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Development and Evaluation of Lessoncast in Learning Selected Basic Technology Concept in Ilorin Metropolis

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A B S T R A C T S

This study determined the development and evaluation of Lessoncast in learning selected Basic Technology concept in Ilorin Metropolis. The study adopted a design and development model type. The population for this study was 5 educational technology experts, 5 computer science experts and 5 basic technology teachers were randomly selected to participate in the study. Two research instrument were used in this study; a developed lessoncast on basic technology; an experts rating questionnaire for the selected experts. Percentage and mean were used to answer the research questions. The findings indicated that Lessoncast in upper basic technology can be successfully developed for teaching upper basic technology. Educational technology experts agreed that developed lesson cast satisfied the required expectation. This study concluded that the visual aids or materials such as lesson cast work as a powerful tool in the classroom and can be used to enhance the teaching of basic technology in Nigeria. The implication is that if Lessoncast is properly integrated into teaching and learning, it will concretize the teaching and learning of basic technology concept. Therefore, the study recommended that schools should make resources such as the Internet and computers available to basic technology teachers so as to design and develop appropriate classroom learning and teaching materials that would help to explain concepts in basic technology better.

A R T I C L E   I N F O

1. INTRODUCTION

The education has important role in building the society. It is one of the most important needs for the well-being of individual and the society. Quality education helps to empower the nation in all standpoints. There are many ways to increase the learner's knowledge, and technology is the most effective way. ICT is an acronym that stands for Information Communication Technology, that provide access to information through telecommunication (Ahmad *et al.*, 2013). The incorporation of Information and Communication Technology (ICT) in all spheres of life have created a society which is motivated by knowledge and driven by technology. Susan (2018) observed that Information and Communication Technology (ICT) has created a more interactive relationship between teachers and students which promotes an integrative approach to teaching and learning.

The Federal Ministry of Education, (2004) defined ICT as encompassing all equipment and tools (including, traditional technologies of radio, video, and television to the newer technologies of computers, hardware, film-ware and others as well as the methods, practices, processes, procedures, concepts and principles) that come into play in the conduct of the ICT activities. Soetan *et al.,* (2014) argued that Information and Communication Technologies have the potential of being used to meet the learning needs of individual students, increase self-efficiency and independence of learning among students and improve students development, whereas Soetan *et al.,* (2014) affirmed that one of the breakthroughs in Information and Communication Technology in the 21st century is the discovery and emergence of the new media which have facilitated the creation of different platforms for social interactions.

The extent to which ICT are used in the educational process can be different, varying from using Internet resources for designing presentations, e-mail projects and web quests to distance learning (Martynova, 2016). For effective teacher training on the use of ICT, in addition to clarifying theoretical principles of introducing ICT into teaching, it becomes important to make the analysis of the conditions which provide the effective use of e-learning resources in the educational processes in schools. E-learning resources are computer based educational tool or system that enables people to learn anywhere and anytime. Today e-learning is mostly delivered through the internet, although it was delivered in the past by using a blend of computer-based methods like CD-ROM. Technology has advanced so much that the geographical gap is bridged with the use of tools that make people feel that they are inside the classroom. E-learning offers the ability to share material in all kinds of formats such as videos, slideshows, word documents and PDFs (Haxton & McGarvey, 2011).

Lessoncast is taking teacher preparation and professional development to the next level. A lessoncast is a short, 3-minute multimedia presentation, created by teachers for teachers. With a suite of easy-to-use tools and resources, users are guided through the process of creating interactive and engaging lessoncasts. In terms of teacher preparation, new instructors can now access clear and concise explanations of ideas and objectives, based on the advice and experience of senior teachers. A lessoncast can also be a great tool for teacher professional development, as it allows for easy collaboration between users. It can be used to demonstrate best practices and to showcase effective teaching strategies for specific areas (Lloyd & Robertson, 2012).

The teaching of a subject like Basic Technology may be effectively achieved through the use of lessoncast where students can revise their work as much as they like based on the oral and visual feedback that the teacher provides. A cursory or closer look at the nine themes of the subject may reveal that there is need for more than the face-to-face (traditional) settings

to each the subject, but the subject is usually taught by using just the face-to-face (traditional) settings in majority of the junior secondary schools in Nigeria. In some cases the students might forget some of the concepts being taught. Deriving from these contentions, it becomes necessary to ask; how can the objectives of the subject and the success of delivering its themes can be achieved? A teacher may experience difficulties in delivering all the concepts of the themes in Basic Technology using just the traditional settings, irrespective of the arm or class being taught. Also, (Elom & Okolie, 2014), observed that poor performance of students in basic technology has been so high in many Nigerian public schools in the recent years. It is against these backdrops that this study intends to develop and evaluate a lessoncast for learning selected Basic Technology concept in Ilorin metropolis.

