

Effectiveness of the Training of Teachers Project in Economic Education in Free State Secondary Schools

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KEYWORDS Training of Teachers Project. Economics Education. Test of Economic Literacy (TEL). Pretest-Posttest Design

ABSTRACT This paper measured the Council for Economic Education's Training of Teachers project's effectiveness in secondary schools in the Free State Province by evaluating teachers understanding and attitude toward economics education. The author employed a randomization of economics teachers across treatment and control groups at two separate stages of the research design. A pretest-posttest design, with matched experimental (n=124) and control (n=124) groups, was constructed because of its resistance to common threats to internal validity. Results indicated that the Training of Teachers (ToT) project showed improvement scores of participants' Test of Economic Literacy (TEL) scores by approximately 10.73 percent, which indicated greater gains in economic understanding. Furthermore, the ToT participants' showed positive attitude towards the subject compared to teachers who did not participate in project in Free State secondary schools. This result indicates that additional research is needed to determine the cost-effectiveness of teacher training versus curriculum delivery.

I. INTRODUCTION

According to the National Policy Framework for Teacher Education and Development in South Africa (National Department of Education 2007), the right to quality education for all in South Africa is noted as a democratic right without limitation, and 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 Norms and Standards for Educators, is also quite impressive and is expected to have a significant impact on teacher training and curriculum development initiatives in all school curricula and also relate to economics education. Walstad and Rebeck (2001) mentioned that a viable education system with committed, competent and confident teachers is a primary condition for achieving the outcomes within the National Curriculum Statement (NCS) for South African schools. Teacher efficacy has emerged as an important construct and teachers' beliefs in their ability to actualize the desired outcomes for their students.

Teacher efficacy has been linked to teacher effectiveness and appears to influence students in their academic achievements (Dickie 2006; Wheatley 2005; Goddard et al. 2000). This research study investigated the Training of Teachers project's effectiveness by measuring teachers' knowledge and attitude towards economics education.

Conceptualization of Teacher Efficacy

Teacher efficacy has emerged as an important construct in teacher education over the past two decades in the social science and humanities. Wheatley (2005) defined the concept as:.. "teachers' beliefs in their ability to actualize the desired outcomes" (p.748). Teacher efficacy has been linked to teacher effectiveness and appears to influence students in their achievement, attitude and affective growth. Scholars have shown that teacher efficacy has positive effects on teacher effort and persistence in the face of difficulties (Dickie 2006; Soodak and Podell 1993), professional commitment (Tschanen-Moran et al. 2001), Coladarci (1992), student motivation (Midgley et al. 1989), and openness to new methods in teaching and positive teacher behaviour (Ghaith and Shaaban 1999). Moreover, Ghaith and Yaghi (1997) mentioned that in addition, teachers with a high sense of

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efficacy are more likely to use student-centred teaching strategies, while low-efficacious teachers tend to use teacher-directed strategies, such as didactic lectures and reading from textbooks (Dickie 2006). Thus, the importance of teacher efficacy is well established. Teachers' sense of efficacy and reforms in curriculum has many common points (Goddard et al. 2000). The changes teachers apply to their practices and adaptation to innovations require that they have a high sense of efficacy. Nevertheless, while both the implementation of reform in teacher education and teacher efficacy beliefs have been studied in depth over the years, there have been few research studies completed on the possible connection between the two.

Council for Economic Education's Training of Trainers Programme

The Council on Economic Education (CEE) is a nationwide network in the United States of America (USA) that aims at promoting economic literacy among learners and their teachers. CEE's mission is to help learners develop the real-life skills they need to succeed: to be able to think and choose responsibly as consumers, savers, investors, citizens, members of the workforce, and effective participants in a global economy (National Council on Economic Education (NCEE) 2005). Although there are various service providers in South Africa which provide teacher training and development programmes, the demand for specialized economic training programmes are not adequately met. Financial-resources constraint in Provincial Education Departments necessitate that other sources of funding be explored. One such support and funding initiative for teacher training in Economics, emanated from the Council on Economic Education (CEE)-United States of America. In 2006 the National Department of Education and CEE signed an official memorandum of understanding (MOU) to endorse co-operation and partnerships on teacher-training capacity building through the Economics International programme. In the same year, CEE was officially launched through a partnership between Free State Department of Education (FSDoE) and the University of the Free State in Bloemfontein. After 2007, other provinces, such as Northern Cape, Eastern Cape, Western Cape, Northwest, Gauteng, Limpopo, Mpumalanga and

