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## DEVELOPMENT AND VALIDATION OF ECONOMICS INSTRUCTIONAL PACKAGE (ECOIPAC) FOR LEARNING DIFFICULT ECONOMICS TOPICS IN SENIOR SECONDARY SCHOOLS LAGOS STATE, NIGERIA

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### Abstract

The development and effect of the Economics Instructional Package (EcoIPac) for the learning of difficult topics on students' learning outcomes in economics were investigated in the study. The study adopted a non-experimental research design. The population of the study comprised all SS2 Economics students, with an intact class of two hundred and sixty-two (262) students being used for the study. Three (3) educational districts were randomly selected from six educational districts in Lagos. Four schools having functional computers were purposively selected for the study, and two schools were assigned to each. Two instruments were used to gather data. The Economics Instructional Package Rating Scale ( $r=0.72$ ) and the Economics Instructional Package Adequacy Software Development Rating Scale ( $r=0.78$ ) were used to collect data. Data were analysed using descriptive statistics. Results showed that the Economics Instructional Learning Package (EcoIPac) conformed to software development procedures. It also affirmed that the learning package is user-friendly in terms of navigation, chats, voiceover/sound, and examples cited, coupled with embedded feedback and assessment. It also showed that the students did not encounter challenges (launching of the package, use of text, sound, and examples, and explicit use of diagrams) learning with the digital package. In view of these findings, it was recommended that the economics instruction package should be used for learning difficult economics topics; this will improve students' learning outcomes in economics. Thus, teachers can also adapt it for their teaching methodology regarding difficult topics in economics.

*Keywords:* Difficult topics, economics instructional package, learning outcomes, package development, user-friendliness

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### **Introduction**

Economics is a social science subject offered at the senior level of education in Nigeria. Ever since the introduction of the subject into the school curriculum, many students do register and write Economics at the senior school certificate examination, especially science students, due to its advantage to migrate from science-orientated to social science or business at the tertiary institution in order to align with life endeavours. The performances of students in public examinations are a result of several variables. Among the variables are poor learning outcomes in the school subject, inadequate preparation by teachers, type of instructional strategies used in teaching, language of instructions, instructional aids, school location, difficult topics, teachers' competence and experiences, class size, teachers' mastery of the subject, and so on (Atanda & Adegbile, 2018; Adeyemi-Adewoyin, 2021). Atanda (2019) was of the opinion that teachers employ diverse teaching styles to impart knowledge to students. But, due to poor understanding of basic concepts and topics in economics, it has been found that students' performance in economics has been inconsistent in the last decade.

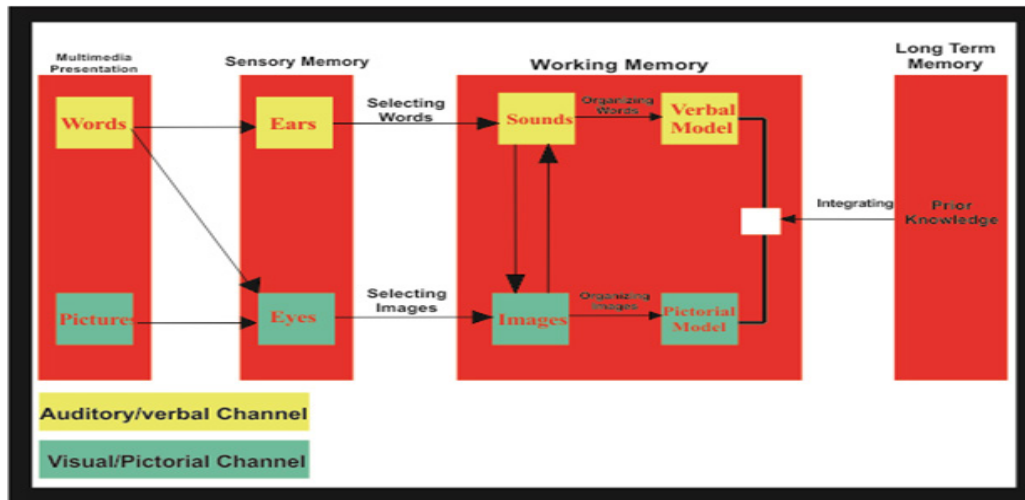
Technology for education has made learning a phenomenon. This is because teaching and learning have gone beyond the classroom. There are different software packages developed for teaching and learning; students can access them to be educated. Egbo, Ifeanacho, Okoyeuzu & Onwumere (2011) and Eiadat (2014) were of the opinion that an instructional software package involves the use of a computer as a set screen to provide a sequence of learning objectives to the students, such as diagrams, sound and text. It is usually organised and presented with the aid of software programming that provides students the opportunity to interact positively with them while using the software package. As a result of the presence of mathematical operation inherent in some topics in economics, Arsaythamby & Julinamary (2015) affirmed that students perceived some economics topics as difficult. Economics entails the use of mathematical calculation, drawing of graphs and tables, use of theories to interpret economic information and so on. Most students displayed great deficiencies on item questions involving data response questions that require the use of tables and graphs to explain or determine economic situations (WAEC, Chief Examiners' Report 2020, 2021, 2022 and 2023). This makes it difficult for some students to expatiate on their points to earn good marks. The cause of the inconsistent performance in economics can also be associated with the difficulty of some topics in economics (Mohammed & Jimoh, 2022).

