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THE NEXUS BETWEEN PEER ASSESSMENT, TRADITIONAL ASSESSMENT, AND ACADEMIC ACHIEVEMENT OF SENIOR SECONDARY SCHOOL STUDENTS IN DELTA CENTRAL SENATORIAL DISTRICT, DELTA STATE

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Abstract

This study examined the relationship between assessment technique and academic achievement among senior secondary school Economics students in Delta Central Senatorial District, Delta State, Nigeria. Three null hypotheses were tested at the .05 level: no significant difference in posttest achievement between peer and traditional assessment groups; no significant difference in gain scores by assessment type in relation to achievement level; and no significant interaction between assessment type and achievement level. A quasi-experimental pretest–posttest design was used with 100 SS II students (50 per group) in two public schools. Data from a researcher-developed Economics Achievement Test (KR-20 = .78) were analysed with an independent-samples t test and a two-way ANOVA. Peer assessment produced significantly higher posttest scores, $t(98) = 8.57$, $p < .001$, $d = 1.71$, and significantly larger gains, $F(1, 96) = 166.44$, $p < .001$, partial $\eta^2 = .63$. Achievement level also had a significant main effect, $F(1, 96) = 8.15$, $p = .005$, but the interaction was not significant, $F(1, 96) = 1.42$, $p = .236$. Peer assessment benefited high and low achievers alike.

Keywords: peer assessment, traditional assessment, academic achievement, achievement level, interaction effect, Economics

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Introduction

Few decisions in classroom practice shape what students learn as strongly as the way their work is assessed. Assessment tells learners what counts, signals how well they are doing, and, when used well, shows them how to improve (Black & Wiliam, 1998; Sadler, 1989). Two broad approaches compete for attention in secondary schools. The first, traditional assessment, rests on teacher-set and teacher-marked tests, quizzes, and examinations. The second, peer assessment, asks students to apply criteria to one another's work and to explain their judgments (Topping, 1998). The relationship between these approaches and students' academic achievement is the central concern of this paper.

Nigerian education policy commits schools to continuous assessment of learners' progress (Federal Republic of Nigeria [FRN], 2014), but the practical meaning of that commitment is often a sequence of periodic teacher-marked tests. Such tests yield scores, yet they seldom make the marking criteria visible to students or give them chances to examine each other's reasoning. Peer assessment is attractive precisely because it addresses these gaps. International syntheses suggest that it can raise performance relative to teacher assessment and to no assessment (Double et al., 2020), and that students who give feedback learn from the act of giving it (Li et al., 2010).

The question of *for whom* an assessment technique works is as important as the question of *whether* it works. If peer assessment helps only strong students, it may widen achievement gaps; if it helps only weaker students, it may under-challenge others. Aptitude–treatment interaction research

has long cautioned that instructional methods can affect learners differently depending on their prior attainment (Cronbach & Snow, 1977). Teachers and policy makers therefore need to know both the average effect of a technique and whether that effect depends on student achievement level.

Economics offers a demanding test case. It is an elective at the senior secondary level that asks students to reason about scarcity, choice, utility, and public finance, and external examiners have repeatedly drawn attention to weak performance in the subject (West African Examinations Council [WAEC], 2022). This study examines the nexus between peer assessment, traditional assessment, and the academic achievement of senior secondary school Economics students in Delta Central Senatorial District, Delta State, through the testing of three hypotheses.

Research Questions

The following research questions guided the study:

Hypotheses

The following null hypotheses were tested at the .05 level of significance.

$H_0$1: There is no significant difference in the mean achievement scores of students exposed to peer assessment and those exposed to traditional assessment.

$H_0$2: There is no significant difference in the mean gain scores of students assessed with peer and traditional techniques in relation to their level of academic achievement.

$H_0$3: There is no significant interaction effect between assessment type and achievement level (high or low) on students' academic performance.

Literature Review

The review is organised around the three objectives, after a brief note on the

theoretical position adopted.

Theoretical Anchor

Bandura's (1986) social cognitive theory frames the study. Learners build knowledge and beliefs about their own capability by observing others, interacting with them, and receiving feedback. Peer assessment creates conditions for all three: students see how classmates solve problems, compare their own work against it, and receive judgments from peers whom they regard as similar to themselves. Vygotsky's (1978) view that more capable peers can support learning within the zone of proximal development adds a reason to ask whether students at different achievement levels benefit differently, which is the concern of the second and third hypotheses.