Kwazulu Natal were also included in the Economics International programme in training subject specialist and economics teachers. From the above it can be deduced that any type of training in Economics teaching presented to a South African audience, should consider and be directed toward enhancing the learning capacity of economics teachers and subject advisors within an outcomes-based paradigm.

This paper measured the Council for Economic Education's Training of Teachers project's effectiveness in secondary schools in the Free State Province by evaluating teachers understanding and attitude towards economics education.

II. RESEARCH METHODOLOGY

Research Design: The author employed a randomization of economics teachers across treatment and control groups at two separate stages of the research design. A pretest-posttest design, with matched experimental and control groups, was constructed because of its resistance to common threats to internal validity (Mouton 2001; Gray 2004).

Selection of the Sample: The researcher examines the ability of South Africa Training of Teachers (ToT) graduates to improve teacher understanding of market-based economics and the subsequent impact on student learning. The CEE's Cooperative Education Exchange Program (CEEP) was designed to further the progress of the transition process by promoting the effective teaching of market-based economics through local public educational systems. The keystone element of the USA federally funded CEEP is the intensive ToT programme. Subject advisors, university professors and economics educators participating in the ToT programme from 2007-2010 attended a series of four week-long seminars conducted by CEE personnel over the course of one year. The primary goal of these seminars was to develop within the participants a significant knowledge of market-based economics and classroom pedagogy so that graduates can provide effective teacher training programs. This article presents the first formal evaluation of ToT graduates in South Africa, the largest and most complex democratic nation in the South African Development and Economic Community (SADEC) region. This evaluation began by selecting five education districts Motheo,

Xhariep, Fezile Dabi, Lejweleputswa and Thabo Mofutsanyane that could synchronize teacher workshops and reflect the immense size and diversity of the Free State province

CEE Teacher Workshops: The education districts centres in Bloemfontein, Harrismith, Kroonstad, Qwaqwa, and Welkom in the Free State province hosted the workshops. These regions show the current geographic distribution of active economic education centres in the Free State. Each of the five centres administered a standardized six-day CEE workshop for subject advisors and secondary teachers conducted by CEE faculty staff and graduates. The South African Foundation on Economic Education and Financial Education (SAFEFE) office recruited teachers following normal local procedures, limiting eligibility to secondary-school-level teachers who would teach an economics class of at least 20 high school students during the next academic year (2006–09). However, contrary to normal practices, the centres oversubscribed eligible applicants in order to secure enough teachers to populate the treatment and control groups. The teacher workshops were produced and delivered by CEE faculty and SAFEFE personnel at each of the five sites immediately prior to the start of a normal academic year. Each workshop consisted of six full days of training and lesson demonstrations using CEE curriculum materials. Each local workshop followed a common agenda and timetable developed by the CEE and SAFEFE staff for implementation. The workshop topics included standard treatments of introductory market economics and basic microeconomic and macroeconomic concepts (NCEE 2005). Thus, the ToT treatment received by teachers in this experimental sample was homogeneous across the five geographic sites of the secondary schools in the Free State Province.

