

DIGITAL RESOURCES AND HOME ECONOMICS EDUCATION STUDENTS LEARNING OUTCOME IN BATTER MAKING: THE CASE OF THE UNIVERSITY OF UYO

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Abstract

This study determined the effect of digital resources on learning outcomes in batter making among Home Economics Education students in University of Uyo, Akwa Ibom State. Two specific objectives, two research questions and two null hypotheses were stated to guide the study. The study employed the quasi experimental research design, utilizing the pretest, post-test, control group design. 46 year one students of Home Economics Education in the 2022/2023 set from the University of Uyo formed the population for the study. 46 students were used for the sample. The students were randomly assigned to treatment and control groups. 10 students were in the control group taught with expository method, while 9 students each were taught with youtube and google classroom respectively. The instruments of the study included instructional lesson plans for the three teaching methods and an assessment tool titled "Batter making Achievement Test". To ensure face and content validity of the instruments, the draft of the instruments was subjected to face and content validation by three experts, one from the department of measurement and evaluation and two from the department of Home Economic Education, all from the University of Uyo, Uyo. To determine the reliability of the instrument, the instrument was administered to 10 respondents from the population of the study who did not constitute part of the main study. A reliability coefficient of 0.86 was obtained using Cronbach Alpha. Mean and standard deviation was used for answering research questions while analysis of covariance (ANCOVA) was used in testing the null hypotheses at 05 level of significance. Findings of the study revealed that youtube and google classroom have a significant positive effect on learning outcomes. Based on the findings of the study, it was recommended that heads of schools should encourage their teachers to regularly use google classroom method when teaching students batter making.

Keywords: Google classroom, YouTube, online learning, batter making, learning outcomes

Introduction

Digital resources (DR) is broadly defined as information, teaching and learning resources that can be accessed through the Internet-connected devices. This includes the use of mobile phones, computers and other electronic gadgets to assess videos, electronic journals and books, online databases, websites, CD-ROM, electronic texts. Digital resources have become essential resources for teachers and students as well as enriching and transforming the instructional process (Ternenge & Kashimana, 2019). Digital resources are handier than print resources because it enables access to materials that might otherwise be denied to consumers

owing to geographic location, economics, or other constraints. It also supports all forms and modes of learning including synchronous and asynchronous learning (Anunobi & Okoye, 2008; Lo, Cho, Law, Chiu & Allard, 2017).

Traditional teaching methods have been complemented and, in some cases, replaced by digital resources. The integration of digital resources in education has brought about a paradigm shift, enabling educators to leverage interactive and dynamic tools that cater for the diverse learning needs of students (Picciano, 2017). These resources have their origin in the evolution of computer technology and the rapid expansion of the internet, which have paved the way for innovative approaches to education (Means, 2017). Examples of digital resources adopted for teaching include interactive multimedia presentations, Google classroom and youtube (Ng'ambi and Bozalek, 2019).

Google classroom is one of the blended learning models intended for every scope of education. Google classroom is an application in the form of a classroom that is connected via an internet connects and occurs in cyberspace (Nirfayanti and Nurbaeti, 2019). Google classroom is an application that allows the creation of classrooms in cyberspace. This application helps make it easier for teachers and students to carry out the learning process more deeply and without direct physical contact and is more friendly to the environment because they no longer use paper in collecting their assignment (Yusuf *et al.* 2020). Google classroom can be used to teach students anything including food and nutrition practicals such as pastry, dough and batter.

Youtube is an online video sharing and social media platform Youtube is the most popular video sharing website where registered users can upload and share videos with any one able to access the site. YouTube has evolved as an effective, educative platform, altering the educational landscape and democratizing access to information. With its attractive videos and engaging information, YouTube gives educators and learners an unprecedented chance to engage, inspire, and change learning.

