

Effects of Andragogical Inquiry, Analogy and Lecture Instructional Strategies on Students' Achievement in Economics in Delta State

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Abstract: *The study investigated the effects of andragogical inquiry, analogy and lecture strategies on students' economics achievement in Delta State. A 3x2 factorial, planned variation, quasi-experimental factorial design was utilised for the study. 30,813 Delta State public SSII Economics students made up the population. There were 258 SSII students in the study's sample. The Economics Achievement Test (EAT) was utilised to gather data. The validity of EAT's face, construct and content were established. The Kuder-Richardson formula 21 was used to determine the instrument's reliability, and it produced a coefficient index of 0.83. The data were examined using ANOVA, ANCOVA and Scheffe's post-hoc analysis. The results showed that: there was a significant difference in the mean achievement scores in Economics among students taught using andragogical inquiry strategy, analogy instructional strategy and lecture method, with students taught with andragogical inquiry strategy scoring higher marks, followed by analogy instructional strategy and lecture method respectively. Thus, it was advised that teachers of economics use andragogical inquiry and analogy instructional strategies when instructing students at the secondary school level because they encourage active participation in class, facilitate conceptual understanding, encourage students to discover their own knowledge, and promote interaction with the course materials.*

Keywords: Andragogical Inquiry Strategy, Instructional Analogy Strate, Lecture Strategy

Introduction

In the modern era, it is essential for each individual member of a society to acquire useful and applicable scientific knowledge in order to function effectively in their environment, competently deal with the demands and difficulties of daily life, and confidently pursue individual and group goals. Any country's ability to flourish economically, politically, and technologically is understood to be facilitated by the acquisition of pertinent scientific knowledge, attitudes, and values. Thus, for an individual to be able to cope with current economic situation, there is need to understand early importance of Economics (Aduba, Ezeofor & Okoro, 2010).

One of the crucial courses covered in secondary education is economics. As is evident from its straightforward definition, it is significant for both students and society as a whole because it spans all areas of human endeavour. According to Robbin (1932), economics is the science that examines how human behaviour relates to scarce resources with multiple uses. Jhingan (2010) claims that the study of economics focuses on how human conduct responds to limited resources with numerous uses. Following much argument that made it clear that Economics was essential for every citizen to understand the economic system and how the economy operates, it was first included in the secondary school curriculum in Nigeria in 1966. The students were then given their first examination in this subject in 1967. It was acknowledged that economics served as a strict intellectual discipline vehicle.

Secondary schools, colleges of education, monotronics, polytechnics and universities all offer economics as a field of study. It is a social science that looks at how best to use resources to meet the needs of businesses, customers and the general economy. At the micro level, economics seeks to maximise returns including utility, profit, welfare, personal income and firm output. At the macro level, it emphasises, among other things, potential output, full employment levels while containing inflation and equilibrium income levels. Economics is a tool for independence. It is a tool for controlling the economy and guides the design and execution of government economic policies.

Despite the prime of Economics to the entire society, and with the current shift in the economic situation of the nation, there seems to be a drawback in both aspects of the teaching and learning of the subject. Many students still fail Economics in WASSCE (WAEC Chief Examiner's Reports, 2017-2020). According to the Chief Examiner's report, the majority of the examinees who received low grades in economics in 2017 and 2018 lacked basic quantitative skills. This shortcoming is evident in their inability to perform straightforward statistical applications. Most applicants found it difficult to score highly on problems involving math in WAEC 2019 and 2020. Few candidates were able to evaluate demand function solutions, and the majority of those who attempted the question on balance of trade were unable to calculate it, which prevented them from scoring highly on the test. Teachers, researchers, psychologists, school administrators, and parents from WAEC-participating nations like Nigeria have expressed interest in and attention to this situation (Amuda, Ali, & Durkwa, 2016). According to research (Eleje, Esomonu, Okoye, Agu, Ngozi, Ugorji, Okoi & Abanobi, 2020), the causes of students' low economics accomplishment can be traced to the difficulty of specific economics concepts, students' attitudes towards economics, gender problems, and bad teaching methods, among other things.