In a bid to proffer solutions to the identified difficult topics in economics as well as inconsistency in the academic performance of students in economics, the development of a learning package was considered for the study. A learning package is a technological instructional application that can be used for learning difficult topics in economics. Al-Assaf & Ahmad (2020) see instructional application as the introduction of technology into the instructional process of

teaching and learning. Hence, technology is employed in the process of teaching and learning. The adoption of software applications for teaching and learning has made education a global phenomenon. This is because the use of technology for teaching and learning now exists in various forms of instructional application, educational application or e-learning platforms such as Google Docs, Google Meet, Zoom, Microsoft PowerPoint, Facebook, YouTube, WhatsApp, Telegram and so on and is significant when compared to the traditional method of teaching and learning.

Literature on software development reveals that some teaching and learning application package in different discipline have been developed in areas of English language, Mathematics and sciences and technical and vocational skills for secondary schools. All these efforts were to make learning student-centred and ease the workload of teachers. For instance, Omotayo (2017) developed dynamic mathematics software and a 5E instructional model on students' geometry achievement, interest and retention in senior secondary school in Ibadan, Nigeria. Ogunrinde (2023) also developed a technology-enabled assessment learning package for junior secondary school students' basic science.

In the process of developing a software application for difficult topics in economics, the findings on difficult topics in economics by Amao-Adeleke & Akorede (2024) were adopted for the development. The eight (8) topics perceived to be difficult are SS II topics. These include the concept *and theory of demand*, *the concept and theory of supply*, *cost concept*, *revenue Concept*, *elasticity of demand*, *elasticity of supply*, *price control/legislation and market structure*. The WAEC Chief Examiners' Reports (2020, 2021, 2022, and 2023) also served as a guide. This study was anchored in Multimedia Cognitive Learning Theory (CTML). The theory states that deeper mastery of knowledge could take place in a learner when information is presented to students through text, diagrams, sound, and animation rather than text alone. The objective of multimedia learning as an educational and interactive tool is not to eliminate the importance of teachers but to make teaching easier for teachers and learning easier for students.

