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Measuring the Effectiveness of Student Teams Achievement Divisions as a Teaching Strategy on Grade 10 Learners' Economic Knowledge

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ABSTRACT Economics education focuses on the teaching and learning of Economics as a subject. It encompasses the content to be taught (what), the methods of teaching (how), the evaluation of those methods (why), and information of general interest to teachers of Economics from elementary through to graduate school level. This paper investigates the effectiveness of the pedagogic method of the student teams' achievement divisions (STAD) as a cooperative learning and teaching strategy as compared to the direct-instructional method in building the economic knowledge of grade 10 learners at secondary schools in the Free State. Data was collected from 229 grade 10 Economics learners and eight teachers at secondary schools in the Free State. Teachers used both STAD and direct instruction by teaching the topic, 'Contemporary Economics Issues', from the Economics curriculum of the Curriculum and Assessment Policy Statement (CAPS). Learners completed a forty-response-item multiple-choice questionnaire on Economics as a pre-test and post-test. The statistical findings of this study reveal that STAD significantly increased learners' knowledge of the 'Contemporary Economics Issues' module as a teaching strategy, as compared to the direct-instruction method. The results further indicated that STAD as a teaching method improved learners' learning, when teachers who were well trained in both the cooperative learning teaching strategy and in the subject of Economics were involved.

INTRODUCTION

Economics education focuses on the teaching and learning of Economics as a subject. It encompasses the content to be taught (what), the methods of teaching (how), the evaluation of those methods (why), and information of general interest to teachers of Economics from elementary through to graduate school level (van Wyk 2012a; Walstad and Rebeck 2001a). It can be argued that a widespread understanding of Economics is vital to the future health of the nation's economy, because effective Economics education in schools has an important role to play in providing future citizens with the knowledge and tools necessary to make responsible and effective decisions in creating sustainable communities (van Wyk 2015).

Students develop perceptions of their economic world at an early age, as they progress through the educational process, and these perceptions develop into attitudes and opinions about the subject of Economics. Whether they intend to or not, teachers influence the direction of the development of their students' attitudes. By finding ways to teach students Economics more effectively, teachers can contribute to improved attitudes towards the subject. It is important to understand that the scope and importance of Economics as a subject go far beyond the goal of improving an understanding of the basic principles of supply and demand in the workings of the economy. According to Walstad and Rebeck (2001b), for example, Economics can be taught in such as way as to generate new knowledge by exposing students to real-life learning environments and experiences.

Research studies reveal that by teaching basic economic concepts and applying them to classroom discussions of economic issues and institutions, teachers and lecturers are not indoctrinating students, but providing a knowledge foundation for more informed opinions and decision-making on vital economic issues (Nkonyane and Van Wyk 2015; Van Wyk 2010; Walstad and Rebeck 2001a; Dickie (2006). On the other hand, as Walstad (1994) suggests, students who do not get the opportunity to learn Economics and thereby increase their economic understanding will probably never take much interest in the subject or in their economic world.

The contention in this study is, therefore, that the more economic concepts learners know,

the more they like and value the subject, and the more information they have at their disposal about economic issues. However, Economics is still seen as an elective subject in South African secondary schools. Given the importance of the subject, it is clear that this is an imbalance. Economics teachers will be key agents in changing it.

The National Policy Framework for Teacher Education and Development in South Africa (Department of Education 2007) establishes that quality education is the democratic right of everyone in South Africa without limitation. Schooling is described as a public good in which teachers are the key agents. The range of demands placed on teachers, evident in the seven roles set out for them in the section on Norms and Standards for Educators (DoE 2007), is impressive and is expected to have a significant impact on teacher training and curriculum development initiatives in all school curricula. This is critically important in relation to Economics education.

As Walstad and Rebeck (2001a) argue, a viable education system staffed by committed, competent and confident teachers is a primary condition for achieving the objectives of a quality education, and this includes the subject of Economics. South African methodology places a huge emphasis on *what*, *why* and *how* Economics is taught as a subject, and these three factors are seen as critical to achieving outcomes set by the National Curriculum and Assessment Policy Statement (NCAPS) curriculum policy framework for South African schools (Department of Basic Education 2010). In this context, teacher efficacy has emerged as an important construct, as well as the teachers' beliefs in their ability to actualize the desired outcomes for their learners. Teacher efficacy has been linked to teacher effectiveness and appears to influence learners in their academic achievements (Dickie 2006; Goddard et al. 2000).

In the following paragraphs, the link between teacher efficacy and the student teams achievement divisions (STAD) method as a cooperative learning teaching strategy is reviewed for the purpose of conducting a literature review.