Objective 1: Peer Versus Traditional Assessment and Achievement

Traditional assessment is efficient and familiar, and it remains the default in Nigerian classrooms (Ghaicha, 2016). Its limitations are well documented. Black and Wiliam (1998), reviewing a large body of classroom research, concluded that tests set and marked by teachers often promote recall of isolated facts and provide little usable feedback. Shepard (2000) argued that assessment designed mainly for grading is poorly aligned with what is known about how people learn.

Peer assessment has been proposed as a corrective. Dochy et al. (1999) reviewed self-, peer, and co-assessment and noted their potential to deepen engagement with criteria and content. Topping (2009) described the cognitive benefits for assessors, including the need to retrieve, compare, and explain. Meta-analytic evidence indicates that peer assessment improves performance relative to no assessment, teacher assessment, and self-assessment (Double et al., 2020). However, effects

depend on design, and poorly structured peer feedback can be unreliable (Gielen et al., 2010; Harris & Brown, 2013; Sluijsmans et al., 2002). The first hypothesis tests whether the general advantage holds in Economics classrooms in Delta Central.

Objective 2: Assessment Type, Achievement Level, and Gain Scores

Gain scores, the difference between posttest and pretest performance, indicate how far learners have moved during an intervention. Feedback is among the strongest influences on such movement, but its power varies with its content and with the learner's existing knowledge (Hattie & Timperley, 2007; Shute, 2008). Because peer assessment multiplies the number of feedback sources in a class, it may raise gains substantially (Boud et al., 1999; Nicol & Macfarlane-Dick, 2006).

Achievement level matters for a separate reason: students who already know more are generally better placed to benefit from new instruction, so a main effect of achievement level on gains is plausible whatever the assessment technique. Peer assessment may also put different demands on different learners. Stronger students can act as models and explainers, whereas weaker students may gain from exposure to worked examples of good answers, as social cognitive theory would suggest (Bandura, 1986). The second hypothesis therefore asks about the separate contributions of assessment type and achievement level to gain scores.

Objective 3: Interaction of Assessment Type and Achievement Level

An interaction occurs when the effect of one factor depends on the level of another. In instructional research this idea is captured by aptitude–treatment interaction (Cronbach & Snow, 1977): a

method may favour learners of one ability level and not another. Applied to assessment, an interaction would imply that peer assessment helps high achievers more than low achievers (or the reverse), and that a single approach to classroom assessment may therefore be inappropriate for mixed-ability classes.

Empirical evidence on such interactions in peer assessment is limited, particularly at secondary level. Training and structure are widely identified as the conditions under which peer feedback works (Gielen et al., 2010; Sluijsmans et al., 2002), which suggests that, where students are given clear criteria, the benefit may be broadly shared. The third hypothesis tests this possibility directly for Economics students in Delta Central.

Methodology

The study adopted a quasi-experimental pretest–posttest nonequivalent-group design (Kerlinger & Lee, 2000). Intact classes were used because random assignment of individual students would have disrupted school timetables. One class received peer assessment (experimental group) and one received traditional teacher-led assessment (control group). The population was 8,485 SS II Economics students (4,640 female and 3,845 male) in 35 public senior secondary schools in Delta Central Senatorial District. SS II students were chosen because they were neither new to Economics nor preparing for an external examination. Two public co-educational schools in Sapele Local Government Area, sufficiently far apart to limit contact, were selected, and one intact Economics class was used from each. The sample was 100 students (60 female and 40 male), 50 in each group.

Data were collected with the Economics Achievement Test (EAT), a researcher-developed, 30-item multiple-

choice test scored dichotomously and built from a table of specification based on Bloom's taxonomy across four SS II topics: Agriculture, Public Finance, Utility Theory, and Industrialisation. Two experts in Economics Education and in Measurement and Evaluation established content validity. A pilot test with 40 SS II students outside the sample gave a Kuder–Richardson 20 coefficient of .78 (Kuder & Richardson, 1937).