Data Collection Instruments and Procedures: The assessment of student understanding of economics was conducted with the Test of Economic Literacy (TEL) (Dickie 2006; Soper and Walstad 1987). The TEL was originally developed for use with high school students in the United States. It has been translated and used as a standardized measure of economic understanding in studies with high school students in at least eight nations (Thomas and Campbell 2002; Walstad 1994). The TEL was administered to students in this study as a pre-

test between the seminars of 15-29 July 2009, and as a posttest, between 10-20 October 2010. Only 40 items of the 46 TEL items were administered to students. The shorter test was used so that students had time to complete the test and respond to survey items during a typical class period lasting about 45 minutes. Testing instructions were given to teachers at the five districts workshop briefings on the learners test. Numbered copies of the test were given to each teacher for pretesting. After the session all teachers then took the teachers' test at these centres. The SAFEFE staff kept the test materials under lock and key until they were distributed for posttesting. Answer sheets were then returned by all learning facilitators to SAFEFE staff in sealed envelopes through the districts. According to SAFEFE and CEE staff, there was no reason to suspect cheating or deviations from the uniform testing and data collection procedures. The total data set included information on 336 teachers (186 ToT treatment and 210 control) and 871 learners (451 ToT treatment and 380 control). Not all information, however, was complete and usable for this study because (1) some teachers did not complete a teacher survey; (2) some teachers did not give a posttest to learners (3) some learners did not take the posttest; and (4) some learners did not answer questions about gender or age.

III. RESULTS

In Table 1, the descriptive statistics for the variables on which there were complete teacher and student records for this study is reported. There were 248 teachers in this study (124 ToT treatment and 124 control). The teachers were distributed regarding gender across the five districts. The ToT Treatment group consisted of male 39.5 percentage (n=49) and female 60.5 percentage (n=75) while control group consisted of male 41.1 percentage (n=51) and female 58.9 percentage (n=73). The mean score for teaching experience (years teaching economics) is 8.33. Complete data were also available for 780 students (478 ToT treatment and 312 control) who were taking economics as a choice subject in secondary schools from these teachers in the five districts. What is interesting to note in Table 1 are the TEL scores for the ToT treatment group and control groups of learners. The pretest scores were similar for each group, overall and

by district. Both groups showed an increase in economic understanding. This gain would be expected given that the learners in both groups were being taught economics. The gain for the ToT treatment group, however, was greater than the gain for the control group, suggesting that ToT treatment learners are benefiting from the education in CEE adapted economics received by their teachers.

Table 1: Descriptive statistics of Training of Teachers (ToT) project

| Variables | ToT treatment group | Control group | Total |
|-----------------------------|---------------------|----------------|-----------------|
| <i>Sample Size</i> | | | |
| Teacher | 124 | 124 | 248 |
| Learner | 478 | 312 | 780 |
| <i>Variable for Learner</i> | | | |
| Age | 15.21 | 15.11 | 15.10 |
| <i>Gender</i> | | | |
| % Male teacher | 39.5 (n=49) | 41.1 (n=51) | 40.3 (n=100) |
| % Female teacher | 60.5 (n=75) | 58.9 (n=73) | 59.7 (n=148) |
| <i>Teaching Experience</i> | | | |
| (years teaching economics) | 11.22 | 10.66 | 10.94 |
| TEL Pretest mean: | 13.14 | 13.05 | 13.09 |
| Motheo | 16.41 | 15.20 | 15.77 |
| Xhariep | 12.76 | 13.01 | 12.31 |
| Fezile Dabi | 17.22 | 16.33 | 16.19 |
| Lejweleputswa | 13.32 | 14.01 | 13.66 |
| Thabo Mofutsanyane | 14.88 | 14.59 | 14.28 |
| TEL Posttest mean: | 16.78 | 15.98 | 15.56 |
| TEL change mean: | 3.64 | 2.93 | 2.47 |

Teachers' Test of Economic Literacy

Data in Table 2 showed the teachers who participated in the workshops were pre- and post-tested, before and after the six-day local workshop delivered by the ToT alumni using the 40-item Test of Economic Literacy (TEL) (Walstad and Rebeck 2001b). Overall, the workshop teachers improved their scores by 10.73 percentage points (see Tables 1 and 2). The training-only teachers earned an average of 87.33 percent on the post-test, improving by 11.75 percentage points from the pretest. The teachers who continued in the study by testing their students earned an average score of 81.05 percent on the posttest—up by 10.05 percentage points from the previous test. The post workshop TEL score was a measure that indicated the

knowledge of the teachers as they entered the classroom at the beginning of the academic year. A comparable measure was collected for the control group teachers, who were tested using the same 40-question TEL, under controlled conditions in their schools, just before the fall academic term began. The workshop trained teachers' TEL scores were significantly higher than the control teachers' average scores (81.05 percent compared to 67.60 percent).