Literature Review

Teacher Efficacy Construct

Effectiveness is a difficult concept to define. Teaching is a complex task and teachers work in a multitude of contexts. Discussing the relation between teacher preparation and effective teaching, Ghaith and Shaaban (1999:3) aptly noted that *"teacher quality is a complex phenomenon, and there is little consensus on what it is or how to measure it"*. In fact, there is considerable debate as to whether teacher effectiveness should be evaluated on the basis of teacher inputs (qualifications), the teaching process (instructional practices), the product of teaching (effects on student learning), or a composite of these elements.

As originally formulated by Bandura (1977), the construct of self-efficacy was grounded in social cognitive theory in the context of self-regulatory processes that affect a person's selection and construction of environments. Self-efficacy beliefs affect one's cognitive, motivational, affective, and selection processes (Bandura 1997). Implicit in Bandura's (1997) work is the assumption that efficacy is a situation-specific attitude that changes with circumstances and events. Perceived self-efficacy may be developed by such variables as previously experiencing successes in specific tasks and watching others become successful at similar functions. Bandura (1997:42) argued that efficacy beliefs should be measured in terms of particularized judgments of capability that may vary across realms of activity, under different levels of task demands within a given activity domain. A high sense of efficacy in one domain is not necessarily accompanied by high self-efficacy in other realms.

In essence, perceived self-efficacy plays a major role in the amount of effort a person devotes to the accomplishment of a specific outcome because it is related to a person's inherent belief in his or her capabilities to accomplish something, regardless of actual competencies. Teacher efficacy, as seen from the self-efficacy perspective, has emerged as an important construct in teacher education over the past two decades. Wheatley (2005: 748) defined the concept as: "teachers' beliefs in their ability to actualize the desired outcomes". Moreover, scholars have shown that higher levels of self-perceived teacher efficacy have positive effects on teacher effort and persistence in the face of difficulties (Dickie 2006; Soodak and Podell 1996). This applies also to teachers' levels of professional commitment (Tschannen-Moran et al. 2001; Coladarci 1992), openness to using new methods in teaching and positive teacher be-

havior (Ghaith and Shaaban 1999), as well as the teachers' ability to motivate students (Wigfield 1994). Additionally, as Ghaith and Yaghi (1997) point out that teachers with a high sense of efficacy are more likely to use student-centered teaching strategies, while low-efficacious teachers tend to use teacher-directed strategies, such as didactic lectures and reading from textbooks (Dickie 2006). The importance of teacher efficacy is, therefore, well established.

It is useful to note, too, that there are some important common points linking recent reforms in curriculum with the subject of the teachers' sense of their own efficacy (Goddard et al. 2000). In this paper, the topic of teacher effectiveness in relation to the uses of specific economic subject content knowledge (SCK) and pedagogical content knowledge (PCK) in achieving specific teaching and learning objectives in Economics as a subject is evaluated. In particular, this study seeks to measure the way Economics teachers apply their praxis (SCK and PCK) and adapt to innovations that requires they develop a higher sense of self-efficacy in their subject. The implementation of reform in teacher education and teacher efficacy beliefs are both subjects that have been studied in depth over the years, but few research studies have evaluated the possible connections between the two. This study seeks to show that there is a clear link between teacher efficacy and teacher effectiveness and that it has a direct influence on learners' economic knowledge.

Student Teams Achievement Divisions (STAD) as a Cooperative Learning Teaching Method

Scholars of the cooperative learning approach (CL) are of the opinion that this approach should be promoted in the teaching of the social sciences, and especially in Economics education (Johnson et al. 2000; Shachar and Fischer 2004; van Wyk 2010).

In the CL environment, learning is characterized as a collaborative approach that restructures problem-solving activities by integrating different points of view. Typically, it is understood as a collaborative approach to finding explanations and analyzing misconceptions, as well as to study practice. In particular, the high intensity of learner interactions and activities, and levels of controversial discussion that are typical of cooperative methods can be labeled as cognitive elaboration.

It has been frequently argued that such elaborative processes of actively integrating new information into prior knowledge might be a fundamental explanation for the effectiveness of cooperative learning methods (van Wyk 2010). The student teams achievement divisions (STAD) method is one such CL-teaching method, which constructs a cooperative learning environment that fosters learner activity, joint acquisition of content and mutual explanation. The researcher's contention here is that STAD is a CL-learner-centeredness instructional technique that could help meet the challenge of developing greater teacher effectiveness in South African school classrooms, especially regarding the subject of Economics.

STAD restructures conventional instructional strategies by placing the learner at the forefront of the learning process and by transforming the teacher into a facilitator who probes and challenges learners to construct new knowledge (van Wyk 2010; Johnson 2003; van Boxtel et al. 2000; Emerson and Taylor 2004). In this study, grade 10 learners pursued their own learning objectives by researching a topic, set within the CAPS Economics curriculum, by developing appropriate questions and then producing their own solution to a problem. In this model, Economics teachers facilitated and coached learners with suggestions and advice for further study or inquiry, but they did not assign predetermined learning activities on the specific topics.