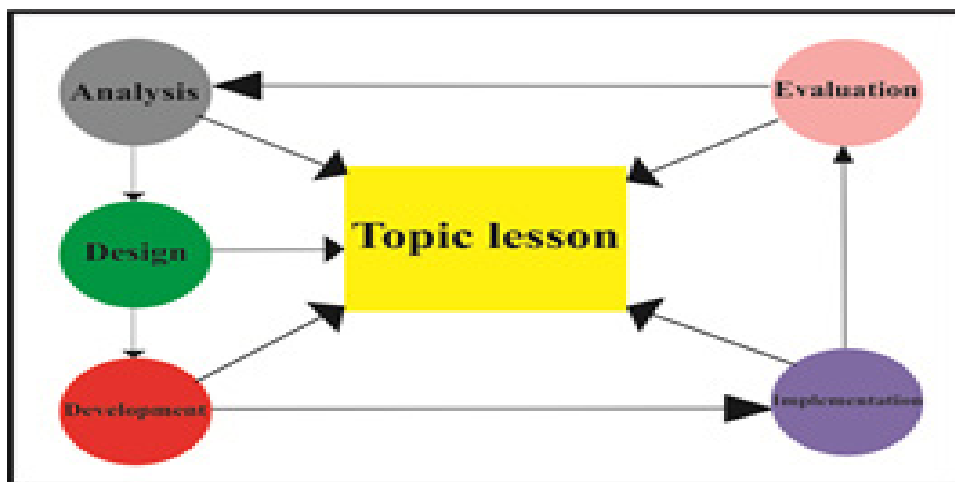


**Figure 1:** Cognitive Theory of Multimedia Learning

**Source:** Mayer and Moreno (2003)

Multimedia learning theory has to do with refining students’ knowledge and skills, thereby preparing students to identify challenges on their own, build their personalities through their expression and improve their knowledge. The senses accept information by selecting words and images and pass it to the working memory for processing for the learning experience to take effect in a learner. Hence, this study gives same opportunities to students when they learn difficult topics using Economics Instructional Package (EcoIPac) in economics.

The study adopted the ADDIE model. It is an acronym of five (5) phases of design. Analysis, Design, Development, Implementation and Evaluation were used to develop the EcoIPac package offline mode on a web browser as a stand-alone application package. Nada (2015) and Ogunrinde (2020) affirmed that it’s a good model for developing instructional materials that are suitable for specific aims and objectives as well as integrating all aspects of learning experiences to be achieved. The phases are as follows:



**Figure 2:** Process of ADDIE Model

**Source:** *ADDIE Model by Abubakar, Nasri and Sahaat, 2020*

### **Analysis Phase**

This phase focused on understanding the instructional needs, defining objectives, and identifying the characteristics of the target audience. For this economics instructional package, the analysis included the following steps:

- i. Needs Analysis:* Recognising the necessity to create a structured, interactive learning package on specific topics in economics. Amao-Adeleke & Akorede (2024) identified eight difficult topics to learn in their study, and it provided the contents of instructional objectives to be achieved in the package.
- ii. Learner Analysis:* The primary learners for this package are students offering economics at the senior secondary level of education. Understanding their educational background and familiarity with the subject allowed for an appropriate level of content complexity and interactivity.
- iii. Learning Objectives:* Each lesson was designed with clear, measurable objectives aligned with the knowledge and skills learners need to acquire. The objectives for the lessons were crafted by the subject matter expert to ensure alignment with educational standards.
- iv. Resource Analysis:* The content relating to the difficult topics to learn was considered in detail alongside the software developer, and the gaps identified were corrected. Resources included text explanations, examples, quizzes, images and interactive elements for engagement.

### **Design Phase**

This phase included:

- i. Creating instructional strategies:* Here the best methodology for the delivery of the instructional package across the student was considered, such as learning activities to be performed by the students
- ii. Development of content:* This has to do with arranging all the instructional objectives content into what will flow in sequence and stimulate learning, e.g., use of scripts.
- iii. Development of assessment:* Here assessment is embedded into the design to ascertain the level of assimilation, e.g., quizzes to test the ability of knowledge gained from the instructional package.

- iv. *Selecting multimedia:* This involved the technological tool that will deliver the package before the students, e.g., google meet, whatsapp, PowerPoint etc.
- v. *Selecting additional resources:* This involved provision of other supporting materials that can stimulate learning on the package, such as video, chats, diagrams, etc.

### **Development Phase**

The authoring tools used in the development phase are Microsoft PowerPoint, Audacity, and Storyline 360. Key steps in this phase included:

- i. ***Content Creation and Integration:*** The content was developed into lessons that align with the instructional goals. Each topic was presented with clarity, using text, voiceover, graphics, and interactive elements to enhance engagement and retention of the lesson.
- ii. ***Interface Development:*** The landing page, information page, and lesson selection page were developed with simplicity and clarity to ensure users could navigate effortlessly. Aesthetic elements, such as font choices and layout, were carefully selected to support readability and a positive user experience.
- iii. ***Quiz Development:*** Each quiz was created with multiple-choice types to evaluate the learners' understanding of the lessons. The option to review, retake, or print quiz results was integrated to encourage self-assessment and mastery.

### **Implementation Phase**

Key activities in this phase were:

- i. ***Testing the Learning Package:*** The usability testing ensured the navigation, quiz functions, and interface worked smoothly, providing a seamless user experience.
- ii. ***Learner Support:*** Instructions were provided on the landing page to guide learners on navigating the package.

### **Evaluation Phase**

This phase comprised both formative and summative evaluation steps:

- i. ***Formative Evaluation:*** During the design and development stages, each component of the package was reviewed and refined. Feedback from stakeholders, especially the researcher's advisors who are also experts in Economics teaching, testing, and educational technology on content and usability informed adjustments to content flow, navigation, and assessments.

