

Full Length Research

Effects of Enhanced-Declarative Knowledge Approach on Learners' Performance and Assessment-mode Attitude in Quantitative Economics

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The effect of the enhanced-declarative knowledge approach (EDKA) on students' performance and assessment-mode attitude in quantitative economics was looked at in this research. In six secondary schools in the Oyo East, Atiba, and Oyo West LGAs of Oyo State, a sample of 145 SS II students was randomly selected for the study. A quasi-experimental design that used a 2-by-2 factorial matrix was adopted. Enhanced-Declarative Knowledge Approach (EDKA) and Conventional Knowledge Approach (CKA) treatment groups were randomly assigned to participants. The Quantitative Economics Achievement Test (QEAT) and the Economics Students' Assessment-Mode Attitude Scale (ESAMAS) were used to gather the data. The 0.05 significance level was used to test three null hypotheses. Data was acquired, and then ANCOVA was used to analyse it. The performance of the students was significantly impacted by the treatment ($F_{(1,140)}=980.61$, $p>0.05$). The partial eta square (η^2) value of 0.875 indicated that 88% of the variance in students' economics achievement was attributable to the treatment's (EDKA) influence. The main effect of gender was not shown to be statistically significant by $F_{(1,140)}=0.469$, $p>0.05$. The therapy and numerical ability interaction effect ($F_{(2,149)}=1.557$, $p>0.05$) did not reach statistical significance. It was thereafter suggested that teachers must permit students to supply relevant examples in the course of teaching and should employ appropriate approaches, such as the declarative knowledge approach, in the teaching of quantitative economics.

Keywords: Enhanced-Declarative Knowledge Approach, Learners, Performance, Assessment-mode Attitude

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INTRODUCTION

Nowadays, understanding economic issues has become quite requisite for all segments of society. Such understandings might be developed through formal and informal methods of learning. At times, an understanding of economic matters is gained through informal means, but those who intend to make a mark undergo formal proceedings. This then gives them the right knowledge of economics. They can apply this information in different contexts. By Reynolds (2005), economics is the study of the ways that humans deal with economic issues and challenges.

Ande (2008) claims that economics is a part of the social sciences, a field of study that examines numerous facets of human behaviours. Economics that is being taught and studied in secondary schools is essential because it allows

students to know how scarce resources are allocated among various sectors of the economy. It informs students on the rationale for human choices among diverse needs within their limited resources. The pattern of human consumption of products and services can be determined with the aid of economic knowledge. Utilising the principles of choice, opportunity cost, scale of preference, and other economic concepts can help satiate human desires. In the end, an understanding of economics enables students and other people to actively engage in the practice of governing. This underscores the importance of the subject at the school and community levels. Unfortunately, students' performances in the subject in recent times have been bedeviled by poor and fluctuating performances in the public examination. Academics and other stakeholders in the education system have been troubled by this. The poor and fluctuating performances of students may not be unconnected with the teaching approaches adopted by the teachers as well as their attitude towards assessment approaches being adopted in assessing students' cognitive and affective domains.

The use of practical experience in teaching economics was highlighted by the enhanced-declarative knowledge approach. It is procedural knowledge. It follows a succession of stages, or activities, taken to achieve a goal, while such steps lead to the derivation of concepts, just like in Rittle-Johnson & Schneider (2012). Under this approach, the teaching begins with examples, case studies, or real-life scenarios, and the concepts are derived in the course of the teaching by students. Enhanced-declarative knowledge can be defined as action sequences for solving problems to extract the underlying concepts. Enhanced-declarative knowledge is an approach containing the knowledge of how to do things skillfully and intelligently through performance and knowledge of factual information. Effective and skilled learning then takes place through performance and not only the conscious recall of the experience of the learning process. Learning through experience will aid students in integrating knowledge, abilities, and attitudes; enhancing the dexterity of skills necessary for carrying out tasks or resolving problems; and facilitating the application of new knowledge to unusual and frequently challenging tasks and problem situations (Kirschner & van Merriënboer, 2009). Therefore, expertise is a fundamental component of the enhanced-declarative teaching style. Therefore, it is mostly evaluated in factual and problem-solving situations. If students are given the chance to participate in a series that gives them the chance to more fully understand themselves, they will be able to demonstrate enhanced declarative knowledge. Thus, it requires line-by-line steps to attain factual knowledge and the skills to do something appropriately and repeatedly. It is therefore, built on the concepts of knowledge, quality, and type. Since it is acquired through problem-solving exercises. This knowledge is exclusive to certain kinds of problems. Constant practice of familiar activities that have been completed and cognizance of steps for solving similar problems, as well as accumulation of logical concepts, assist in enhanced declarative knowledge.