This study measures the effectiveness of STAD as a teaching strategy on grade 10 learners' knowledge and skills in Economics as compared to the direct-instruction method, as used by teachers in Free State secondary schools. The research question for this investigation is formulated thus: 'Does STAD enhance grade 10 learners' learning and knowledge of the subject 'Contemporary Economics Issues' more effectively than the direct-instruction approach?

RESEARCH METHODOLOGY

This research project was registered and permission was granted by the Quality Assurance Unit of the Free State Department of Education (FSDoE) before the research was undertaken. After permission was granted, a consent letter that included the official consent letter was

sent to eight secondary schools that had been identified for participation. The letter outlined the purpose of the study, the confidentiality clause and the fact that the consent of participants (teachers and learners) would be sought for this study. Eight grade 10 Economics teachers with more than five years of teaching experience at eight different secondary schools (urban, rural and township schools) in the FSDoE were selected. From the biographical data collected about each teacher, it was established that five of these teachers (teachers A, B, C, D, E, F and G) had participated in the Training-the-Trainers (ToT) training program (van Wyk 2012b) conducted by the Council on Economic Education (CEE) faculty. From the same biographical data it was also established that four of these teachers had obtained a Master's degree in the subject. All of the secondary schools were located in the education districts of the Free State province. Three of the secondary schools were located in rural education districts, while five were located in urban education districts.

All the participating teachers accepted the official invitation, which required them to agree to participation in the research project during the third quarter of 2011, which ran from the beginning of July to the end of September. An agreement was signed with the school principals and the eight Economics teachers for advice, assistance and ongoing support that would be provided to participants by the researcher during the research period.

At this point, all grade 10 learners had received their June 2013 mid-year examination results, and the participating teachers were able to establish which learners would need extra support and monitoring in the subject. The participating teachers of two grade 10 classes used both STAD and direct-instruction methods in their teaching of the topic, 'Contemporary Economics Issues', as outlined in the Curriculum and Assessment Policy Statement (CAPS) Economics curriculum (DoE 2010). The content focused specifically on building the learners' knowledge, and skills on the topics of unemployment, poverty, inflation, globalization and tourism, as well as on supporting their positive attitude to studying these topics.

During the unit sessions, as the problem unfolded, learners discovered that in a healthy economy scarcity dictates opportunity costs and societal tradeoffs. Learners generally spent 5 to 10 classes solving one Contemporary Economics Issue problem as planned by the teacher. During the third school quarter of 2010, each teacher taught one class in a direct-instruction format and one class using a STAD unit designed to meet curriculum outcomes in the CAPS Economics curriculum. The research design for this quasi-experimental construct was constructed in such a way as to minimize biases in estimating differences between the direct- instruction (comparison) and STAD (treatment) classes.

Using the STAD approach, learners and teachers confronted an ill-structured problem on unemployment. Investigation, research, and cooperative discussion then revealed that there might be more than one possible solution. As learners worked through the problem, they discovered that understanding the underlying economic concepts was essential to framing and solving problems relating to the topic of unemployment. The problem was loosely structured to allow for learner discovery and independent learning, but solving it proceeded in a structured way. Learners worked in groups throughout the learning unit. They were required to conceptualize the problem, determine the Economics concepts necessary to solve it, and undertake the research and reading necessary to understand the relevant Economics concepts. This cycle was repeated throughout the unit, and the problem concluded with a presentation and report.

Teachers began their 'Contemporary Economic Issues' unit using the traditional direct-instruction method of instruction with the comparison class and the STAD CL method with the treatment classes. All eight teachers had experience in teaching the topic using both these methods. They were asked to spend the same amount of time and cover the same concepts in each class using each method. All teachers attended a weeklong training workshop during the June school holidays under the guidance of a university professor of Economics Education, in order to prepare themselves for using the STAD method in teaching the 'Contemporary Economic Issues' topics to their classes. After each topic had been presented and discussed, conversations were held with the teachers on how they were teaching the topics. Debriefings on the completion of each topic suggested that they had been implemented as planned.

Learners in both the direct-instruction and STAD classes completed several assessment

instruments for this study (DoE 2007). Most importantly, learners completed a 40-item multiple-choice 'Contemporary Economic Issues' test as a pre-test and post-test. *To test the reliability of the instrument, Cronbach's alpha coefficient was calculated for items in the multiple-choice questionnaire (α = 0.8071).* As indicated earlier, the pre-post design allows for assessing change in knowledge and skills associated with the topics. The tests were developed on the basis of the CAPS Economics curriculum policy.