The EAT was administered as a pretest. Both groups were then taught the same four topics in regular timetabled periods over four weeks with eight lesson plans (four per group). The peer group applied marking schemes to classmates' work and gave feedback; in the control group, the teacher set, marked, and returned all work. The EAT was re-administered as a posttest, and gain scores were computed as posttest minus pretest. Students were classified as high or low achievers on posttest performance. Analysis in SPSS version 25 used descriptive statistics, an independent-samples *t* test for $H_0$1, and a two-way ANOVA (assessment type × achievement level) on gain scores for $H_0$2 and $H_0$3, all at the .05 level. Effect sizes (Cohen's *d* and partial η^2) were interpreted against Cohen's (1988) benchmarks.

Results

Hypothesis 1: Peer Versus Traditional Assessment and Posttest Achievement

$H_0$1 states that there is no significant difference in the mean achievement scores of students exposed to peer assessment and those exposed to traditional assessment. Table 1 presents the descriptive statistics and the independent-samples *t* test.

Table 1

Independent-Samples t Test of Posttest Achievement Scores by Assessment Type

Group	*n*	*M*	*SD*	*SE*	*t*(98)	*p*	*d*
Peer assessment	50	23.96	3.41	0.48	8.57	< .001	1.71
Traditional assessment	50	18.34	3.14	0.44			

Note. Maximum score = 30. Mean difference = 5.62, 95% CI [4.32, 6.92]. Critical *t* (df = 98, α = .05) = 1.98.

Students exposed to peer assessment (*M* = 23.96, *SD* = 3.41) scored 5.62 points higher than those exposed to traditional assessment (*M* = 18.34, *SD* = 3.14). The calculated *t* of 8.57 exceeded the critical value of 1.98 and the associated probability was below .001, so $H_0$1 was rejected. The effect was very large (Cohen's *d* = 1.71). The peer group's mean corresponded to about 80% of the maximum score, against about 61% for the traditional group.

Hypothesis 2: Assessment Type, Achievement Level, and Gain Scores

$H_0$2 states that there is no significant difference in the mean gain scores of students assessed with peer and traditional techniques in relation to their level of academic achievement. Table 2 gives the descriptive statistics of gain scores, and Table 3 the two-way ANOVA.

Table 2

Descriptive Statistics of Gain Scores by Assessment Type and Achievement Level

Grouping variable	Group	*M* gain	*SD*	Min.	Max.
Assessment type	Peer assessment	8.54	1.64	6	11
	Traditional assessment	3.60	1.44	2	6
Achievement level	Low	4.39	2.22	2	9
	High	7.50	2.69	2	11

Note. Gain = posttest minus pretest. Groups by assessment type, *n* = 50 each. Achievement level was classified after the intervention.

Table 3

Two-Way ANOVA of Gain Scores by Assessment Type and Achievement Level

Source	*SS*	*df*	*MS*	*F*	*p*	η_p^2
Assessment type	371.667	1	371.667	166.44	< .001	.63
Achievement level	18.195	1	18.195	8.15	.005	.08
Type × Level	3.176	1	3.176	1.42	.236	.01
Error	214.376	96	2.233			
Corrected total	844.510	99				

Note. Corrected model: $F(3, 96) = 94.06$, $p < .001$, $R^2 = .75$. η_p^2 = partial eta squared, computed as *SS* effect / (*SS* effect + *SS* error).

Students exposed to peer assessment gained an average of 8.54 points (*SD* = 1.64), against 3.60 (*SD* = 1.44) for the traditional group. High achievers gained 7.50 points (*SD* = 2.69) and low achievers 4.39 (*SD* = 2.22). The ANOVA showed a significant main effect of assessment type, $F(1, 96) = 166.44$, $p < .001$, partial $\eta^2 = .63$, and a significant main effect of achievement level, $F(1, 96) = 8.15$, $p = .005$, partial $\eta^2 = .08$. Both exceed Cohen's (1988) thresholds for a large and a medium effect respectively. $H_0$2 was therefore rejected: gain scores differed significantly by assessment type and by achievement level.

Hypothesis 3: Interaction of Assessment Type and Achievement Level

$H_0$3 states that there is no significant interaction effect between assessment type and achievement level on students' academic performance. The Type × Level row of Table 3 addresses this hypothesis.

The interaction was not significant, $F(1, 96) = 1.42$, $p = .236$, partial $\eta^2 = .01$. The effect of assessment type on gains

therefore did not differ meaningfully between high and low achievers, and $H_0$3 was retained. Table 4 summarises the decisions on all three hypotheses.