Eleje, et al. (2020) noted that lecturing is the primary style of instruction used by Nigerian teachers to provide knowledge in a variety of topics, including economics. The lecture method is a method of instruction whereby information is passed to the

students in the final form. Teachers often pass along information, dogmas and beliefs to their students in order to complete the work plan, forcing them to regurgitate them in exam questions after only a partial digestion. The common lecture technique of teaching economics prevents students from having a thorough understanding of the subject, which also has a negative impact on memory. This undesirable growth impedes the development of learners' critical thinking abilities and may make Economics challenging for students. The impact of alternative teaching techniques, such as andragogical inquiry and analogy instructional strategies, on students' achievement in Economics must therefore be tested in order to meet the goal of Economics education at the secondary school level. In order to identify the most successful teaching strategy among them, this study made an effort to examine the various effects of andragogical inquiry, analogy, and lecture technique on students' achievement in Economics..

The term andragogy is from two Greek words, 'aner' meaning man and 'agogos' meaning leading. Andragogy, according to Christopher (2015), is the "art and science of facilitating adult learning." Although the term "andragogy" was first used in 1833, it wasn't until 1967 that it was legally adopted into the American educational system. A problem-solving educational technique known as andragogical inquiry uses elements of the inquiry process. It is a method of instruction that makes use of role plays, presentations, discussions in groups, and brainstorming exercises. As opposed to a pedagogical style where students depend on the teacher, this encourages students to work independently or in small groups and gives them the chance to share their knowledge and experiences by asking and answering others' questions.

According to Deb (2017), andragogical inquiry involves dialogical inquiry that is aided by questions. The facilitator (teacher) in andragogical inquiry is to help students give birth to their own ideas, just as a midwife helps a pregnant woman give birth to her child, the author further emphasised. Vedhathiri (2021), defending the use of andragogical inquiry, stated simply that andragogy and pedagogy approaches are more likely a contrast between effective instructional practises and ineffective instructional practises rather than how to teach adults and children. The present knowledge of the students should be taken into consideration, problems should be founded, the justification for the instruction should be explained practically, the students should be given greater independence, the lessons should be based on real-world tasks, and so on. The author came to the conclusion that youngsters can benefit from andragogy's practises and ideas. Four of andragogy's five assumptions or principles can be applied to both adults and children, despite the fact that andragogy is typically emphasised in educational textbooks as the way adults learn. The only distinction is that youngsters have less life experiences and preconceived notions than adults, and as a result, have fewer things to relate to. Research evidences have shown that andragogical inquiry improves higher institution students' academic achievement (Adebola, 2018; Mohamed, 2013).

Another strategy which the study sought to experiment its effectiveness on secondary school students' achievement is analogy instructional strategy. A comparison between two sets of terms that are related to one another in the same way that another two terms are related to one another is stated through an analogy (Jiya, 2011). As an illustration, the mayor of a city and the governor of a state are both examples of elected heads of government. This analogy can be used to illustrate the comparison: mayor = state governor. Analogies are studied and made by students to assist them understand words and concepts as they build their critical thinking and reasoning abilities. Analogies have two sides to them; while they can promote understanding, they can also result in misunderstandings (Jasper & Fredrick, 2012). Students may find it difficult to comprehend parallels since the nature of the relationship may not be immediately apparent. Because of this, it's critical that both teachers and students explicitly express the relationship's nature when using an analogy.

Toluwa and Adefila (2020) define analogy instructional method as a teaching strategy that uses a mapping mechanism to assist learners in building new knowledge based on their recognition of similarities between various topics. An unfamiliar science topic (referred to as the target) is mapped on to a collection of important structural and relational information from well-known examples or events (the analogue or base domain). The student learns about the unfamiliar through the familiar. When the teacher can expand their analogy with examples from the students' personal experiences, analogies are engaging and motivating for students. However, if the students are unable to understand the analogy or have a difficult time visualising it, they may feel excluded or disappointed, which will decrease their interest in the analogical debate. Engagement and interest are consequently essential for learning.