The tests were also aligned with the three main grade 10 Economics textbooks, which are prescribed as learner and teacher support material (LTSM) in the catalogue of the Free State Department of Basic Education (FSDBE). The items included in the tests addressed the full range of cognitive objectives (knowledge, comprehension, application, analysis, and evaluation) described by Bloom et al. (1956). Learner scores were calculated by adding the number of correct answers. Data was also collected on each student's gender, attitude toward learning Economics, preference for group work, feelings regarding failure, and assessment of their teacher.

Data was collected from 229 grade 10 Economics learners at eight secondary schools. For this research project, a quasi-experimental design was applied in order to reduce, if not eliminate, sample selection issues. Because classes were randomly assigned for a STAD treatment, learners from both groups could opt out of testing in similar patterns. Few significant differences existed between the samples used in the multivariate estimations and those that lacked data collected by the instruments.

The data presented in Table 1 shows that fewer students in teacher C's classes completed the verbal ability and interest in Economics instruments, than those in other classes. However, given the relative randomness of the selection of learners in the treatment and comparison samples, sampling errors were distributed equally across both groups.

Economics Teaching Model for this Study

The following Economics teaching model was applied:

$$L_i = \alpha_{0,1} + \alpha_{1.1}\,\mathrm{STAD} + \alpha_{2.1}\,X_i + \alpha_{3.1}\,Z_j + \alpha_{4.1}\mathrm{LPT}_i + \epsilon_{.1} \quad (1)$$

L_i = learner i's achievement in C*ontemporary Economics Issues*

STAD = a 0, 1 binary variable with 1 indicating enrolment in a class using STAD and 0 indicating enrolment in a class using traditional direct-instruction methods,

X_i = a vector of variables indicating student i's characteristics (gender, verbal ability, and interest in Economics),

Z_j = a vector of variables indicating teacher j,

LPT_i = learner i's pre-test score, and

ε = error term.

An estimated equation under three specifications was constructed to ensure that the results were not sensitive to model specification. Firstly, estimated equation (1) was applied, using the learner's post-test score as the dependent variable. Because it could not be ensured that learners were motivated to perform well on the pre-test, the independent variable was dropped from the estimation ($\alpha 4{,}1 = 0$) and the equation was re-estimated on a model that implicitly assumed a course goal of maximizing knowledge of contemporary economic issues. Finally, the change in 'Contemporary Economics Issues' knowledge was used as the independent variable (post-test score minus pre-test score) in estimated equation (1) on a model that implicitly assumed a course goal of increasing knowledge of Economics (that is learner's learning).

As is discussed later, learners using STAD may gain additional skills (for example, positive interdependence, social skills, problem-solving skills, effective communication skills) compared to learners in traditional direct-instruction classes. However, one must leave the analysis of this potential to future research. Under all specifications, the αs in equation (1) estimated the influences on knowledge of 'Contemporary Economic Issues' as a positive and significant coefficient on instructional strategy ($\alpha 1{,}1$), suggesting that STAD increases knowledge over direct instruction and the other as serving as statistical controls.

To examine whether aptitude-treatment interactions existed between STAD and teacher characteristics, the following was estimated:

$$L_i = \alpha 0.2 + \alpha 1.2\mathrm{STAD}_i + \alpha 2.2 Z_j + \alpha 3.2\ \mathrm{STAD}_i\ {}^{*}Z_j + \alpha 4.2\mathrm{PT}_i + \epsilon.2 \quad (2)$$

In this Economics education model 2, $\alpha 3{,}2$ estimates the interactions between the STAD instructional strategy and teacher characteristics, with $\alpha 1{,}2$ estimating the influence of STAD in the aggregate and $\alpha 2{,}2$ estimating its differing influence for each teacher. This equation was applied to examine the influence of STAD-instructional strategy ($\alpha 1{,}2$), teacher ($\alpha 2{,}2$), and

instructional strategy-teacher interaction (α3,2) on knowledge and learning of 'Contemporary Economics Issues'. Where significant interaction effects occurred, a stratified estimation of equation (1) by the teacher was used to determine which specific teachers benefited (that is raised student achievement) from the STAD strategy, which lost, and which were neutral with its use.

Because the dependent variable, post-test or change score, was a relatively continuous one, unbounded measure (for example no one scored a 0 or 16), ordinary least squares (OLS) regression for all estimations were used.

RESULTS

Before the results are discussed of the multivariate estimations, the learners, teachers, and outcomes from this analysis samples will be described (Table 1). This description provides a benchmark for explaining the subsequent multivariate analysis, which highlights changes from the averages presented in the descriptive statistics.