- ii. **Summative Evaluation:** After the implementation, learners' feedback was gathered on their experience with the content, navigation, and quizzes were reviewed to assess whether the package met the instructional objectives.
- iii. **Continuous Improvement:** Based on the evaluation feedback, further revisions were made to enhance content clarity, quiz effectiveness, and interface functionality, ensuring the learning package continuously met the students' needs and improved with each iteration.

Demir & Akpınar (2018), Etcuban & Pantinople (2018), Adebayo & Adigun (2018), Bawa & Bagudo (2020), Al-Assaf & Ahmad (2020), and Ababa et al. (2021) affirmed that the use of instructional applications, media or technology used in teaching and learning guarantees the growth of learning when it comes to the evaluation of instructional objectives. In light of the above, this study developed and validated an economics instructional package. This package could be installed and practised with no internet requirement for learning difficult economics topics in Lagos State, Nigeria.

Despite the adoption of different teaching methods, some economics topics have been identified to be difficult as a result of the teaching approach; this might be one of the reasons for inconsistent performance in the last ten years. It was reported that students were deficient in attempting certain topic items involving tables, charts and calculations; this made the academic achievements of students be inconsistent in the last decade. This might be due to the fact that students believed that some topics are difficult to understand in economics. Review of literature showed that quite a few of software packages have been developed for teaching of difficult topics in economics but not specifically for offline mode that can be accessed by many students, such as Google, Google Play Store and Apple Play Store, and require an internet connection for them to be accessed by the students. The few developed packages for economics include Principle of Economics, Basic Economics book offline, Economics Textbook offline, Learn Economics, Basic Economics, and so on. Despite all the packages developed for teaching economics, no appreciable performance was recorded for economics. Therefore, this study developed and validated an economics instructional package for learning difficult economics topics in Lagos State, Nigeria.

The specific objectives of this study were to:

- » Examined process of Economics Instructional Package development
- » Examined user-friendliness of Economics Instructional Package
- » Observed challenges students encountered during the use of the learning package

### **Research Questions**

1. Does the developed EcoIPac package conform to software development procedure?
2. How user-friendly is the Economics Instructional Package in conjunction to (a) Ease of use (b) Content (c) Sound and (d) Texts?
3. What are the challenges students encountered in using the economics instructional package for learning economics?

### **Methodology**

The study employed a non-experimental research design. The population comprised all SS2 Economics students with an intact class of two hundred and sixty-two (262) students (94 males and 168 females) in Lagos State public senior schools. The study selected three (3) Educational District randomly from six educational districts in Lagos. Purposive sampling was used to select four schools having functional computers for the study.

Two instruments were used to gather data. The Economics Instructional Package Rating Scale ( $r=0.72$ ) and the Economics Instructional Package Adequacy Software Development Rating Scale ( $r=0.78$ ) were used to collect data. Data were analysed using descriptive statistics.

## Results

**Research Question One:** Does the Economics Instructional Package (EcoIPac) conform to software development?

**Table 1: Economics Instructional Package (EcoIPac) conformity to software development**

S/N	Statements	Not Present at all	%	Present to a small extent	%	Present to a great extent	%
1	To what extent is the flow chart branching well executed in the software?					18	100
2	To what extent is the looping in the flow chart implemented in the software?					18	100
3	To what extent do the decision boxes representing the RECAP in the flow chart execute in the software?			1	5.6	17	94.4
4	To what extent are the data boxes implemented in the software?					18	100
5	To what extent are topics properly executed in the software application?					18	100
6	To what extent is the logicity of the flowchart implemented on the software application?					18	100
7	Does the software application reflect the topics of discussion?					18	100

Table 1 revealed the response from the software expert. The result showed that 100% of respondents affirmed that the flow chat and looping on the flow chart were ‘present to a great extent’ and well executed in the development of the software package. 95% of respondents were in support that the decision boxes representing RECAP in the flowchart were ‘present to a great extent’ in the design of the package. 5% respondents aligned their response that, the

RECAP boxes on the flowchart were ‘present to a small extent’, while there was no response for ‘not present at all’

100% of respondents aligned their responses that all the topics treated in the package were well executed, there was logicity of flowchart implementation of the software, and the software reflected the topics discussed in the development of the learning package, which was ‘present to a great extent’. Thus no affirmation on ‘present to a mall extent’ and ‘not present at all’

**Research Question Two:** How user-friendly is the Economics Instructional Package in conjunction to (a) Ease of use (b) Content (c) Sound and (d) Texts?