1.1. Statements of The Problem

Lessoncast is of global importance in teaching and learning as it has emerged as a prominent teaching tool on the internet. For the teacher, lessoncast is an efficient and effective means of describing a step-by-step process, explaining a particular concept, or presenting a PowerPoint presentation with narration. Teachers have the ability to craft succinct and concise presentations because each lessoncast be edited. For the students, lesson casting allows them to learn by example, seeing for instance a step-by-step sequence in great detail or viewing a lessoncast video directly related to lesson content. Students can also watch a lessoncast video anytime, anywhere and have complete control of the lesson.

Despite the benefits of Lessoncast in teaching and learning, there are still problems facing its deployment into teaching and learning in Nigeria which include lack of teachers' mastery of subject area, student's attitudes towards the use of Lessoncast in learning Basic Technology concept, inability of teacher to use effectively Lessoncast for lesson presentation. Also, many new instructors may still prefer to observe seasoned teachers in a classroom setting.

It is in this light that this study has sought information on how to solve and develop problems facing lessoncast deployment into teaching and learning in Nigeria which includes creating a positive learning space for the students; A positive environment would help in eliminating negativity and encouraging healthy thoughts as the students tackles new learning challenges. Also teachers are to undergo a training session on how to make use of Lessoncast for lesson presentation. This research also concluded that the teachers should utilize adequate instructional materials and variety of teaching tools to facilitate mastery of subject area. In addition, Government should equip teachers with the skills and support needed to implement technology into their teaching practices.

1.2. Literature Review

A lessoncast is a multimedia PD artifact - created by teachers for teachers - showing the complete picture of what effective teaching looks like before, during and after engaging students. Lessoncast is a teacher learning platform. Alexiou & Paraskeva, (2010) analysis that it's unique e-portfolio tools provide targeted professional development modules that demonstrate classroom application and measure the impact on student learning. Teachers use Lessoncast to document professional learning, embed video clips, and record the "behind the scenes" thinking required for effective teaching. Instructional coaches use Lessoncast to

provide specific, timely feedback and support. Schools leaders get real-time reports that link professional development to classroom impact.

Silva writes lessoncast artifact is more than just a video clip of classroom instruction. A lessoncast provides the "behind the scenes" thinking or teacher metacognition that makes instruction effective. It includes teacher narration, video clips, downloadable resources, and metatags all in one easy to access digital artifact. Lessoncast Binder as narrated is the web application that makes it easy to create this multimedia PD artifact. Ademola illustrate that the app walks educators through the creation and publishing process. The final product - the lessoncast PD artifact - is easy to share and can always be updated even after publishing.

Creating a lessoncast is an effective assignment for teaching candidates to illustrate their thinking process for professors to ensure they are adequately prepared. Creating a lessoncast is a key element of scaffolded and differentiated professional development for experienced educators that can unpack and deconstruct highly effective best practices in a manner that makes those practices explicit for new teachers.

1.3. Lessoncasting Tools

Lessoncasting has tremendous potential for teachers and students alike. Making a screencast while narrating a Power Point is an easy way to begin. The University of Houston posts an excellent resource about digital storytelling, and its website offers many examples for composing, recording, and evaluating screencasts. There are two kinds of lessoncasting tools: The first involves use of Web 2.0 technology to compose and store the videos, and this is the one we recommend to classroom teachers and their students. Users of this kind of lessoncasting create and store their videos into online accounts in Jing, Screencast-o-matic, or other lessoncasting sites (e.g., Screenjelly). These online storage accounts are part of the new cloud technology, which circumvents the need for large storage space on a personal.

