**
Mediation Group	PRME	44	-2.87*
	Mechanics	44	-3.07*
	Core	44	-5.57**
	Overall	44	-2.94*
Tutor Group	Chemistry	35	3.07*
	Physics	35	-3.47*
	PRME	35	-2.03*
	Core	35	-11.34**
Peer Group	Chemistry	29	2.18*

** p < .05; ** p < .01*

comparison groups. Within the Tutor group, only the two variables, namely Physics and PRME demonstrated significant improvement. A possible explanation for this finding is that although the tutors who provided the intervention within the Tutor group possessed advanced knowledge in engineering problems, they appear to have not had adequate knowledge and experience with the provision of mediation for cognitive and academic development and of teaching at a tertiary level, relative to that of the lecturer. These findings are consistent with previous empirical studies (Mehl, 1991; Schur et al., 2002; Skuy et al., 2002), which have established improved academic functioning following provision of the mediation.

The results in the current study also revealed no statistically significant difference between the Mediation, Tutor and the Peer groups on intellectual and academic functioning. On the basis of these results, it appears that, although significant improvements in intellectual and academic achievement variables were obtained within the Mediation group, they were not strong enough to differentiate between the groups, probably because of the relatively short period of intervention.

The present study failed to corroborate findings reviewed in the literature, which demonstrated the effectiveness of mediated learning experiences in differentiating individuals on the basis of academic achievement (Mehl, 1991) and intellectual functioning (Skuy, et al., 2002; Tzuriel & Kaufmann, 1999).

Theoretically, failure of a student to improve performance may be due to the inability of the assessor or mediator to discover optimal teaching strategies, and not necessarily due to a student's lack of potential (Mearig, 1987). Therefore, it is suggested that the failure of the current study to yield significant results in favour of the Mediation group could be explained by the fact that, unlike previous studies (Mehl, 1991; Skuy et al., 1987) which identified the cognitive deficiencies to be mediated, in the current study specific cognitive deficiencies were not identified, but rather an attempt was made to mediate *all* cognitive deficiencies as posited by Feuerstein et al. (1979; 1980) at the input, elaboration and output phases. This approach appears to have been ineffective. Given that students in the current study were predominantly from disadvantaged backgrounds, it was assumed that mediation of all cognitive deficiencies would prove beneficial to them. Disappointingly, that was not the case.. A more focused type of intervention that identifies each student's unique profile of cognitive deficiencies and then mediates effective strategies accordingly may be more effective.

A major limitation of the current study was the composition of the groups. While the composition of the Peer group involved students from only the upper and middle academic ranges, the Mediation and Tutor groups were composed of students from the upper, middle and bottom levels of academic achievement. For ethical reasons, it was considered unfair to put students of weaker academic ability in the Peer group, as no support from the tutor or the lecturer was to be given.

Conclusion

The present study investigated the effects of the construct of mediated learning experience on intellectual and academic functioning of students. It was argued that for students to thrive academically, they have to be able to regulate their thinking, and intellectual actions associated with the learning processes. The presence of significant improvements in intellectual functioning and academic achievement particularly within the Mediation group confirm the research aim as well as results from earlier studies, in which the intervention was based on the theory of mediated learning experience (Mehl, 1991; Schur et al., 2002; Skuy, 2002). It is evident in the present study that through exposure to mediated interactions, not only are students' intellectual functioning enhanced, but academic achievements also improved.

References

Alderman, B. (2000). *Get Real! Collaborative Learning in Higher Education*, 4(*1*). Retrieved December 16, 2008, from http://www.gu.edu.au/school/art/text

Astin A., & Alexander, W. (1993). *Engineering Outcomes. ASEE Prism, September, 27-30.*

Beaufait, A., & Fred, W. (1991). *Engineering Education Needs Surgery*. Proceedings – Frontiers in Education Conference, September, 519-522.

Cross, K. P. (1985). Education for the 21st century. *NASPA Journal*, *23*(1), 7-18.

Dale, V.H., Nasir, L., & Sullivan, M. (2005). Evaluation of student attitudes to cooperative learning in undergraduate vet-

erinary medicine. *Journal of Veterinary Medical Education*, *32*(4), 511-516.

Doise, W., & Mugny, G. (1984). *The social development of the intellect*, Pergamon Press, Oxford.

Feldman, K. A., & Newcomb, T. M. (1969). *The impact of college on students*. San Francisco: Jossey-Bass.

Feuerstein, R. (1979). *The dynamic assessment of retarded performers: The learning potential assessment device, theory, instruments, and techniques.* Baltimore, MD: University Park Press.

Feuerstein, R. (1980). *Instrumental Enrichment: An Intervention Programme for Cognitive Modifiability*. Baltimore, MD: University Park Press.

Feuerstein, R., & Feuerstein, S. (1991*).* Mediated learning experience: A theoretical review. In R. Feuerstein, P.S. Klein. & A. Tannenbaum, *Mediated Learning Experience* (pp. 213-240). London: Freund Publishing House.

Feuerstein, R., Rand, Y., & Hoffman, M. (1979). *The dynamic assessment of retarded performers: The learning potential assessment device (LPAD).* (Rev. ed.). Baltimore, MD: University Park Press.

Feuerstein, R. (2003). The Dynamic Assessment of Cognitive Modifiability. Jerusalem: ICELP Press.

Gokhale, A. A. (1995). Collaborative learning enhances critical thinking. *Journal of Technology Education, 7*(1), 22–30.