Mean scores (M) and Standard Deviations Scores (SD) of STAD and Direct-instruction Teaching Strategies in Free State Secondary Schools

The descriptive statistics showed significant differences between the STAD and direct-instruction groups in learning secondary school Economics. The post-pre-test difference was +6.02 (SD = 3.21) for the learners in STAD classes, and +1.88 (SD = 2.62) for learners in the direct-instruction classes. This is equivalent to an effect size of .64 for STAD learners and .42 for direct-instruction learners. The t-tests between the means in the treatment and contrast groups indicated significant ($p \leq .05$) differences other than for the change in score (that is post-test minus pre-test).

Teacher A (0.282) and G (0.213) taught significantly more learners in STAD than direct-instruction classes, and direct-instruction (3.451) learners classes had significantly more interest in learning Economics at the beginning of the course than those in STAD classes. STAD's large-effect size and the significant difference between STAD and direct-instruction classes in learning Economics (change score) suggest that STAD is an effective tool for teaching and learning the 'Contemporary Economics Issues' module in secondary school. However, differences in effectiveness may arise with different teachers, as the framework suggests.

Pre-test and Post-test Scores Between STAD and Direct-instruction Methods in Teaching Economics

A cursory overview of this potential is described for each teacher's differences in learners' economic knowledge (Table 2). Based on

Table 1: Mean scores (M) and standard deviations scores (SD) of STAD and direct-instruction teaching strategies

	Direct instruction		*STAD*	
Variable	*Mean*	*Std. dev*	*Mean*	*Std. dev.*
Effect size	0.421	-	**0.641**	-
Change scores	1.880	2.617	**6.023****	3.207
Post-test score	31.357	13.099	34.371	13.613
Pre-test score	29.478	22.983	28.279	22.763
Student Characteristics				
Gender	0.561	0.555	0.531	0.511
Verbal ability	50.222	17.411	48.333	16.399
Interest in learning in Economics	**3.451****	0.877	3.221	0.832
Teacher Factor				
Teacher A	0.195	0.387	**0.282****	0.487
Teacher B	0.214	0.451	0.189	0.391
Teacher C	0.222	0.311	0.194	0.361
Teacher D	0.219	0.332	0.172	0.392
Teacher E	0.204	0.487	0.186	0.387
Teacher F	0.232	0.351	0.189	0.388
Teacher G	0.188	0.411	**0.213****	0.361
N	241	229		

** Indicates significant differences ($p \leq 0.05$) between STAD and direct instruction by determining *t* test for mean differences

Table 2: Pre-test – Post-test scores between STAD and direct instruction

		Pre-test scores		*Post-test scores*		*Change scores*	
Variables	*N*	*Mean score*	*Std. dev*	*Mean score*	*Std. dev*	*Mean score*	*Std. dev*
Teacher A							
STAD	35	27.079	12.661	31.098	16.332	4.019	3.451
Direct instruction	33	28.378	13.223	29.441	14.201	1.063	2.611
Teacher B							
STAD	29	24.129	12.001	27.328	19.231	3.199	5.422
Direct instruction	32	27.078	11.200	28.441	13.221	1.363	3.251
Teacher C							
STAD	41	26.069	12.461	27.098	17.032	1.029	4.422
Direct instruction	42	28.128	11.023	29.901	14.001	1.773	3.051
Teacher D							
STAD	29	23.069	12.452	26.238	17.231	3.169	5.451
Direct instruction	33	25.378	11.341	27.041	13.201	1.663	4.102
Teacher E							
STAD	40	29.719	13.223	31.398	19.201	1.679	4.822
Direct instruction	41	28.578	12.122	29.331	18.443	0.753	3.331
Teacher F							
STAD	33	23.399	13.522	24.348	15.021	0.949	3.451
Direct instruction	35	28.118	12.111	29.111	13.032	0.993	5.622
Teacher G							
STAD	29	26.229	11.611	30.098	15.223	3.869	6.062
Direct instruction	25	26.672	13.072	29.441	17.231	2.769	3.566

Note: 40-item multiple-choice contemporary economic issues test as a pre-test and post-test.

the results in Table 2, significant ($p \leq .05$) differences existed between STAD and direct-instruction classes for all participating teachers in performance on either the pre- or post-test. However, teachers A (4.019) and G (3.869) had a significantly higher change in test scores from the pre- to post-test in the STAD classes. In sum, teachers A, B, D, E and G who used the STAD performance compared better when using the direct-instruction method. Economics model equation (1), without any interaction terms, shows whether STAD is correlated with increased knowledge of the 'Contemporary Economics Issues' module as measured by a multiple-choice post-test score, controlling for verbal ability, individual factors (gender, interest in Economics), and teacher.

Comparison Between the *t*-test Scores of the Teaching Methods

Results based on information and results in Tables 3 and 4 regarding *t*-test scores between the effectiveness of STAD and direct instruction as teaching strategies are displayed statistically. Results of the t-test are shown in Tables 3 and 4. The differences in the mean scores of STAD as a teaching method (M=29.611, SD=3.783) are statistically significantly higher (t=2.93, df=994) in a two-tailed ($p = 0.044$ and 0.034) test when compared to the direct-instruction method (M=27.633, SD=2.671). Overall, the results show that STAD as a CL teaching method enhanced learners' knowledge and learning of 'Contemporary Economics Issues' in secondary schools.