Cloud technology is often free for basic storage space, although fees are charged when extensive space is required. The second kind of screen-casting tool are those that convert a screencast into a QuickTime movie or Flash video that can be stored on personal computers and/or posted to a website. ScreenFlow, a paid software program, is an example of this kind of lessoncasting. The advantage of this kind of lessoncasting tool is that the actual video is stored on one's computer or disk drive, and the video can be edited and reworked again and again for many purposes. On the other hand, creating too many videos will stretch the memory capacity of most computers and an external drive might need to be purchased. One way around such challenges is to use free cloud storage for videos; we particularly like Dropbox, which provides 2Gb of space for no cost. Regardless of choice of lessoncasting tool (we like both), we recommend that classroom teachers learn Jing because it is free for up to five minutes of recording time and easy to learn. Steps in Making a Screencast The steps in preparing for lessoncasting are straightforward. First, prepare visual content to appear in the screencast - this is where a PowerPoint might be used. The teachers with whom we work usually prepare PowerPoint slides containing some amounts of text that are integrated with images, photos, and graphics. Second, narratives for each of the slides are rehearsed or written. Third, they create a Jing account by entering an ID and password (http://www.techsmith.com/jing/). The actual recording process begins by opening the PowerPoint slideshow, turning on Jing's recording button, and narrating each of the slides in the show. Background music and sound effects can be added as the producer become more skilful with lessoncasting.

There are videos posted to YouTube that may be helpful in learning more detailed information about Jing, but the specific steps for creating a Jing screencast are the following: 1. Become a member of Jing by entering an ID and password. Then download the program onto your computer. The program installs a "Sun" image onto your computer. 2. Select the Jing image (sun), click the "capture" button, and you are ready to start. 3. Then select the "capture a video" icon in the Jing window that appears on your desktop. Next a countdown timer appears on your computer screen and the recording begins!.

1.4. Integration of Lessoncast in Secondary Education for Learning

Educators in today's classrooms must be able to use and integrate both current and emerging technologies. One of the keys to effective 21st century teaching is to balance traditional pedagogical methods with the effective use of technology to foster learning. Many educational technology tools can be used in instruction; however, one fundamentally useful tool in teaching is the screencast. A screencast can provide learners a student-centered and engaging learning experience in both distance and traditional learning settings. Screencasts enable teachers to create a digital recording of any instructional activity performed on a computer screen, and they can be used as learning resources, learning tasks, and learning support.

Lessoncast can be integrated across the curriculum and into many learning activities. Lessoncasts are an effective instructional format that can be used for tutorials, demonstrations, digital storytelling, and narrated PowerPoint presentations. During the video editing process, a variety of media can be imported into a screencast project, such as video clips, photos, music, and animations. Screen casting is a multimedia alternative to video recording, is easy to use, and helps fill a need for dynamic, engaging content.

Lessoncast have many applications, which include: Training; such as learning new software and orientations to new products in secondary schools. Teaching; a lesson on a particular topic or showing a step-by-step process, in which students can learn material at their own pace or catch up on missed sessions. Selling; a product. Blogging and YouTube; communicating opinions, facts, and ideas, etc.

Lessoncast as instructional tool can be used in many different instructional modes such as an introduction to a topic, overview of a lesson, in-depth discussions, remediation, etc. The pervasiveness of online instructional videos such as Khan Academy, Teacher Tube, YouTube, Lynda.com, neoK12, and many others gives student access to many educational screencast videos on the Internet. Recently there has been a lot of interest generated in the "flipped classroom" teaching model. The term "flipped" is so named because the classroom and homework paradigm is reversed. What used to be done in the classroom is now done at home, and that which used to be done at home is now done in classroom. Students watch and listen to a teacher's lecture via lessoncast video for homework, and then use class time for what previously, often, was done in homework: tackling difficult problems, collaborating in groups, and researching.

For example, instead of starting classes with an overview of (a lecture) on the Big Bang theory, the overview and equations are completed at home via a Big Bang theory screencast. The next class could start with questions and discussion on the screencast content about the origins of the universe and transition into a class activity in which students are given the equation used to determine the rate at which the universe is expanding according to the Big Bang theory. As a result, students come to class having prior knowledge of the content, more

interest in the topic, and lessened cognitive overload. The flipped teaching method — a blending of direct instruction with constructivist learning activities — can be integrated across many curriculum areas.

Benefits of using the flipped classroom methodology include; makes class time more productive for both teachers and students, Increases student engagement, Increases student achievement, combines direct and online learning in a hybrid approach, Provides more time in which students can work collaboratively in groups, Engages students in learning and gives them knowledge of content before class, Gives students access to content if they missed class or need remediation.

2. METHODS

This section encompasses the methodology for the research. It has subheadings like research type, sample and population, research instrument, sample and sampling techniques, research instrument, validation of research instrument, procedure for data collection and data analysis technique.