Turns & Meter (2011) observed that weak students were less likely to use the method of drawing component axes to help them become familiar with the direction of forces in the problems when comparing the skill acquisition of two groups of strong and weak students. It was then concluded that the difficulties students have with solving novel problems could be at least partially attributed to their weak knowledge of procedures. Berge & Hezewijk (1999) concluded in their works that although knowledge of procedure plays a more significant role in the total knowledge base than declarative knowledge, this is not to say that declarative knowledge is unimportant in human understanding of skill possession. This conclusion then justifies the essence of the enhanced-declarative knowledge approach in teaching and learning.

Besides the instructional approach, which stands as one of the contributing factors to high or low performance in any subject, students' attitude is another strong dictating factor in their achievement. Sarmah and Puri (2014) defined attitude as one's propensity to react satisfactorily or undesirably to problems, concepts, situations, objects, or other people. Attitudes stand a chance of being developed, and they can be changed over a period of time (Syeda, 2016). The inconsistency of attitude reveals that attitude is not born in humans. As soon as an attitude is formed, it can make or mar a human's desire to acquire or reject knowledge. We can then refer to attitude as sentiment, which may include loyalties and attachment to an individual, ideas, or objects (George 2000). Once a good attitude is created, it can help to encourage and enhance students' learning (Mutai, 2011). Attitudes become positive when students are ready and motivated to study at a specific point in time. A negative attitude, on the other hand, hinders learning that is effective, which lowers the learning outcome and minimizes students' exceptional performance (Joseph, 2013). Therefore, attitude is a significant factor that needs to be taken into account. Moreover, a major factor that can be responsible for students liking a subject depends heavily on a good instructional approach and derived enjoyment (Yilmaz, Altun, and Olkun, 2010). The affective component, which has to do with feelings about an object; the behavioural component, which has to do with propensity to act toward the attitude object in a particular way; and the cognitive component, which has to do with beliefs about the attitude object, are among the components of attitudes. One of the ways attitudes serve a purpose is by allowing expression of values and identity. 2. The ego-defensive function allows one to externalise our own difficulties. 3. The ability to understand the world is a function of knowledge. 4. Utilitarian function: helps in getting incentives and stay out of trouble.

Numerous studies have demonstrated a significant and direct relationship between students' academic achievement and attitudes toward mathematics. For instance, Mensah & Kurancie (2013) conducted research and found a significant

positive correlation between student performance and attitude. The results of Sakariyau, Taiwo & Ajagbe's (2016) study established a favorable impact of performance in scientific education on students' attitudes and, also shown that gender has no appreciable relevance on students' attitudes. Nicolaidou & Philippou (2003) discovered a substantial correlation between attitudes and mathematical achievement. It also goes against the findings of David, Okorn, Koko & Bessong (2013), who discovered that male students had more positive attitudes than their female counterparts. Similar to Rono & Rono (2016), the survey found that more men than women enjoy studying history and government. Their study demonstrates that students' perspectives regarding history and government are not influenced by their gender. When examining how gender affected students' performance, Abubakar & Oguguo (2011) found a strong association between gender and academic accomplishment among NCE students. The null hypothesis, which asserted that there is no difference between the mean achievement scores of male and female students, was supported by studies on how gender affects student performance by Eze, Ezenwafor & Obidile (2016), Adigun, Onihunwa, Irunokhai, Sada & Adesina (2015), and Dania (2014). Also, Nnamani & Oyibe (2016) found a significant difference in gender achievement in their study. The difference was in favour of female students.