Table 3: Mean and standard deviation scores for *t*-test between teaching methods

Teaching strategy		*Mean*	*SD*	*SE mean*
STAD	229	29.611	3.783	2.556
Direct instruction	241	27.633	2.671	1.445

Results of the estimation (Table 5) revealed that STAD is significantly correlated with the knowledge of Economics learners after studying a topic in 'Contemporary Economics Issues', where knowledge is measured as the gain from the pre-test to the post-test. These results indicated that STAD increased learning over the direct-instruction method over time.

As noted, pre-test score, verbal ability, and teacher C are the only other significant ($p \leq 0.05$) correlations in the estimation of equation (2). The estimation of equation (2), with STAD-

Table 4: Levene's test for equality of variances between STAD and direct-instruction methods

		Independent sample test								
		Levene's test for equality of variances		*t-test for equality of variances*				*95% confidence*	
		F	*Sig.*	*T*	*df*	*Sig. (2-tailed)*	*Mean difference*	*SE difference*	*Lower*	*Upper*
Comparison between STAD and direct instruction teaching methods	Equal variances assured	9.334	0.0004	2.93	944	0.044**	4.221	0.213	0.004	0.622
	Equal variances not assured			2.04	822.033	0.034**	1.671	0.211	0.008	0.509

**$p \leq 0.05$

Table 5: Test scores differences by teachers, STAD and class groups in 'Contemporary Economics Issues'

	Post-test scores		*Post-test scores*		*Change scores*	
Dependent variables	*No teacher interaction*	*Teacher interaction*	*No teacher interaction*	*Teacher interaction*	*No teacher interaction*	*Teacher interaction*
Teacher A	27.079 (.459)	28.661 (.688)	27.098 (.341)	31.332 (.722)	0.019	2.671
Teacher B	25.378 (.544)	28.861 (.604)	26.766 (.344)	28.112 (.671)	1.388	-.749
Teacher C	22.331 (.582)	23.231 (.744)	21.231 (.546)	29.487 (.760)	1.100	6.256**
Teacher D	24.129 (.522)	22.761 (.644)	28.766 (.334)	24.112 (.671)	4.637**	1.351
Teacher E	21.078 (.451)	21.231 (.744)	22.231 (.546)	25.487 (.760)	1.153	4.256**
Teacher F	26.333 (.533)	23.761 (.684)	24.066 (.444)	25.102 (.671)	-2.267	1.341
Teacher G	26.069 (.341)	24.231 (.624)	26.231 (.556)	26.487 (.760)	0.162	2.256
Teacher Interaction with Teaching Method						
A*STAD		29.332 (.891)		34.545 (.929)		5.213
B*STAD		25.031 (.766)		28.056 (.724)		3.025
C*STAD		26.061 (.631)		27.761 (.631)		1.700
D*STAD		24.231 (.744)		26.431 (.789)		2.200
E*STAD		25.061 (.584)		27.800 (.684)		2.739
F*STAD		25.431 (.744)		27.831 (.789)		2.400
G*STAD		25.061 (.724)		28.454 (.624)		3.393
Student Characteristics in Contemporary Economic Knowledge						
Verbal ability	.067**** (.211)	.069**** (.022)	.089**** (.011)	.094**** .(.014)	.024* (.015)	0.22* (.013)
Interest in learning in Economics	0.091 (0.186)	0.133 (0.169)	-.095 (.184)	-.072 (.179)	.373* (.251)	.462* (.261)
Pre-test score	.342**** (.069)	.453*** (.064)	-	-	-	-
Intercept	.878	2.31	2.631***	3.239**	-2.119	1.955*
R^2	.872	.522	6.44	.439	0.618	-.213
F	22.11	17.88	19.32	15.22	1.39	3.45
N	229	229	241	241	229	229

*Notes:*****p≤ 0.001; ***pd≤ 0.01; **p≤ 0.05; *p≤ 0.10

teacher interaction terms, shows that STAD enhances student learning for all teachers adopting the strategy. Results found a significant, positive interaction between STAD and teachers A, D and F (Table 6) for all measures of knowledge, and a significant, positive interaction between post-test with pre-test as a control and change score for teacher B.