2.1. Research Design

This study adopted research and development of lessoncast learning selected Basic Technology for Educational Technology experts, Computer Science experts and Basic Technology experts who would also participate in this study.

2.2. Population Sample and Sampling Technique

The population sample for this study consisted of all Educational Technology expert, Computer science expert and Basic science in Ilorin metropolis. The target population were all Educational Technology expert and Computer science expert in University of Ilorin and Basic Technology teachers in Ilorin metropolis. In the research, 5 Educational Technology experts, 5 Computer Science experts and 5 Basic Technology experts were purposively selected for this study. The experts were selected on the premises that they have been teaching the subject over the years.

2.3. Research Instrument

There are four (4) research instruments that were employed for this study:
1) Lesson in Basic Technology (LBT)
   An Audio-visual Lessoncast graphics package carefully aligned with an educational script was used. It enabled addition of videos, voice narration and power-points animation to make the instructional package appealing.
 2) Educational Technology Experts Questionnaire (ETQ)
   This instrument was designed and given to 5 educational technology experts to access the extent to which the contents, procedures and presentation of the lessoncast conform to educational technology standard. Section A was on the demographic data of the respondents. While Section B contained items to access the developed instructional

package. It will be rated based on: Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1).

3) Computer science Experts Questionnaire (CSQ)

This instrument was designed and given to 5 Computer Science Experts to access the extent to which the contents, procedures and presentation of the lessoncast conform to educational technology standard. Section A was on the demographic data of the respondents. While Section B contained items to access the developed instructional package. It will be rated based on: Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1).

4) Basic Technology Teachers Questionnaire (BSQ)

This instrument was designed and given to 5 basic technology teachers for teacher's validation of the lessoncast. The instrument is to check the extents at which the lessoncast can help and facilitate both teaching and learning process. Section A was on the demographic data of the respondents. While Section B contained items to access the developed instructional package. It will be rated based on: Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1).

2.4. Validation of Research Instrument

The instrument was validated by the researcher supervisor and other three Educational Technology experts for face and content validity. Their corrections were modified and was critically analyzed, thus carefully considered before the final production of the lessoncast. Some of the expert's observations were synchronization of sound and visual, typographical error, boldness of shot text, contents and technicality of the lessoncast.

2.5. Procedure for Data Collection

The data collection was conducted after getting an approval from the Head of Department of Educational Technology. The researchers reached the consent of the respondents to fill in the rating scale. Before the respondents fill in the rating scale, the researchers briefed the respondents on how to go about it and was allowed to ask questions in the process in case they did not understand something. This briefing was part of data quality assurance measures that ensured that accurate and reliable data is gathered. The retrieval of the rating scale was made by the researchers immediately.

A total number of 15 respondents were selected. 5 Educational Technology experts. 5 Computer Science Experts and 5 Basic Technology Experts were purposively selected for the study to determine the ease access of the lessoncast.

2.6. Data Analysis Technique

The main statistical analysis method used in testing the research question was descriptive and inferential statistics. Descriptive statistics such as frequency, percentage and mean was used to analyze the characteristics of the respondents. Likert type scale will be used to examine the extent to which the influence of selected variables on the development and

evaluation of Educational Technology experts, Computer Science experts and Basic Technology experts.

3. DATA ANALYSES and RESULTS

This section presents the data analyses and interpretation of data collected for the study through the administered instrument (questionnaire). The study is a descriptive research; hence, the results are presented in a descriptive format using frequency, percentage and mean for the demographic information and the research questions. All analyzed data are represented on tables.

3.1. Demographic Information

The data collected and analysed in this section represents the variables of focus for the study and background information on the development and validation of a digital photo-series in basic technology for upper basic schools in Ilorin metropolis. The demographic information in which data were collected and analyzed includes respondent's gender and educational qualification obtained which are presented on **Table 1**.

Table 1 reveals the distribution of basic technology teachers that were involved in the study-based gender. 3 (60.0%) of the respondents where Basic technology teachers were male, while, 2 (40.0%) was female.

Table 2 reveals the distribution of basic technology experts that were involved in the study based on gender. The table indicates that 4 (80.0%) of the respondents where Basic technology teachers were male, while, 1 (20.0%) was female.