Table 2: Teacher pre-workshop and post-workshop test of economic literacy mean scores (%) and attitude index scores

| Group | N | Pre-workshop | Post-workshop | Difference | t-value |
|-----------------------|-----|------------------|------------------|------------------|---------|
| Workshop participants | 248 | 76.40 (15.80) | 86.13 (8.70) | 10.7 (14.10) | 6.60*** |
| Training only | 131 | 75.58 (18.50) | 87.33 (8.10) | 11.75 (17.28) | 3.72*** |
| Treatment group | 124 | 71.00 (13.93) | 81.05 (9.18) | 10.05 (11.65) | 5.79*** |
| Control group | 124 | | 67.60 (12.53) | | 5.79*** |

Note: Standard deviations are in parentheses. A *t*-values test null hypothesis that mean post-workshop TEL score equals mean pre-workshop TEL score. ****p* < .01 level, one-tailed test.

Teachers' Attitudes towards the Market System

Based on the data in Table 3, the 40-question TEL was accompanied by five additional questions concerning attitudes toward market processes. This index is a shortened version of the one previously used by earlier international evaluations of CEE training programs (Thomas and Campbell 2002; Grimes and Millea 2001). Higher scores reflect more positive personal attitudes toward the market and market processes. Overall, the teachers ranked market outcomes favorably, scoring 19.75 (ToT treatment) and 17.70 (control) out of possible 25 points for a positive market attitude going into the classroom. Both groups show a positive and significantly increases in attitude to a market system.

Regression Results

To control for the influence of other variables on TEL scores, we specified a regression model estimated with the data in Table 4. The

Table 3: Teacher pre-course and post-course test of economic literacy mean scores (%) and attitude index scores by experimental group: Five-question attitude index maximum score = 25

| Group | N | Pre-workshop | Post-workshop | Diff-erence | t-value |
|-----------------|-----|-----------------|-----------------|-----------------|---------|
| Treatment group | 124 | 18.64 (0.32) | 19.75 (2.44) | 1.11 (2.78) | 3.32*** |
| Control group | 124 | 18.33 (0.37) | 17.70 (2.11) | -0.63 (2.91) | 2.33** |

Note: Standard deviations are in parentheses.
A *t*-values test null hypothesis that mean post-workshop TEL score equals mean pre-workshop TEL score.
****p* < .05 level, two-tailed test.

dependent variable was the change in a learner's TEL scores from pretest to posttest (TELCHANGE). The regressors were learner and teacher variables expected to influence the amount of economics learned over the sample period, although there were no adjustments made for potential problems with sample selection. The purpose of the regression analysis was exploratory and not inferential. The results are only suggestive of what might be found if a random sample of teachers and learners had been available for the analysis. A dummy variable was included in the regression to test for differences in gains in the economic understanding of learners of ToT teachers compared with learners of control teachers. A variable for learner AGE was included because research in the United States and other nations has found older students often learn more economics than younger students and better handle abstract subject matter. A variable for GENDER (1 = male) was included because some studies show that males learn more economics in courses than females (Allgood and Walstad 1999; Walstad and Robson 1997).

One teacher variable that has been found to be important in some economic education studies is the number of years of experience the student's teacher has in teaching economics (T-EXPERIENCE). It was expected that, on average, the more years of experience a teacher had in teaching economics, the more students would learn about the subject. This variable, however, was of special interest because the direction of its effect on learning may indicate whether economics teachers in these former socialist nations are teaching much western economics.

It might be that more experienced teachers know less about western economics than less experienced economics teachers, in which case the coefficient on this variable would be negative.