As regards students' assessment-mode attitudes, students seem to have firm attitudes toward diverse testing and evaluation modes (Miron, 2014). Such attitudes ought not to be overlooked since they have a great influence on students' test performance. According to Boud & Falchikov (2007), students' preferences for different test formats have not changed much over time. The most flexible and practical kind of assessment has historically been and continues to be multiple-choice questions. In a study, Abu-Dabat (2014) found that at the Faculty of Arts, Al-Zaytoonah University, Jordan, there is a fair and favourable relation between the exam scores in Curriculum and Teaching Methods, and the students' attitudes. Students' attitudes to the evaluation method, however, had little or no impact on their subject test scores. Struyven, Dochy & Janssens (2005), who discovered that students' study strategies are affected by how their assessments are seen, made similar findings.

Oyesiji (2013) argued that learning outcomes should not only demonstrate what students know but capture the changes that occur in their cognitive and affective development because of learning experiences that have taken place. Because of the benefits that accrue to enhanced-declarative knowledge approach and gender on students' assessment mode attitude and learning outcome, this study explored the effects of treatment on learners' achievement and assessment-modes attitude among students offering Economics in Oyo educational public senior secondary schools.

At a significance level of 0.05, the study assessed the following three null hypotheses:

H₀1: Treatment's main effect does not significantly exist on:

1. Learners' performance; and
2. Learners' assessment-mode attitude in quantitative economics.

H₀2: Gender's main effect does not significantly exist on:

1. Learners' performance; and
2. Learners' assessment-mode attitude in quantitative economics.

H₀3: Treatment and gender's interaction effect does not significantly exist on:

1. Learners' performance; and
2. Learners' assessment-mode attitude in quantitative economics.

METHODOLOGY

Using a 2X2 factorial, quasi-experimental approach, the effect of the independent variable was ascertained. This allowed researchers to investigate the effects of the independent and moderating variables (gender) on the dependent variable (see Table 1). The SS 2 students taking Economics in public secondary schools in Oyo East, Atiba, and Oyo West LGAs of Oyo State were the study's primary target group. There were two public secondary schools chosen at random from each local authority. Six schools were used, and 145 students participated in the study overall. For the investigation, two (2) instruments were used. There were two of these: the Economics Students' Assessment-Mode Attitude Scale (ESAMAS) and the Quantitative Economics Achievement Test (QEAT).

Table 1. Factorial Design

Gender	Treatment		
	Enhanced-declarative Knowledge Approach	Conventional Approach	Knowledge
Male			
Female			

For both the pre and post-test, items for Quantitative Economics Achievement Test (QEAT) addressing the quantitative content, covering the concepts of cost, revenue, and taxation were drawn from the past questions series of the West African Examination Council (WAEC) from 1988 to 2015. The subjects of this study completed thirty (30) objective questions, each of which had four options (A–D) out of which one was correct. K-R 20 was used to calculate the test's reliability, and the result was 0.89.

The SPAQ (Students' Perception of Assessment Questionnaire) developed by Mussawy in 2009 was modified to create the Economics Students' Assessment-Mode Attitude Scale (ESAMAS). The SPAQ has 24 items, whereas the ESAMAS has 31 items that are tailored to the study of economics. The introduction and demographic data of the respondents were included in Section A of the ESAMAS, whereas Section B focused on the major 31 questions and information about the respondents' assessment attitudes. The component was answered on a 4-point Likert-type scale (strongly agree, agree, disagree, and strongly disagree). The reliability coefficient and consistency of the instrument were calculated using Cronbach's alpha, which was 0.91.

Procedure for the Treatment Group (Enhanced-Declarative Knowledge Approach Group-EDKAG)

This group was characterized by the following

1. It was a case-based and performance-based approach. Real experiential and analytical teaching was adopted for this group.
2. The teaching approach that was adopted here was role-playing, narration, activity, and an experience-centered approach.