Table 3 reveals the distribution of experts that participated in validating the developed Lessoncast on basic technology for upper basic schools in Ilorin metropolis. The table indicates that all the experts were equally distributed with 5(33.3%) each. In all 15(100%) expert participated in the study.

3.2. Results

The results of data collected were analyzed to answer research questions of the study. Results are represented on tables and subsequently interpreted.

Table 1. Distribution of Basic Technology Teachers by Gender.

Gender	Frequency	Percentage (%)
Male	3	60
Female	2	40
Total	**5**	**100**

3.3. Analysis of Research Questions

Research Question One: What are the processes involved in the development of Lessoncast for learning selected Basic Technology concept?

The production of instructional video to teach a concept in upper basic school based on the ADDIE model. The ADDIE model is a basic instructional model that has commonly been used in the development of a teaching and learning tool (Dick &Carey, 1996). The model consists of five different but interrelated phases: analysis, design, development, implementation and evaluation phase. The details of the five phases were elaborated further in the development phases below.

1) Analysis Phase

   It was decided that the instructional platform design was to be development of Lessoncast to teach a concept in upper basic school for the instructional design.

2) Design Phase

   The design phase involves the process of transforming the idea and concepts into something that is tangible and visual. Thus, the development of Lessoncast to teach a concept in upper basic school was developed based on the three aspects of design which are: interactional, information and representation. The details of each aspect were as follows:

   a. Interactional Design, involves the process of designing the instructional video package by synchronizing the recorded video and audio to suit the contents of the computer studies.

   b. Information Design, deciding on how the information is to be presented to the users. This includes assessment, Learning Strategy, Learning standard, and objectives.

   c. Representation Design, planning the layout of the animated video package with regards to three elements: color, scheme, font and graphics. That is the suitable graphics Combination asymmetry and symmetry layout. At design stage, the entire framework and architecture of the instructional video package in computer studies was thus constructed and designed.

3) Development Phase

   This third phase of development of involves the actual process of writing and preparing the assessment materials for the development of Lessoncast.

Table 2. Distribution of Educational Technology Experts by Gender.

Gender	Frequency	Percentage (%)
Male	4	80
Female	1	20
Total	**5**	**100**

Table 3. Distribution of Basic Technology Teachers by Qualification.

Educational Qualification	Frequency	Percentage (%)
Educational Technology	5	33.3
Computer Science	5	33.3
Basic Technology	5	33.3
Total	**15**	**100**

4) Implementation Phase

Implementation phase involves the process of putting the developed Lessoncast into the real world. The development of Lessoncast was validated by the developer as a self-check, by an Educational Technology expert and also by the developer's supervisor. The validation by Educational Technology expert was to obtain feedbacks in regards to the content, strategy, graphics, and text of the developed Lessoncast.

5) Evaluation Phase

To determine the expert rating of the development of Lessoncast, responses were obtained via questionnaires conducted computer science and educational Technology experts. For the questionnaires, 5 Educational technologies, 5 Basic technology experts and 5computer science experts were surveyed. The questionnaires were specifically designed to obtain feedback on the rating of the developed Lessoncast.

Research Question Two: What are the ratings of Educational Technology on the developed Lessoncast for learning selected Basic Technology concept?

To answer research question two, an educational technology experts rating guide was used in the validation of the developed Lessoncast in Basic technology. The data were analysed using mean, while grand mean was used to determine the validation rate of the developed Lessoncast on basic technology. The bench mark of 3.0 of a 5-point Likert scale was adopted. Results of the analysis are shown on **Table 3** and interpreted as thus.

Table 4 indicates the educational technology experts rating of the developed Lesson cast on basic technology concepts. The table revealed that the grand mean score of educational technology experts' rating of a developed Lessoncast on basic technology for upper basic schools in Ilorin metropolis is 3.78 which is higher than the benchmark of 2.5 on a likert scale. This implies that the developed lesson cast was well structured and every expectation in the developed lesson cast was achieved.

Table 4. Mean Rating of Educational Technology Experts.

S/N	Statement	Mean
1	The use of text follows the principles of readability.	3.71
2	The presentation of information can stimulate recall.	4.00
3	The presentation of information can captivate student's attention.	4.66
4	The lessoncast is developed and presented in a clear and understandable manner.	4.00
5	The package gives room for interactivity between learner and the students.	4.00
6	Package allows learner to learn at their own pace.	3.62
7	Package captivates and maintains the attention of the learners.	3.31
8	Package was developed using the instructional system design (ISD)	3.63
9	Package requires the use of ADDIE model for the implementation	4.10
10	The lessoncast is clear, precise and appealing	3.77
	Grand Mean	**3.78**

Research Question Three: examine computer science expert rating on the developed Lessoncast for learning selected Basic Technology concept?