Key concepts can be better learned through the use of analogies, which also help students understand the specific concepts used in them, develop their critical thinking skills, identify and analyse relationships, and connect new information to their existing body of knowledge. Numerous studies have demonstrated that using analogies as a teaching approach results in much higher student understanding of scientific topics and fosters more effective information integration, which raises student accomplishment (Aybuke & Omer, 2012). Thus, the rationale for this study is to find out which of these strategies (andragogical inquiry, analogy and lecture strategies) is most effective in boosting students' achievement in Economics.

Additionally, some teaching methods are believed to be independent on students' sex while others are dependent on students' sex. Sex is a socio-culturally ascribed attribute which differentiates feminine from masculine (Okeke, 2015). Sex is used to describe certain characteristics that are biologically determined. In this study, sex specifically refers to the gender identities of male and female students in a classroom. The study went on to evaluate whether or not the impacts of andragogical inquiry and analogy instructional tactics on students' achievement in Economics are influenced by their sex. In light of this, the study looked into how students' economic achievement in senior secondary schools in Delta State was affected by andragogical inquiry and analogy strategies.

Statement of the Problem

Almost all of Delta State's senior secondary schools provide economics classes. Since Economics is a fundamental social science subject, emphasis has been placed on its teaching and learning to the point where non-governmental organisations like the Rotary Club and the Thalia Foundation have assisted some schools in becoming equipped for the subject's instruction. Reports, however, indicated that students' academic achievement in Economics in external tests like the WASSCE has slipped below needed standards, despite the priority or prominence afforded to Economics as an important subject. This subpar performance may be linked to teachers using incorrect teaching techniques while teaching economics at the senior secondary school level, but this is not the only explanation.

Since the lecture technique is so frequently used by teachers, it is possible that using the traditional lecture approach, which has been found to be inadequate in addressing student issues, is a contributing factor in students' underachievement. Economics teachers are under a lot of pressure to find a teaching strategy that is more effective in raising students' economic achievement. Although it has been suggested that andragogical inquiry and analogy strategies can improve students' learning, the impact of combining the two on students' understanding of economic concepts has not been investigated and resolved. The interaction effect of andragogical inquiry and analogy strategies and students' sex on students' accomplishment in Economics is also a topic that has received little attention in the literature. Therefore, the study's problem expressed as a question: How do students of different sexes' economic accomplishment in senior secondary schools depend on andragogical inquiry strategy (AIS), analogy strategy (AS) and (LM)?

Purpose of the Study

The study's goal was to determine how the AIS, AS and LM affected the academic performance of Economics students at Delta State. The study's specific objectives are to determine:

1. the variance in economics students taught using AIS, AS, and LM mean achievement scores;
2. the effect of the interaction between teaching methods and sex on students' economics achievement.

Hypotheses

1. There is no significant difference in the mean achievement scores in Economics among students taught using AIS, AS and LM.
2. There is no significant effect of interaction of teaching methods and sex on students' achievement in Economics.

Research Method

The study employed a quasi-experimental 3x2 factorial pretest-posttest planned variation design. 30,813 SSII students in Delta State public schools made up the study's population. There were 258 SSII students in the study's sample. The Economics Achievement Test (EAT) was utilised to gather data. Three types of validity (facial, construct and content) were devised for EAT in order to ensure that it measures what it is intended to measure. The reliability of EAT was established using Kuder Richardson formula 21. This method was chosen because it works well with multiple-choice questions. Fifty Economics students in a school in Ukwuani Local Government Area, were given EAT. The results of applying Kuder-Richardson formula 21 to the student scores produced a reliability coefficient of 0.83.

The initial step in the treatment process was assignment of students to AIS group, AS group and LM group. Six intact SSII classes were randomly chosen from the nine schools chosen for the study to make up the three groups (3 schools each for andragogical inquiry, analogy instructional strategy and lecture method). The same Economics concepts were presented to students in the three groups. Pretest were administered before the treatment to the three groups. Students in the three groups took the EAT again after the six weeks of treatment, with the items rearranged. The scores obtained were analyzed using ANOVA, ANCOVA and Scheffe's post-hoc test.