Table 6: STAD effects for Economics teachers

Dependent variable	*N*	*Post-test score (with pre-test as a control)*	*Post-test score (without pre-test as a control)*	*Change score*
Teacher A	35	31.976*** (.602)	33.106*** (.620)	1.879*** (.667)
Teacher B	29	28.126*** (.710)	31.053 3. (.601)	3.138**** (.733)
Teacher C	41	30.998*** (.544)	31.506** (.563)	1.141 (.840)
Teacher D	22	28.22 3* (.601)	27.838**** (.733)	1.053 3. (.701)
Teacher E	40	26.582 (.678)	27.725 (.332)	-.472 (.562)
Teacher F	33	26.22 3** (.301)	27.008*** (.403)	3.053*** (.444)
Teacher G	35	28.953** (.701)	28.198**** (.403)	1.533 (.671)

Notes: ****p≤ 0.001; ***p≤ 0.01; **p≤ 0.05; *p ≤.010.

These positive interactions further emphasized that STAD is more effective for some teachers than others. In sum, the results showed that STAD was a significantly more effective instructional strategy for the participating teachers as compared to the direct-instruction method.

Results based on the estimations in Table 6 showed the full impact of STAD for each teacher. Analysis suggested that student learning of the 'Contemporary Economics Issues' module significantly increased with STAD for teachers A, B, C, D, F and G. Three of the teachers had a Master's degree in Economics and all had STAD training experience (in-service training (INSET) at a university). Student learning of 'Contemporary Economics Issues' significantly decreased using STAD for teachers E and H. Grade 10 learners in classes taught by teachers D and G learned from both STAD and traditional direct-instruction pedagogies.

The results in Table 7 indicated that STAD (between teacher groups, learners groups) was statistically significant (p = 0.003), which indicated a modest effect (8721.619 ÷45266.8 = 0.192) in enhancing the learners' knowledge and skills in grade 10 as compared to the direct-instruction method in teaching 'Contemporary Economics Issues'.

DISCUSSION

Only a few research studies on Economics education that used quasi-experimental designs could be found (van Wyk 2010; Dickie 2006; Emerson and Taylor 2004; Walstad 1979). However, these operational research designs have been employed with some success in conducting Economics education research in universities. More findings relating to the studies that are available revealed that STAD is an appropriate technique for increasing students' Economics literacy (van Wyk 2015, 2012; Walstad and Rebeck 2001a). Moreover, the findings of this study indicated that STAD enhanced grade 10 learners' knowledge and learning of 'Contemporary Economics Issues' in the classroom as compared to the traditional direct-instruction approach. The results showed a statistical significant difference between STAD and direct-instruction groups in learning secondary school Economics. The results of the post- and pre-test show that there was a statistical significant difference (+6.02) for the learners in STAD classes as compared to direct-instruction classes (+1.88). The t-tests between the means in the STAD treatment and direct-instruction contrast groups indicate significant ($p \leq .05$) differences. Furthermore, some teachers were positive towards

Table 7: Effect size in analysis of variances (ANOVA) for teaching methods and different groups

	ANOVA				
	Sum of squares	*df*	*Mean squares*	*F*	*Sig*
Between groups	8721.619	45	2349.940	6.922	0.003**
Within groups	45266.8	781	671.166		
Total	53988.419	826			

*p ≤ 0.05 .

STAD as a CL-teaching strategy because it impacted their praxis. These findings suggest that the STAD approach was more effective than direct instruction in the classes held for the purpose of this investigation. A comparison was made on the t-test differences scores of STAD (M=29.611, SD=3.783), which yielded a statistically significantly higher result (t=2.93, df=994) than a two-tailed (p = 0.044 and 0.034) test as compared to the direct- instruction method (M=27.633, SD=2.671). Overall, the results show that STAD as cooperative learning teaching method enhanced learners' knowledge and learning of 'Contemporary Economics Issues' in Free State secondary schools. Teachers who were using STAD to teach 'Contemporary Economics Issues' during this study also achieved other outcomes, such as collaboration, cooperation and established relationships amongst learners, which were not measured in this investigation. The Economics teaching model, $Li = \alpha 0.2 + \alpha 1.2 STADi + \alpha 2.2 Zj + \alpha 3.2 STADi * Zj + \alpha 4.2 PTi + \varepsilon .2$ was achieved for this study. A major finding using STAD as a teaching strategy was that it enhanced learners' multiple collaborative discussions wherein learners frame (identify) the problem, collaboratively decide on a solution, revise the solution on the basis of new information, and finally prepare a group presentation describing their solution. Other specific outcomes of STAD as teaching strategy were the enhancement of fostering positive interdependence amongst learners in learning and an increased problem-solving ability. Learners through this teaching strategy were challenging their inquiries in their group projects in such a way so as to stimulate knowledge gained in this study.