A researcher-designed evaluation guide was used to determine the quality of the Lesson cast to teach a concept in upper basic school.

From **Table 5**, a grand mean of 3.68 was obtained for the expert rating of the quality of the lesson cast developed to teach a concept in upper basic Technology in upper basic school in Ilorin. The individual mean of the items in the rating guides which indicated good qualities in term of the stated objectives, music quality and sound effect, relevancy of the lesson cast and suitable for the learners was greater than the mean bench mark. Also, the grand mean score was greater than the bench mark. This confirms the suitability and the quality of the lesson cast for teaching.

Research Question Four: What are the ratings of Basic Technology teachers on the developed Lessoncast for learning selected Basic Technology concept?

Table 6 indicates the mean responses of basic technology teachers in upper basic schools to the developed lesson cast. Using a bench mark of 3.0, the grand mean result revealed that the mean score for each of the ten (10) items on the questionnaire is above 2.5, while, the grand mean score of the ten (10) items is 3.64. This indicates that upper basic technology teachers have a positive reaction to the developed lesson cast.

Table 7 indicates that the total sum of five thousand, four hundred and five naira (N5,405) only was the cost estimate for the development and validation of a lesson cast to teach Basic technology in upper basic schools in Ilorin metropolis. The benefits of the lesson cast are unquantifiable and incomparable with the cost.

Table 5. Mean Rating Scale of Computer Science Experts.

S/N	Assessment of the Content	Mean
1	The package is easy to operate for both learners and teachers.	3.61
2	The package requires special software installation for access.	3.86
3	Audio quality in the Lessoncast is of good quality.	3.66
4	Video quality in the Lessoncast is of good quality.	3.00
5	Synchronization of the audio and video graphics is of a high quality.	3.00
6	Package color mixture is appealing to learn.	3.62
7	Noise and other media distractions was carefully avoided.	3.31
8	The lessoncast uses proper fonts in terms of size and style.	3.63
9	Technical Support needed for package use in the classroom.	3.10
10	A high contrast between graphics and background is retained.	3.77
	Grand Mean	**3.68**

Table 6. Mean Rating of Basic Technology Teachers in Upper Basic Schools to the Developed Lesson Cast.

S/N	Items	Mean
1	The contents in the Lessoncastis in consonant with the basic technology curriculum	3.4
2	The use of lessoncast to teach some selected concepts in basic technology will stimulate learners' interest.	3.6
3	Lesson cast will help to make the teaching of basic technology easy and seamless	3.6
4	Lessoncast can concretize the abstraction in basic technology	3.2
5	The use of visual imagery to enhance lesson content in the teaching of basic technology is wonderful	3.6
6	Students will prefer to learn basic technology with the use of lessoncast compare to other traditional instructional materials employed to teach basic technology	3.6
7	The time to explain lesson content will be reduced because the captions in the Lesson already explains better	3.6
8	The utilization of lesson cast can facilitate easy achievement of lesson objectives	3.8
9	Better classroom interaction can be achieved with the utilization of lesson cast.	4.0
10	With the use of lesson cast in teaching basic technology, effective classroom management can be achieved	3.8
	Grand Mean	**3.64**

Table 7. Cost Implication of Developed Lessoncast in Basic Technology for Upper Basic Schools.

S/N	Activities	Rate	Amount
1	Internet connectivity data for downloading Basic technology instruments images from google.com	N600/ Per Gigabyte	N1200
2	Editing of downloaded images	N20/Per Instrument	N700
3	Uploading and Synchronising of images to produce a lesson cast	N40/ Per Slide	N1505
4	Miscellaneous		N2000
	Total		**N5405**

3.4. Summary of Findings

The summary of the findings from the research questions and research hypotheses are presented as follows:

1. A lesson cast in upper basic technology can be successfully developed for teaching upper basic technology.
2. Educational technology experts agreed that developed lesson cast satisfied the required expectation.
3. Upper basic technology teachers have a positive reaction to the developed Lessoncast.