Mode of Teaching in EDKA

1. In the treatment group, after the introduction of the content to be taught, the objectives of the teaching were made known to the students.
2. Teachers initiated the teaching by providing a practical example in the form of role-play, narration, practical experience, or problem-solving media;
3. Based on the scenarios used by the teacher, two (2) students were asked to derive or draw the definition of the concept of the study.
4. After that, the teacher buttresses the given meaning for the students in line with the role play, case study, or narration used in the teaching;
5. Class practice in the form of assessment was then followed using essay items.
6. The previous home assignment was reviewed alongside the class practice.

Data Collection

A week before the treatment's application, the researcher administered the Quantitative Economics Achievement Test (QEAT) to participants. Responses on both instruments were immediately collected since the post-test data also depended on the same instruments. The researcher was not part of the teaching but monitored the treatment's execution. The treatment was carried out for six weeks; thereafter, QEAT was re-applied to the participant as a post-test.

Thus, this study investigated how enhanced declarative knowledge affected students' economic achievement. The effect of the moderator variable, gender was also considered in the study.

Data Analysis Procedure

Responses of SS 2 students in the test and questionnaires formed the basis for data analysis. The posttest performance scores of participants were validated via Analysis of Covariance (ANCOVA) using the pre-tests as covariates at 0.05 degree of significance.

ANCOVA was used on three hypotheses using the pretreatment assessment scores as covariates. Sidak posthoc test was run on any main effect observed to be significant to decide the degree and course connected with the effect and to set up the measure of variety because of each dependent variable.

RESULTS

Table 2: Summary of Analysis of Covariance (ANCOVA) of Learners' Performance in Quantitative Economics by Treatment and Gender

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	7426.612a	4	1856.653	334.823	0.000	0.905
Intercept	1196.88	1	1196.88	215.841	0.000	0.607
Pre-Achievement	236.81	1	236.81	42.706	0.000	0.234
Treatment	5437.643	1	5437.643	980.606	0.000	0.875
Gender	0.408	1	0.408	0.074	0.787	0.001
Treatment * Gender	3.463	1	3.463	0.624	0.431	0.004
Error	776.326	140	5.545			
Total	25051	145				
Corrected Total	8202.938	144				

a R Squared = .905 (Adjusted R Squared = .903)

Ho1: Treatment's main effect has no significance on:

- i. Learners' performance; and
- ii. Learners' assessment-mode attitude towards quantitative Economics.

The findings of the Analysis of Covariance (ANCOVA) for the post-test quantitative economic accomplishment scores of learners by treatment and gender are presented in Table 2. The results indicated that interventions had a statistically significant impact on students' economics achievement ($F_{(1,140)}=980.61$, $p>0.05$), thereby rejecting the null hypothesis. Additionally, Table 2 showed that the partial eta square (η^2) of 0.874 indicated that the treatment's impact was accountable for 87.5% of the variance in students' economics achievement. Sidak Table 3 shows the results of the post-hoc analysis used to determine which of the two treatment groups significantly differs from the other.

Table 3: Sidak Post-hoc Analysis of Dependent Variable- Post Achievement

Groups	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Enhanced-declarative group	19.539	0.343	18.861	20.218
Control group	5.659	0.269	5.127	6.192

a The covariates in the model are assessed using the following values: Pre-Achievement score: 9.74.

The adjusted mean score for the enhanced-declarative group was higher than that of the control group ($X=5.659$), at ($X=19.539$), according to Table 3. Table 4 attests to the statistical significance of the distinction between the treatment and control groups.

Table 4: Estimated Marginal Means for Post-Achievement Score of Treatment

(I) Groups	(J) Groups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
					Lower Bound	Upper Bound
Enhanced-declarative group	Control group	13.880*	0.443	0.000	13.004	14.756
Control group	Enhanced-declarative group	-13.880*	0.443	0.000	-14.756	-13.004

According to the projected marginal means

* At the .05 level, the mean difference is significant.

b Sidak's correction for numerous comparisons.