Presentation of Results

- ✓ There is no significant difference in the mean achievement scores in Economics among students taught using andragogical inquiry strategy (AIS), analogy strategy (AS) and lecture method (LM).

Table 1
ANOVA Summary Table on Difference Between the Economics Mean Pretest and Posttest Scores of Students Taught with AIS, AS and LM

		Sum of Squares	df	Mean Square	F	Sig.
Pretest	Between Groups	288.998	2	144.499	1.865	.157
	Within Groups	19756.836	255	77.478		
	Total	20045.833	257			
Posttest	Between Groups	5504.341	2	2752.171	27.593	.000
	Within Groups	25434.310	255	99.742		
	Total	30938.651	257			

The pretest mean achievement scores of students who were taught economics using AIS, AS and LM differ significantly from each other, as shown in Table 1, $F(2,255) = 1.865, P(0.157) > 0.05$. ANOVA was utilised to test the null hypothesis. Table 1 once more demonstrates a statistically significant difference in the mean posttest results between students who were taught economics

using AIS, AS and LM, with $F(2,255) = 27.593$, $P(0.000) < 0.05$. As a result, the null hypothesis is disproved. The mean achievement scores in Economics among students who were taught using AIS, AS, and LM differ significantly as a result. Using a Scheffe's Post-Hoc test, the direction of the difference was identified, as shown in table 2.

Table 2
Scheffe's Post-Hoc Test on Economics Achievement

(I) Teaching Strategy	(J) Teaching Strategy	Mean Difference (I-J)	Std. Error	Sig. ^b	95% Confidence Interval for Difference ^b	
					Lower Bound	Upper Bound
Andragogical	Analogy	4.555*	1.567	.016	.70	8.41
	Lecture	11.216*	1.531	.000	7.45	14.99
Analogy	Andragogical	-4.555*	1.567	.016	-8.41	-.70
	Lecture	6.661*	1.487	.000	3.00	10.32
Lecture	Andragogical	-11.216*	1.531	.000	-14.99	-7.45
	Analogy	-6.661*	1.487	.000	-10.32	-3.00

Table 2 shows a significant difference between the mean economic achievement scores of students taught using AIS and AS, with a difference favouring AIS ($P=0.016$, < 0.05), a significant difference between the mean economic achievement scores of students taught using AIS and LM, favouring AIS ($P=0.000$, < 0.05), and a significant difference between the mean economic achievement scores of students taught using AS and LM, favouring AS ($P=0.000$, < 0.05). This demonstrates that relevance shifts from AIS, AS to LM in the direction shown.

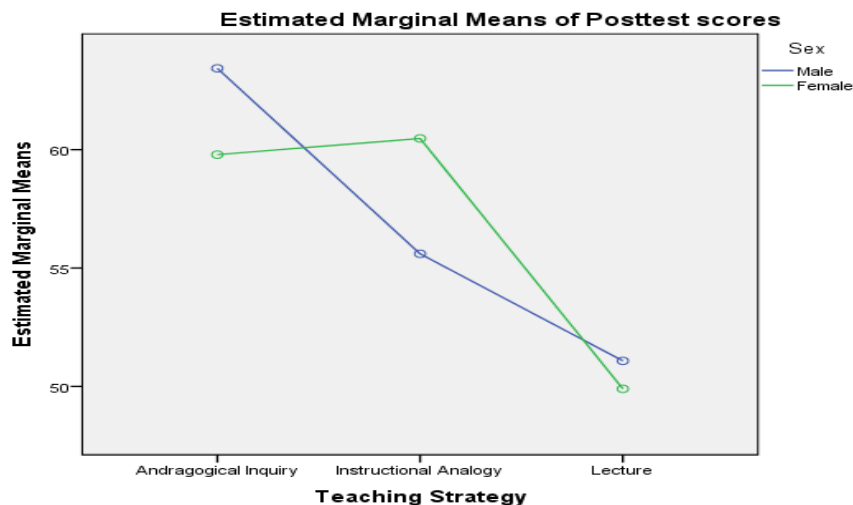
✓ There is no significant interaction effect of teaching methods and sex on students' achievement in Economics.