4. The cost for developing and validating a lesson cast is six thousand four hundred and four naira only.

4. DISCUSSION, CONCLUSION AND RECOMMENDATIONS

This chapter deals with the discussion and conclusion based on data analysed and results presented in chapter four. It will also entail findings on the field by the researcher when carrying out the research survey.

4.1. Discussion of Findings

Findings revealed that the development of a lesson cast in basic technology for upper basic schools in Ilorin metropolis can be done using Product Oriented Model which is front-end system design with four phases (Course Outline, Selection of Media, Development/ Production of material, and Course Delivery). These findings complement the assertion of Dick, Carey, and Carey who made a significant effort to build on the ADDIE model, and postulated that the design of instruction and classroom instructional materials should be based on a whole system that focuses on the interrelationship between contexts, content, learning and instructional technique (Nichols & Greer, 2016).

Findings also revealed that the developed lesson cast for Basic technology was well structured and every expectation in the developed lesson cast was achieved. The researchers posited that a lesson cast showed higher scores on standardized measures of achievement, and also rated higher on as an attitude instrument. Not only is there evidence for achievement, but also evidence for improvement in attitude.

Lessoncast artifact is more than just a video clip of classroom instruction. A lessoncast provides the "behind the scenes" thinking or teacher metacognition that makes instruction effective. It includes teacher narration, video clips, downloadable resources, and metatags all in one easy to access digital artefact (Perry & Perry, 1998). Lessoncast Binder is the web application that makes it easy to create this multimedia PD artifact. Ademola illustrate that the app walks educators through the creation and publishing process. The final product - the lessoncast PD artifact - is easy to share and can always be updated even after publishing.

Findings revealed that upper basic technology teachers have a positive reaction to the developed digital photo-series. This is in line with the assertion of Ramirez, (2012), the researcher opined those visual materials have been an important component of the classroom over the years, and teachers have a positive reaction to the use of visual materials in the classroom. The researcher claimed that visual materials such as film strips, pictures, slides and pass-around objects are mostly liked and utilized by teachers in the classroom compare to other instructional material. Thus, visual materials such as lesson cast are considered a useful tool for teachers in almost every trend of classroom instruction.

4.2. Conclusions

The study concluded that the visual aids or materials such as lesson cast work as a powerful tool in the classroom and can be used to enhance the teaching of basic technology in Nigeria, more particularly, Ilorin metropolis. Lessoncast is appreciated by the teachers and they are

ready to use it in the classroom to provide the opportunity for learners to visualize materials that are not readily available in the school and to show the actual meaning of the lesson content. This conclusion is based on the mean rating revelation that shows positive.

4.3. Implications of the Study

Schools where basic technology subject is offered should adopt the use of multimedia technology most especially lesson cast to concretize learning contents and increase students' performance in basic technology. Also, any school adopting the developed lesson cast will require numbers of computer system and projector in order to project the contents in the lesson cast to the learners in the classroom so as to achieve the purpose of its development.

4.4. Limitation of the Study

The following were the limitations of this study:
1. The research was basically undertaken to develop and validate a lesson cast for the teaching of basic technology in Upper basic schools in Ilorin metropolis, Kwara State Nigeria.
2. The study was limited to visual elements without explanatory audio to support the lesson cast.
3. The study was limited to 5 basic technology teachers and 5 educational technology experts for validation purposes.
4. The positive result gained from this study might be due to location where this study was conducted, due to the fact that Ilorin metropolis is the business hub and elite filled environment.

4.5. Recommendations

The following recommendations were made based on the findings of the research;
1. Lesson cast should be adopted for the teaching of basic technology in Upper basic schools in Ilorin in order to concretise lesson content and abstract content that are inherent in basic technology.
2. Teachers of basic technology should be adequately and properly trained to utilise emerging technologies that are useful for the teaching of basic technology.
3. The government should provide adequate instructional resources to the schools where basic technology is offered in order to improve the technological and scientific skills of teachers.
4. Schools should make resources such as the Internet and computers available to basic technology teachers so as to design and develop appropriate classroom learning and teaching materials that would help to explain concepts in basic technology better.

4.6. Suggestion for Further Studies

For further researches in this area, the following were suggested:
1. Efforts to replicate this study to other secondary schools in Nigeria should be encouraged.

2. The influence of other variables such as qualification, years of working experience, attitude and perception of secondary school teachers in utilization of lesson cast could be investigated.
3. Further studies can as well focus on the lecturers in higher institutions of learning.
4. Further studies can as well focus on the students in Universities in Nigeria.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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