Table 5: Summary of Analysis of Covariance (ANCOVA) of Learners' Assessment-mode Attitude towards Quantitative Economics by Treatment and Gender

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2.487		0.622	3.696	0.007	0.096
Intercept	22.293	1	22.293	132.518	0.000	0.486
Pre-Assessment	1.938	1	1.938	11.519	0.001	0.076
Treatment	0.535	1	0.535	3.178	0.077	0.022
Gender	0.002	1	0.002	0.012	0.912	0.000
Treatment * Gender	0.012	1	0.012	0.070	0.792	0.000
Error	23.552	140	0.168			
Total	1046.739	145				
Corrected Total	26.039	144				

a R Squared = .096 (Adjusted R Squared = .070)

Table 5 summarizes the analysis of covariance (ANCOVA) of learners' attitudes about quantitative economics in the post-test assessment mode by treatment and gender. The outcome showed that the impact of interventions on students' assessment-mode attitudes in economics was statistically negligible ($F_{(1,140)}=3.18$, $p>0.05$); therefore, there was acceptance of the null hypothesis. The adjusted estimated mean was done to conclude which treatment group differs significantly in Table 6.

Table 6: Estimated Marginal Means for Post-Assessment-mode Attitude of Treatment

Groups	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Enhanced-declarative group	2.740	0.058	2.625	2.855
Control group	2.608	0.046	2.516	2.700

a The covariates in the model are assessed using the following values: 2.62 is the preliminary assessment.

According to Table 6, the enhanced-declarative group had the maximum adjusted mean score (2.74), whereas the adjusted mean score for the control group was 2.61.

Ho2: Gender's main effect has no significance on:

- i. Learners' performance; and
- ii. Learners' assessment-mode attitude in quantitative Economics.

The findings in Table 2 supported the null hypothesis by demonstrating that there was no statistically significant gender difference in student performance in quantitative economics ($F_{(1,140)}=0.79$, $p>0.05$). The adjusted estimated mean was done to conclude which gender differs significantly between the two in Table 7.

Table 7: Estimated Marginal Means for Post-Achievement Score of Gender

Gender of respondents	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Male	12.541	0.346	11.858	13.225
Female	12.657	0.253	12.158	13.157

a The covariates in the model are assessed using the following values: Pre-Achievement score: 9.74.

The null hypothesis was supported because Table 5's results showed that the gender-related influence on students' assessment-mode attitudes toward quantitative economics was statistically negligible ($F_{(2,140)}=0.91$, $p>0.05$). The adjusted estimated mean was done to conclude which gender differs significantly between males and females in Table 8.

Table 8: Estimated Marginal Means for Post-Assessment-mode Attitude of Gender

Gender of respondents	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Male	2.678	0.060	2.559	2.797
Female	2.670	0.044	2.583	2.757

a The following values are used to evaluate covariates in the model: Preliminary Assessment: 2.62.

Ho3: Treatment and gender's interaction effect have no significance on:

- i. Learners' performance; and
- ii. Learners' assessment-mode attitude towards quantitative Economics.

The null hypothesis was supported by the finding in Table 2 that treatment and gender's interaction effect on students' performance in quantitative economics was not statistically significant ($F_{(1,140)}=0.43$, $p>0.05$). The adjusted estimated mean in Table 9 was explored to determine which variables differ significantly between treatment groups and gender.

Table 9: Estimated Marginal Means for Post-Achievement Score of Treatment and Gender

Treatment	Gender of Respondents	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Enhanced-declarative group	Male	19.651	0.531	18.601	20.701
	Female	19.428	0.420	18.597	20.259
Control group	Male	5.432	0.445	4.552	6.312
	Female	5.887	0.301	5.291	6.482

a Covariate evaluation in the model is done using the following values: 9.74 is the pre-achievement grade.

Male and female students in the enhanced-declarative group had the greatest adjusted mean scores (19.65 and 19.43, respectively), whereas male and female students in the control group had the lowest adjusted mean scores (5.43 and 5.89, respectively). The adjusted estimated mean in Table 10 was carried out to disentangle the direction of significance between treatment groups and gender with respect to assessment-mode attitude.