Table 4

Summary of Hypothesis Tests

Null	Test	Statistic	*p*	Decision
$H_0$1	Independent-samples *t* test	*t*(98) = 8.57	< .001	Rejected
$H_0$2	Two-way ANOVA (main effects)	*F*(1, 96) = 166.44 (type), 8.15 (level)	< .001, .005	Rejected
$H_0$3	Two-way ANOVA (interaction)	*F*(1, 96) = 1.42	.236	Retained

Note. α = .05.

Discussion of Findings

Peer versus Traditional Assessment and Achievement ($H_0$1)

The rejection of $H_0$1 shows that the type of assessment used in the classroom was strongly related to students' posttest performance. This agrees in direction with the meta-analytic finding that peer assessment outperforms teacher assessment (Double et al., 2020) and with the argument that assessing others requires learners to retrieve and apply content (Li et al., 2010; Topping, 2009). The size of the difference here (*d* = 1.71) is considerably larger than the modest pooled effects typically reported, and this deserves caution. Novelty may have raised engagement in the peer group, a single researcher delivered both conditions, and the peer group worked with explicit marking schemes, which the literature identifies as a condition for effective peer feedback (Gielen et al., 2010; Harris & Brown, 2013). The finding is best read as strong evidence that structured peer assessment can outperform conventional testing in this

setting, not as a universal estimate of its effect.

The result also fits the criticism that traditional assessment offers limited usable feedback (Black & Wiliam, 1998; Shepard, 2000). In the control classes, feedback came from one source, the teacher, and often arrived as marks. In the peer classes, every learner was both a giver and a receiver of feedback, which multiplies the volume and immediacy of information about performance.

Assessment Type, Achievement Level, and Gains ($H_0$2)

The rejection of $H_0$2 rests on two significant main effects. The assessment-type effect was very large: peer-assessed students gained more than twice as much as traditionally assessed students (8.54 vs. 3.60). This supports the view that frequent, criterion-based feedback is a powerful lever for improvement (Hattie & Timperley, 2007; Shute, 2008) and that peer learning encourages reflection on one's own work (Boud et al., 1999; Nicol & Macfarlane-Dick, 2006).

The achievement-level effect, though smaller, was also significant, with high achievers gaining more than low achievers. This is consistent with the idea that students with stronger prior knowledge are better positioned to use new instruction and feedback. A caution is needed, however. Achievement level was defined after the intervention, so a student's classification may partly reflect how well the treatment worked for that student, and the main effect of level may overstate the role of prior ability.

Interaction of Assessment Type and Achievement Level ($H_0$3)

The retention of $H_0$3 indicates that the advantage of peer assessment was similar for high and low achievers. In aptitude–treatment terms (Cronbach & Snow, 1977), there was no evidence that

peer assessment suited one ability group at the expense of the other. A plausible explanation, consistent with social cognitive and socio-cultural accounts (Bandura, 1986; Vygotsky, 1978), is that structured peer assessment gave stronger students the opportunity to explain and consolidate their understanding while giving weaker students access to models of good answers. The finding is also in line with the view that clear criteria and training allow the benefits of peer feedback to be broadly shared (Gielen et al., 2010; Sluijsmans et al., 2002).

A non-significant interaction is not proof that no interaction exists. The cell sizes for the achievement-level groups were small, and the test may have had limited power to detect modest differences. The result is best interpreted as showing that any interaction in this sample was small.

Conclusion

The study examined the nexus between peer assessment, traditional assessment, and academic achievement among senior secondary school Economics students in Delta Central Senatorial District. Peer assessment was associated with significantly higher posttest achievement and significantly larger gains than traditional assessment. Achievement level was independently related to gains, with high achievers gaining more, but the benefit of peer assessment did not vary significantly with achievement level. Within the limits of a short quasi-experimental study, structured peer assessment appears to be an effective and inclusive technique for Economics classrooms.

Recommendations

On the basis of the findings, the following recommendations are made:

1. Economics teachers should use structured peer assessment, guided by clear marking schemes, alongside traditional tests as part of continuous assessment.
2. School administrators should build peer assessment into assessment policy and timetables, and ministries should support teachers with training in criteria design and moderation of peer feedback.
3. Because the advantage was shared by high and low achievers, teachers may use peer assessment with mixed-ability classes, while monitoring weaker students to ensure that they receive adequate support.

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