Table 3
ANCOVA Summary Table on the Impact of Teaching Approaches and Sex on Students' Achievement in Economics

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	11485.042 ^a	6	1914.174	24.698	.000
Intercept	70152.306	1	70152.306	905.139	.000
Pretest	4392.091	1	4392.091	56.669	.000
strategy	5565.579	2	2782.789	35.905	.000
Sex	.015	1	.015	.000	.989
strategy * sex	783.155	2	391.578	5.052	.007
Error	19453.609	251	77.504		
Total	849462.000	258			
Corrected Total	30938.651	257			

Table 3 demonstrates a substantial interaction effect between sex and teaching technique on students' achievement in economics, $F(2,251) = 5.052$, $P(0.007) < 0.05$. the null hypothesis is disproved as a result. As a result, there is a strong interaction effect between sex and instructional approaches on students' achievement in economics. Figure 1 displays the plot of interactions.

Profile Plots



Covariates appearing in the model are evaluated at the following values: Pretest scores = 21.83

Figure 1: Plot of Teaching Methods and Sex's Effect on Students' Economic Achievement

Significant and disordinal/crossover is the relationship between teaching strategy (AS) and sex and students' economic accomplishment. This suggests that when students' sex is taken into account, the impact of AS on accomplishment becomes quite significant.

Discussion of Findings

According to the study, there is a substantial difference in the mean economic accomplishment scores of students who were taught using AIS, AS, and LM, with AIS being more effective than AS and LM in each case. The variances in teaching strategies used in each group, which may have affected students' achievement scores in Economics, may be the cause of the discrepancies in achievement scores between the groups. Students who were taught using AIS and AS outperformed those who were taught using LM, according to the post-hoc test. This shows that, compared to the lecture group, the students in the AIS and AS groups may have engaged in more active learning, which facilitated their understanding of economic concepts. The students in the AIS and AS groups may have had greater achievement scores as a result of this. This is predicated on the idea that participation in the learning process enhances learning. The transmission strategy used, in which professors impart their information to their students in its final form, may not be unrelated to the low accomplishment scores of students taught via the lecture technique. The LM ensures that students are passive in their learning. In line with the findings of Mohamed (2013) and Toluwa and Adefila (2020), students who were taught economics using AIS and AS significantly outperformed those who were taught using LM in terms of achievement. According to Mohammed (2013), AIS is more effective than the LM at raising pupils' achievement levels. Toluwa and Adefila (2020), on the other hand, discovered a substantial difference between the mean achievement scores of pupils using AS and LM, favouring AS.

The limits attributed to AS may be a potential explanation for the poorer achievement, given that it has been seen that students taught with AIS had significantly higher achievement than those taught with AS. Visualising connections and interactions between a hierarchy of concepts spanning from the concrete to the abstract is made possible by AS. On the other hand, AIS does not give the student the desired knowledge or conceptual understanding; instead, the learner must find it on their own or in groups. The greater achievement results compared to students who were taught Economics using AS may be due to the fact that students who were taught using AIS independently discovered knowledge.

The study also revealed a substantial interaction effect between sex and the teaching technique on students' performance in economics. When sex is taken into account, specifically, the use of AS had a more pronounced effect on achievement. In other words, the use of AS when combined with sex has significant effects on achievement of Economics students. This result contradicted that of Akpoghol, Samba, and Asemave (2013), who found no evidence of a gender-method interaction effect on chemical achievement. This result also differs from that of Nawaf (2016), who claimed that there was no significant interaction between gender and teaching technique and students' comprehension of organic ideas.

Conclusion

The following conclusions were drawn from the study's finding: The use of AIS, AS and LM positively influenced students' achievement in Economics, with AIS being most effective, followed by AS and LM respectively. The study, also, concludes that AIS does not interact with students' sex to influence their achievement and retention of Economics, but AIS does interact with students' sex to influence their achievement in Economics.