Table 10: Estimated Marginal Means for Post-Assessment Score of Treatment and Gender

Groups	Gender of respondents	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Enhanced-declarative group	Male	2.734	0.092	2.552	2.917
	Female	2.746	0.072	2.603	2.889
Control group	Male	2.622	0.078	2.468	2.775
	Female	2.594	0.051	2.492	2.695

a The following values are used to evaluate covariates in the model: Preliminary Assessment: 2.62.

DISCUSSION

The findings indicated a strong main effect of treatment on students' quantitative economic performance. The results corroborated Berge & Hezewijk's (1999) finding that procedural knowledge contributes more significantly to students' performance than does general knowledge. This study showed that participants who were exposed to the enhanced-declarative knowledge strategy outperformed those in the control group on tests of declarative knowledge. Thus, it could be explained that the enhanced-declarative knowledge approach proved to be more educationally fruitful as far as learners' cognitive states in quantitative economics are concerned. The outcome also demonstrates that there was no primary influence of treatment on learners' assessment-mode attitudes about quantitative economics. The results of this study support Abu-Dabat's (2014) report, which found that students' attitudes regarding the evaluation system had no impact on their scores (performance), but they contradict the conclusion of Struyven, Dochy & Janssens (2005).

The findings that gender's main effect was not significant on learners' performance, was upheld by Eze, et al. (2016), Sakariyau, et al. (2016), Adigun, et al. (2015), and Dania (2014) reports on the subject. However, Abubakar and Oguguo's (2011) findings contradicted this. According to the adjusted mean score, female students performed noticeably better than male. The findings of Nnamani & Oyibe (2016), who asserted that male students outperformed female pupils, are negated by the female performance. Considering learners' gender assessment-mode attitude towards quantitative economics, there was no significant effect. The conclusion by Rono & Rono (2016) that gender has no impact on a student's attitudes toward test modes is consistent with the finding by Miron (2014) that students appear to have firmly held opinions about various testing and evaluation modes. It also disproves the claim made by Rono & Rono (2016) that gender has a non-significant impact on a student's assessment-mode attitude.

This study's findings further showed that there was no discernible interaction between treatment and gender in terms of how well students performed in quantitative economics. This is consistent with Omotayo's (2016) conclusion that there was no observable interaction between treatment and gender or effect on students' achievement in probability. According to the study's results, the control group students had the lowest adjusted mean scores for both male and female students (, while the enhanced-declarative group students had the highest adjusted mean scores). In this study, it was discovered that while male students fared better than female students in the experimental group, male students performed better than female students in the control group. Male students in this study perform academically better than female students, although therapy and gender had no interaction effect on learners' performance.

With respect to the experimental group, this observation opposed the findings of Osakwe (1991), who submitted that female students are better at spatial conceptualisation than male students. The results of the study on the interaction effects of treatment and gender on students' assessment-mode attitudes towards quantitative economics show that there was no interaction between treatment and gender. The findings show that the enhanced-declarative group's participants had the highest adjusted mean scores for both males and females). This suggests that treatment and gender have an excellent interaction impact on learners' assessment-mode attitudes in the treatment group, with both male and female students having the highest adjusted mean, but female students outperform their male counterparts in the enhanced-declarative group.

CONCLUSION

It is obvious that the method (Enhanced Declarative Knowledge Approach) significantly affects how well students succeed in quantitative economics. This research demonstrates that the performance of learners will be positively boosted when an appropriate technique, such as enhanced declarative, is employed in the teaching and learning of quantitative economics. There was also a definite indication that when an efficient instructional strategy is used, gender does not determine good performance. The adopted treatment alone determines how well students succeed in quantitative economics, not the interaction between treatment and gender.

RECOMMENDATIONS

According to the study's conclusions, it is proposed that students participate in the teaching and learning of quantitative economics. Learner-centered approaches like enhanced-declarative approaches should be engaged in the teaching of economics. Finally, researchers can explore the appropriateness of the approach for other subjects that use quantitative teaching.

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