Moreover, the results of this study support similar studies (van Wyk 2013b, 2012; Dickie 2006; Walstad and Rebeck 2001a). They argue that, because the results achieved in gaining content knowledge are equivalent, STAD is an effective and superior CL-teaching strategy (Johnson and Johnson 1998). On the other hand, traditionalists might argue that the efficiency of the traditional method makes direct instruction the superior teaching strategy compared to STAD. The traditionalists' arguments are less convincing in the face of the findings of this study, which are that learners' learning was enhanced for teachers using STAD, suggesting that this particular instructional strategy should be adopted in the secondary schools of the Free State Department of Basic Education. However, the results suggest that some interaction between the two methods can be effective, given that those teachers, who use STAD to enhance learning of 'Contemporary Economics Issues' in secondary schools, sometimes continue to use traditional methods as well. By using methods such as STAD to teach learners more about Economics, these teachers are contributing to improved attitudes to the subject at their respective schools. At the same time, teaching basic economic concepts and applying them to classroom discussions of economic issues and institutions helps advance the subject knowledge of learners. Other research studies have shown that the STAD method also helps prepare students in applying their understanding of economic concepts and principles to real-world problems through problem definition and analysis (Van Wyk 2012b; Emerson and Taylor 2004; Thomas and Campbell 2002).

The teachers who participated in this study were not indoctrinating learners, but rather, providing a knowledge foundation for more informed learner opinions and decision-making on vital issues such as 'Contemporary Economic Issues'. The findings of this study show that the more economic concepts learners know, the more they like and value the subject, and the more they feel that they have useful information about economic issues. It is probably true that learners who do not get the opportunity to learn Economics and increase their economic understanding will never take much interest in the subject or in the economic world around them. Clearly, further research is needed to establish this. However, if the results of this study withstand the rigor of further expansion and replication of the results, it strongly suggests that more primary and secondary school teachers should consider STAD as a preferred instructional strategy, especially to achieve the CAPS objectives. The limited research that is available on applying knowledge (Gallagher et al. 1992) suggests that learners who have experienced STAD instruction are superior at problem definition as compared to similar learners in traditional direct-instruction or lectured classes. Further research on this question, as well as more discussion and analysis of the goals of STAD teaching, is needed.

However, it needs to be mentioned that there is a concern about research on the use of STAD

teaching for other topics contained in the CAPS Economics curriculum. Clearly, the factors that facilitate or inhibit the implementation of the STAD curriculum should be addressed in future research (Snyder et al. 1992).

CONCLUSION

This study found that the STAD method significantly increased grade 10 learners' knowledge and learning of 'Contemporary Economics Issues', as compared to direct instruction in Free State secondary schools. The results also demonstrate significant differences in the pre-test and post-test scores of STAD and direct-instruction groups as regards the teaching and learning of secondary school Economics. The *t*-tests scores between the means in the treatment (STAD) and contrast groups (direct instruction) indicated significant ($p \leq .05$) differences overall. Depending on the effect size (statistically significant = 0.003), those teachers who were trained through in-service training (INSET) and who held a university degree course in STAD were positive towards STAD as a CL-teaching strategy (Tables 6 and 7). It is evident that STAD is an effective and applicable technique for increasing grade 10 learners' Economics knowledge and skills, and also advances the teachers' praxis. Overall, the results show that STAD, as a cooperative learning teaching method enhanced learners' knowledge and learning of 'Contemporary Economics Issues' in Free State secondary schools. Teachers who were using STAD to teach 'Contemporary Economics Issues' also achieved other outcomes, such as collaboration, cooperation and established relationships amongst learners, which were not measured in this investigation. Additionally, teachers who were trained in using STAD indirectly enhanced learners' skills, such as positive interdependence amongst learners in the class. Empowerment of social skills, such as sharing and collaboration, increased problem-solving skills, and increased effective communication skills, such as presentation skills, were also more evident than those of learners in traditional direct-instruction classes.

RECOMMENDATIONS FOR FURTHER RESEARCH

The results of the present study must be interpreted with a degree of caution, because of the limitations of the study. The first limitation concerns the sample size. A small number of grade 10 Economics teachers and learners (treatment group n=229 and comparison group n=241) participated in this study. Because of the restricted range of participants, future studies will also need to include a more diverse and representative sample of learners and teachers, which will yield different statistical data. The findings of this study cannot be generalized because of the sample size of the specific population. The second limitation of the present study is the time factor. This study was conducted over the period of two school quarters. Further research needs to be conducted over a longer investigation period (two-year longitudinal study) to yield different outcomes. The third limitation relates to some teachers' lack of both, Economics subject knowledge and pedagogical knowledge. This is a serious concern because it was evident that teachers had limited economic knowledge or entirely lacked it. This challenge needs further probing, in particular, issues relating to learner teacher support materials (LTSM) in pre-course Economics content and the different teaching strategies available. These will be important variables in future research. Finally, further research is needed on how the subject of Economics is learned using social media tools, as well as on the implementation of different learner-centeredness teaching strategies to enhance Economics learners' knowledge and support teachers' praxis.

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