**Table 2. Analysis of user’s friendliness of the economics instructional package**

S/N	Statements	Not Present At All	%	Present To Some Extent	%	Present To a Great Extent	%
<b>NAVIGATION</b>							
1	Easy to start the program.			68	26	194	74
2	Navigation options are clearly obvious and understandable.			55	21	207	79
3	Can be navigated with ease.			81	30.9	181	69.1
4	Navigation back to the home page is without difficulty, and links to other pages are functional.			68	26	194	74
5	Clear to students which point he/she has got to.			63	24	199	76
6	Can be ended any time.			70	26.7	192	73.3
<b>Diagrams</b>							
7	The colour texture is nice.			50	19.1	212	80.9
8	The font size is well designed.			54	20.6	208	79.4
9	Direction buttons are user-friendly.			60	22.9	202	77.1
10	The colours used were bright enough.			61	23.3	201	76.7
11	Colours used are appropriate for the lesson.			57	21.8	205	78.2
12	Text is easy to read.			63	24	199	76
13	Text is appropriate.			57	21.8	205	78.2
<b>VOICE/SOUND</b>							

14	Audio is well used	50	19.1	212	80.9
15	Sounds are clear to hear.	54	20.6	208	79.4
16	Grammar used is appropriate.	51	19.5	211	80.5
17	Vocabulary level is accurate.	54	20.6	208	79.4
18	Sounds are appropriate.	62	23.7	200	76.3
19	The level of language offered is clearly understandable.	68	26	194	74
20	Sounds are relevant and aid understanding.	50	19.1	212	80.9
	<b>ILLUSTRATION</b>				\
21	Easy-to-follow on-screen instructions.	59	22.5	203	77.5
22	Content is accurate and factual.	49	18.7	213	81.3
23	Content is educationally appropriate.	64	24.4	198	75.6
24	Content meets learning goals and objectives.	67	25.6	195	74.4
25	Content lacks bias (social, ethnic, gender, etc.).	64	24.4	198	75.6
26	Encourages performance-based learning.	72	27.5	190	72.5
	<b>ASSESSMENT/FEEDBACK</b>				
27	Provide assessment for learning.	57	21.8	205	78.2
28	Self-learning.	58	22.1	204	77.9
29	Feedback offered learners for wrong answers is useful.	52	19.8	210	80.2
30	Offer something extra that cannot be done in more traditional ways, e.g., a whiteboard and marker.	48	18.3	214	81.7
31	Can easily be recommended for use in schools	88	33.6	174	66.4

Table 2 showed that more than 70% of respondents rated their affirmation to the fact that navigation across the learning package was easy and ‘present to a great extent’. This allowed package to be easy to start, navigation options easy to understand, moving the pointer across the screen easy, and the forward and back buttons linked each pages easily, and the package can be ended with ease at any time, 30% of respondents aligned to the fact that navigation over the package was ‘present to some extent and no response aligning to ‘not present at all’.

In terms of diagrams, more than 70% of respondents were of the view that the colour of the text, font size, background screen colour, and legibility of text were adequate and ‘present to a great extent’; less than 20% of respondents aligned with the fact that the items listed under illustrations were ‘present to some extent’, and there was no response on ‘not present at all’.

In terms of voice/sound on the development of the learning package, more than 70% of respondents rated their responses such that the sound was clear enough, grammar was well chosen, vocabulary was appropriate, and the voiceover aligned with the wording on the screen as ‘present to a great extent’. Less than 30% of respondents agreed that all the features of sound were ‘present to some extent’, while no response rated them ‘not present at all’.

In terms of illustration cited on the package, the majority of the respondents rated the examples used in the development of the package to be adequate and ‘present to a great extent’; less than 30% aligned to ‘present to some extent’, while there was no rating of ‘not present at all’. On the feedback and assessment segment, the result showed that most of the respondents rated the software package to contain feedback and assessment items to be ‘present to a great extent’; quite a few aligned their rating on feedback assessment to be ‘present to some extent’, while there was no response rating of ‘not present at all’.

**Research Question Three:** What are the limitations students encountered through the Economics Instructional Package in learning of economics?