Greenwood, C. R., Carta, J. J., & Kamps, D. (1990). Teacher-mediated versus peer-mediated instruction: A Review of educational advantages and disadvantages. In H. C. Foot, M. J. Morgan & R. H. Shute (Eds.), *Children Helping Children*. London & New York: John Wiley.

Grieve, K.W., & Viljoen, S. (2000). An exploratory study of the use of the Austin maze in South Africa. *South African Journal of Psychology*, *30*(3), 14-18.

Guon, D. G. (1988). *Minority access and retention: An evaluation of multi-university peer counselling programme.* Paper Presented at the Annual Meeting of the Mid-Western Psychological Association, Chicago. April.

Henderson, N., Fadali, M. S., & Johnson, J. (2002). *An investigation of first-year engineering students' attitude toward peer-tutoring*. Thirty-second ASEE / IEEE Frontiers in Education Conference, Boston, 6-9 November.

Johnston, V. (1997). *Why do first year students fail to progress to their second year? An academic staff perspective*. Paper presented at the British Educational Research Association Annual Conference, University of York, Education-Line, September 11-14.

Kvam, P. H. (2000). The effect of active learning methods on student retention in engineering statistics. *The American Statistician*, *54*(2), 136-140.

Mearig, J. S. (1987). Assessing the learning potential of kindergarten and primary-age children. In C. S. Lids (Ed.), *Dynamic Assessment: An interaction approach to evaluating learning potential* (pp. 237-267). New York: The Guilford Press.

Mehl, M. C. (1991). Mediated learning experience at university level – a case study. In R. Feuerstein, Klein, (Eds.), *Mediated learning experience: Theoretical, psychological learning implications*, (pp. 157-178). Tannenbaum, London: Freund.

Pascarella, E., & Terenzini, P. (1991). *How college affects students*. San Francisco, CA: Jossey-Bass Publishers.

Poellhuber, B., Chomienne, M., & Karsenti, T. (2008). The effect of peer collaborative learning on self-efficacy and persistence in a learner-paced continuous intake model. *Journal of Distance Education*, *22*(3), 41-62.

Raven, J. C., Court, J. H., & Raven, J. (1977). *Manual for Raven's Progressive Matrices and Vocabulary Scales*. London: H. K. Lewis & Co., Ltd.

Raven, J., Raven, J. C., & Court, J. H. (1998). *Manual for Raven's Progressive Matrices and Vocabulary Scales: Section 1, General Overview*. Oxford: Oxford Psychologists Press Ltd.

Schur, Y., Skuy, M., Zietsman, A., & Fridjhon, P. (2002). *School Psychology International*, *23*(1), 36-67.

above is missing the article title

Scott, I. (2008). Failing the majority. *Mail & Guardian, 10 October, 2008, pp. 15.*

Skuy, M., Gewer, A., Osrin, Y., Khunou, D., Fridjhon, P., & Rushton, P. (2002). Effects of mediated learning experience on Raven's matrices scores of African and non-African university students in South Africa. *Intelligence, 30*, 221-232.

Skuy, M., Mentis, M., Arnott, A., & Nkwe, I. (1990). Combining instrumental enrichment and creativity/socio-emotional development for disadvantaged gifted adolescents in Soweto: Part 2. *International Journal of Cognitive Education & Mediated Learning Experience*, *1*(2), 93-102.

Skuy, M., Mentis, M., & Mentis, M. (1996). *Mediated learning in and out of the classroom*. Arlington Heights, II: Skylight.

Skuy, M., Rushton, P., Fridjhon, P., & Seabi, J. (2002). *Background variables related to IQ test scores and university grades of first year African and non-African engineering students in South Africa*. Paper presented at the Conference of the International Society for Intelligence Research, December 4-7.

Skuy, M., & Schmukler, D. (1987). Effectiveness of the Learning Potential Assessment Device with Indian and Coloured adolescents in South Africa. *International Journal of Special Education*, *2*, 131-149.

Smith, G. (2002). Survivor college style. *Career World*, *30*(6), 29-31.

Totten, S. Sills, T. Digby, A., & Russ, P. (1991). *Cooperative learning: A guide to research*. New York: Garland.

Tzuriel, D. (1998). *Cognitive modifiability: The dynamic assessment of learning potential*. Tel-Aviv: Sifriat Poalim.

Tzuriel, D., & Kaufman, R. (1999). Mediated learning and cognitive modifiability: Dynamic assessment of young Ethiopian immigrants in Israel. *Journal of Cross-Cultural Psychology, 30,* 359-380.

Van Walsum, E.J., Sanders, C., Fossum, T., Sadoski, M., Bramson, R., & Wiprud, R. (2004). Attitudes of veterinary medical students and medical students toward collaborative learning: An experiment. *Journal of Veterinary Medical Education*, *31*(1), 76-78.

Vygotsky, L. S. (1978). *Mind in Society*. Boston: Harvard Press.

Vygotsky, L. S. (1987). Emotions and their development in childhood. In Reiber & Carton (Eds.) *Collected Works of L.S. Vygotsky*, 1, (pp. 325-337). New York: Plenum.

Wong, E. S. (2003a). *Action research philosophy: The fountain of living research*. Perth: Centre of Professional Practitioner Resources Publication.

Authors note

Joseph Seabi is a Lecturer and a Research Coordinator in the Discipline of Psychology, at University of Witwatersrand. Kate Cockcroft is an Associate Professor in the Discipline of Psychology, at University of Witwatersrand Peter Fridjhon is a Senior Lecturer in the School of Statistics and Actuarial Science, University of the Witwatersrand.