Table 4: Regression results for ToT experimental group compare to the control group

| Regressor | Dependent variable= TELCHANGE [2.47; 3.07] | Absolute values of <i>t</i> statistics |
|--------------------------------------|--|--|
| Age [15.10; 0.76] | -0.0013 | 0.168 |
| Gender [Male 40.3% and Female 59.7%] | 0.151 | 0.883 |
| T-EXPERIENCE [10.94; 12.01] | 0.135** | 9.033 |
| ToT [57.33%] | 1.91 | 7.219 |
| Motheo [59.25%] | 1.023** | 5.077 |
| Xhariep [25.22%] | 0.231 | 0.263 |
| Fezile Dabi [61.44%] | -1.066** | 3.278 |
| Lejweleputswa [24.12%] | 0.134 | 1.166 |
| Thabo | 0.755* | 1.355 |
| Mofutsanyane [31.55%] | | |
| Constant | 1.048 | |
| N | 1.943 | |
| F-R ² | 28.012** | |

Note: Variable mean and standard deviation, or percentage for dummy variables, are in brackets.
*Significant at the .05 Type I error level, two-tailed test;

** Significant at the .01 Type I error, two-tailed test.

The regression analysis also controlled for the effects of differences in gains in economic understanding. There may have been factors related to curriculum, courses, or the translation of materials that may have affected the average gain in learner scores within each district. To control for these differences, dummy variables were specified for all districts

The results from the ToT variable confirmed *a priori* expectations (Table 4). Learners with a teacher trained in a ToT seminar received an additional benefit of 1.5 TEL points relative to learners with a teacher without these ToT characteristics, after accounting for the influence of other relevant variables. The coefficient estimates represent an 11.3 percent improvement in the gain of students on the TEL relative to the mean pretest score (12.87). This finding suggests that students' learning of economics benefited from having a teacher who attended a ToT seminar, at least with the sample of students for this study. According to Emerson and Taylor (2004)

that the years of experience in teaching economics had a positive influence on the gain in the economic knowledge of students. This finding suggests that prior experience in teaching economics in these schools and districts, controlling for other factors including ToT participation, was not a hindrance to teaching economics and facilitated economic learning.

Teacher Knowledge and Understanding of Economics

At each of the ToT seminars, teachers were administered the 46-item TEL as a posttest. This teacher TEL score can be entered in the specified regression equation to capture the effect of the level of teacher knowledge (TCHSCORE) on learner economic understanding. The results (Table 5) show, as expected, that TCHSCORE had a positive effect on teachers' understanding of economics. The addition of the TCHSCORE variable addresses an alternative explanation for the influence of ToT found in Table 2. It might be argued that the characteristics represented by ToT are simply capturing the effects of the ToT seminars on increased student learning in economics, not through increases in teacher knowledge of economics or their ability to use the ToT materials in the classroom, but through its likely influence on teachers' coverage of topics in the classroom. ToT teachers simply might be more likely to cover concepts found on the TEL. Walstad and Rebeck (2002) conducted a study by assessing the economic knowledge and economic opinions of adults. Results showed that respondents were positive about market economies but no increase in economic knowledge. The results in Table 5 show that ToT contributes to teachers' understanding in economics (TCHSCORE=0.062). A notable change in the results from Table 2 to Table 3 is that the estimated coefficient for the years of experience in teaching economics becomes insignificant. This finding suggests that this experience variable serves as a proxy for teacher knowledge of economics. To check this conclusion, the equation was reestimated with the same sample, but excluding the variable for teacher knowledge. In this re-estimation, the results show that years of experience in teaching economics was an important factor affecting student learning in economics.

Table 5: Regression results for ToT teachers understanding of economics

| <i>Regressor</i> | <i>Dependent variable= TELCHANGE [1.37; 2.07]</i> | <i>Absolute values of t statistics</i> |
|--------------------------------------|---|--|
| Age [15.10; 0.76] | -0013 | 1.318 |
| Gender [Male 40.3% and Female 59.7%] | 0.151 | 0.643 |
| T-EXPERIENCE [10.94; 12.01] | 0.091 | 9.033 |
| ToT [51.03%] | 1.791** | 5.019 |
| TCHSCORE | 0.062** | 2.981 |
| Motheo [52.15%] | 1.723** | 4.377 |
| Xhariep [25.02%] | -2.231* | 0.613 |
| Fezile Dabi [51.44%] | 1.806** | 5.778 |
| Lejweleputswa [36.34%] | 1.454* | 1.006 |
| Thabo Mofuts-anyane [38.11%] | 2.055** | 1.320 |
| Constant | -2338 | |
| N | 903 | |
| F ⁻ | 24.210** | |
| R ² | .312 | |

Note: Variable mean and standard deviation, or percentage for dummy variables, are in brackets.