**Table 3: Analysis of students’ challenges in the use of EcoIPac**

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<b>Challenges</b>	<b>Frequency of those that did not have challenges</b>	<b>%</b>	<b>Frequency of those that have challenges</b>	<b>%</b>
Irregular Power Supply	66	25	196	75
Insufficient Computer Systems	49	18.7	213	81.3

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Table 3 showed that 75% aligned their challenge to the power outage issue. This is peculiar to every sector of the economy, and use of a generator set ameliorated the challenge. Also, 81.3% were of the opinion that there was not an adequate computer system for an intact class due to the population of the class. Donations of personal laptops were provided to salvage the situations.

## Discussion

The study revealed that the Economics Instructional Package (EcoIPac) conformed to software development; this was affirmed by software experts. This means that almost all the (software expert) respondents affirmed that all the parameters and indications of appropriate software development were present to a great extent. The result agrees with Sommerville (2011), who reported that software development entails related activities leading to a standard software production. These include software specification, software design and implementation, software validation and software evolution. Thus there is tendencies for improvement at any point in time. The findings are also in line with Babiker (2015), who affirms that multimedia is the combination of text, charts/diagrams, sound and animation or video using a computer device in an offline mode. When students interact with the computer system, it significantly improves students' achievement in a lesson. Thus, every teacher should create their multimedia along the instructional objectives of the lesson. The result also corroborated the study of Ogunyomi (2021) that students enjoy the use of software packages that adhere to basic steps of development software coupled with evaluation provision at the end of the lesson. The study found that EcoIPac conforms to standard development of software development through the use of the ADDIE model.

Experience shows that, for software to be user-friendly, it must demonstrate some characteristics of user-friendliness. This finding revealed that voiceover on the package, text, colour, diagrams, animation and content are user-friendly to the students. This result supports the assertion of Ogunyomi (2021) that user-friendly software guides students to achieve maximum learning objectives. The user interface provides students a combination of text, diagrams, sound, video or animation to aid learning. The main driven interface of the Economics Instructional Package (EcoIPac) provides a series of lessons which are navigated by selecting among the lesson options from the list (topic menu). This allows the students to learn the difficult topics without the teacher while assessment quiz items are provided for the evaluation of students' learning. Also, the result is consistent with a prior study that found a significant effect of a technology-based package on students' learning outcomes (Ogunrinde, 2023). User friendliness of the Economic Instructional Package (EcoIPac) entails navigation, diagrams, voice, use of diverse examples, quiz items and feedback across each of the eight lessons in the package for the evaluation of students' learning, which are present to a great extent in the learning package. This study revealed that EcoIPac is user-friendly in terms of navigation, diagrams, voice/sound, illustration and assessment/feedback to students having challenges on difficult topics in economics.

Among the challenges encountered was an inadequate computer system for the intact

classes. The sampled schools had fewer than twenty functional computers. Repairs were made to have substantial numbers of computer systems, while laptops were also volunteered for the study. For schools that had more than twenty computers, the school authority was unwilling to release the schools' computers for validation of the learning package; the reason was to avoid damages to the school computers by the students. An appeal was made with a promise to fix any damaged system in the school. In addition, the problem of power outage confronted the effective validation of the learning package. Schools hardly have an electricity supply during school hours. Generators were provided by the schools, and gas was purchased to ensure the package was validated within a stipulated time frame.

### **Conclusion**

Based on the results presented, 100% of software experts affirmed that the economics instructional package conformed to the software development procedure. More than half of the respondents affirmed that the learning package is user-friendly in relation to navigation from one topic to others or movement back and forward over the lesson; display of charts and diagrams with font specification and size; sound; vocabularies with detailed explanation; illustration with appropriate examples; as well as feedback and assessment provided to evaluate the extent of learning objectives attained on a topic.

### **Recommendations**

Based on the findings, the following recommendations were provided:

1. Use of ICT for learning should be encouraged among students. This will aid their learning developments and enable them to use the Economics Instructional Package at their pace.
2. Students should be encouraged to use the learning package to study difficult topics. This will ameliorate the challenge of studying difficult topics in economics.
3. Teachers can be encouraged to adapt the learning package for the teaching of difficult topics in economics. The workload of teachers will reduce when the package is adopted for teaching economics.
4. There should be provision of modern computers for learning at schools. Government alone cannot do it; old students' associations, parent forums, non-governmental organisations and other corporate bodies should be encouraged to donate computers to public schools. This will enable the student to learn using computers.

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