References

Adebola, S. I. (2018). Effect of Oyedeji problem-solving model on Nigerian secondary school students' achievement and retention in further mathematics. *Journal of Popular Education in Africa*, 2(4), 15-27.

- Aduba, V. C., Ezeofor, A., & Okoro, U. C. (2010). Level of difficulty experienced by students and teachers in learning and teaching economics in secondary schools in Nsukka local government area, Enugu State (Unpublished undergraduate project). University of Nigeria, Nsukka.
- Akpoghol, T. V., Samba, R. M. O., & Asemave, K. (2013). *Effect of problem solving strategy on students' achievement and retention in secondary school chemistry in Makurdi Metropolis*. Retrieved 2nd July, 2022 from <https://www.researchgate.net/publication/308378691>.
- Amuda, B. G., Ali, D. G., & Durkwa, H. (2016). Gender difference in academic performance in SSCE economics subject among senior secondary school students in Maiduguri Metropolis, Borno State, Nigeria. *American Journal of Educational Research*, 4(3), 288-293.
- Aybuke, P., & Omer, G. (2012). Students' conceptual level of understanding on chemical bonding, *International Online Journal of Educational Sciences*, 4(3), 563-580.
- Christopher, P. (2015). Pedagogy Vs andragogy in elearning: Can you tell the differences? Retrieved 12th December, 2022 from <https://elearningindustry.com/pedagogy-vs-andragogy-in-elearning-can-you-tell-the-differences>.
- Deb, P. (2017). What is andragogy and who needs to know? Retrieved 12th December, 2022 from <https://thought.com/what-is-andragogy-31318>.
- Eleje, L. I., Esomonu, N. P., Okoye, R. O., Agu, N. N., Ugorji, C. O., Okoi, O. A., & Abanobi, C. C. (2020). Students' academic achievement in secondary-school quantitative economics: Effect of feedback with remediation. *Education Quarterly Reviews*, 3(4), 479-488.
- Jesper, H., & Fredrik, J. (2012). Using self-generated analogies in teaching of thermodynamics. *Journal of Research in Science Teaching*, 49(7), 898-921.
- Jhingan, M. L. (2010). *Microeconomic theory*. Delhi: Vrinda Publications (P) Ltd.
- Jiya, A. (2011). Effects of teaching-with-analogy on academic performance and retention of evolution concepts among Nigeria Certificate in Education biology students (Unpublished master thesis). Ahmadu Bello University, Zaria Nigeria.
- Mohamed, B. H. N. (2013). Effect of andragogical approach on the academic performance of psychology learners in open university in Malaysia (OUM). *57 World Assembly of International Council on Education for Teaching (ICET)*, 1, 102-110.
- Nawaf, A. H. S. (2016). Effectiveness of analogy instructional strategy on undergraduate students' acquisition of organic chemistry concepts in Mutah University, Jordan. *Journal of Education and Practice*, 7(8), 70-74.
- Okeke, O. C. (2015). Comparative effects of project and lecture method on secondary school students' achievement in economics (Unpublished Master Thesis). University of Nigeria, Nsukka.
- Robbin, L. (1932). *An essay on the nature and significance of economic science*. London: Spinger.
- Toluwa, O., & Adefila, O. M. (2020). Effects of analogy-enhanced instructional strategy on learning outcomes of students in basic science practical skills in Ekiti State, Nigeria. *International Journal of Multidisciplinary and Current Educational Research (IJM CER)*, 2(4), 41-45.
- Vedhathiri, T. (2021). *Enragogy, andragogy and pedagogy*. Retrieved 12th December, 2022, from https://www.researchgate.net/publication/354321921_Enragogy_Andragogy_and_Pedagogy/link/6130d9bd38818c2eaef79edb9/download.
- West African Examination Council (2017-2020). *WAEC Chief Examiners' Report*. Retrieved 2nd July, 2022 from <https://www.waeconline.org.ng/e-learning>.
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