*Significant at the .05 Type I error level, two-tailed test;

**Significant at the .01 Type I error, two-tailed test.

IV. DISCUSSION

The findings of this study is encouraging and contributed to similar studies conducted (van Wyk 2010; Oliver 2008; Dickie 2006; Bachan and Reilly 2005; Thomas and Campbel 2002; Walstad 2002; Goddard et al. 2000). In this article, the relationship between teacher understanding and attitude to economic education in Free State secondary schools is reported. The major question for which answers were sought was whether ToT seminars for high school teachers were effective in improving the economic understanding of their learners in grade 10. Findings revealed that learners of teachers who had attended ToT seminars had a greater gain in economic understanding than did teachers who did not participate in a ToT seminar. Further, the positive effect of teacher education on learners learning in economics has been reported in economic education research in Free State secondary schools. This study provides evidence that the same link exists between teacher attitude and understanding of how market economies operates. In a similar studies conducted by Thomas and Campbell (2002) and Walstad (2002) con-

firmed that training programmes did enhance economic understanding and student learning. The results from the latter study are only suggestive because there may be other explanations that account for the findings. Moreover two particular studies, Bachan and Reilly (2005), as well as Bachan and Barrow (2004) reported on student curriculum choice at a Business Studies course and found that students chose the Business Studies course most favourable in comparison to Economics. In this study, it is found that the type of teacher who volunteered for the ToT seminars was qualitatively different from non-ToT teachers. This qualitative difference in the initial characteristics of teachers, and not the ToT programme, may explain the results of the differences in learner scores. Although it was not possible to test for this selection problem with the data, the possibility still exists and will need to be investigated in future economic education studies (Walstad and Rebeck 2001; Becker et al. 1990).

V. CONCLUSION

Economics education teachers who attended Training of Teachers (ToT) seminars had a greater gain in economic understanding and showed positive attitude toward the subject of teachers who did not participate in a ToT seminar. Further, the positive effect of teachers' toward a market economy has been reported in economic education research in Free State secondary schools. This study provides evidence that the same link exists between teacher attitude and understanding of how market economies operates will contribute to a more positive attitude in teaching the subject. The teachers who participated in the workshop delivered by CEE faculty improved teachers' Test of Economic Literacy (TEL) scores by approximately 10.73 percent, when held all else constant. The TEL results (0.062) is reliable which is statistically significant as expected, that teacher score (TCHSCORE = 0.062) who participated in the ToT project (two tailed test, $0.01 < 1.791$), had a positive effect on teachers' understanding and attitude toward the subject of economics. One particular teacher variable that has been found to be important in this economic education research study was the number of years of experience the teacher has in teaching economics (T-EXPERIENCE = 0.135) which is statistically

significant. It was expected that, on average, the more years of experience a teacher had in teaching economics, the more students would learn about the subject. This result indicates that additional research is needed to determine the cost-effectiveness of teacher training versus curriculum delivery.

VI. LIMITATIONS

One must view the present study cautiously because of *four* limitations. The first limitation concerns the *sample size* which involved a small number of ToT teachers (N=124) and control group (N=124) who participated in this study. Because of the restricted range of participants, in future research studies, I should include a more diverse and representative sample of teachers and learners. The second limitation is the *time factor*. This study was conducted only on a six day workshop. A longer investigation period will maybe yield different results. The third limitation is *economics subject knowledge and pedagogical knowledge*. This was a serious concern for some teachers because of limited or lack of knowledge regarding pre-course economics content and different teaching strategies. This impeded a lot on how to learn the subject and how to implement applicable teaching strategies to enhance their praxis. Some learners and teachers perceived economics as a difficult subject.

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