Pastry refers to a mixture of flour, fat (such as butter or shortening), and liquid (usually water) that is mixed together to create a pliable dough. Pastry is typically used to make baked goods such as pies, tarts, quiches, and pastries. The ratio of fat to flour, as well as the method of incorporating the fat into the dough, determines the texture of the pastry. Examples of pastries include pie crusts, puff pastry, and croissants (Gisslen, 2017).

Batter is a thin, pourable mixture made from combining wet and dry ingredients such as flour, eggs, milk, and sugar. Batters are typically used to make cakes, pancakes, waffles, and quick breads. The consistency of the batter can vary depending on the desired outcome, ranging from thin and runny to thick and viscous. Batters are often mixed together quickly and do not require extensive kneading or resting like dough does.

Home Economics Education in his entirety has central role to play in promoting national creativity and entrepreneurship (Ayodele, 2018). This therefore calls for effective teaching and learning of bater and bater making among students in Home Economics Education to enhance students' learning outcome in the subject.

Outcome is the observable or measurable behaviour of a person in a particular obligation. Outcome is therefore the end result of an activity. Learning outcome in a narrow

sense refers to the measured performance of students through examinations at a certain study stage. Learning outcome is commonly measured through examinations. In empirical studies of learning outcome, a considerable number of researchers adopt such definitions of learning outcome as students' examination results, for example, Mahasneh and Alwan (2018), define learning achievement as a definition of a learner's performance of teaching and learning assessments, such as final examination results, achieved by the person in school. Digital learning resources such as youtube and google classroom could be important innovations if integrated into Home economics education.

Home economics is an academic discipline that encompasses various aspects of household management and daily living. Scholars have defined home economics as the scientific study of the resources and conditions of family living and principles of personal hygiene, nutrition, and management (Perry, 2019).

One of the key principles of home economics is the integration of theory and practice. By combining theoretical knowledge with hands-on experience, students are better equipped to apply what they have learned in real-life situations. This approach helps individuals to develop practical skills that can be used to make informed decisions in various aspects of their lives. By teaching practical skills and promoting critical thinking, home economics programs play a crucial role in promoting overall well-being and quality of life for individuals and families.

The curriculum of home economics typically covers a wide range of topics related to household management, nutrition, personal finance, and family dynamics. A key aspect of food and nutrition is batter making using flour mixtures. A flour mixture refers to a combination of different types of flours blended together in specific proportions for various culinary purposes. Flour mixture is central to pastry making. Batter and dough are all fundamental elements in baking and pastry-making, each serving different purposes and resulting in distinct textures and flavours. Here are explanations of each term and their characteristics. Pastry refers to a mixture of flour, fat (such as butter or shortening), and liquid (usually water) that is mixed together to create a pliable dough. Pastry is typically used to make baked goods such as pies, tarts, quiches, and pastries. The ratio of fat to flour, as well as the method of incorporating the fat into the dough, determines the texture of the pastry. Examples of pastries include pie crusts, puff pastry, and croissants (Gisslen, 2017).

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Statement of the Problem

Digital technology has become a social necessity to ensure education as a basic human right, especially in a world experiencing more frequent crises and conflicts. More challenging for educators is the changing social dynamics that supports the integration of digital technologies into instruction. The challenge for home economics education is that some have averred that this is practical course that requires physical manipulation, as such, virtual classrooms may not be appropriate. It is however, clear that the emerging digital resources support all kinds of learning, while enhancing student engagement and practical skills application. These differing thoughts inspired this research, to determine if youtube and google classroom can have positive effects on students' learning outcomes.

The Advent of Information Communication Technology has led to the use of digital resources in teaching and learning across all disciplines including Home Economics Education. Observation reveals an upsurge in student population in the Department of Home Economics Education without an attendant increase in the number of lecturer thereby making the teaching of these students cumbersome for the few lecturers, thus the need for this study.

Also, students are constantly on the internet for one reason or the other and so the researcher deemed it necessary to explore the use of digital resources and learning outcomes in batter making among student in the Department of Home Economics Education with a view to bridge the gap created in the staff lecturer, student ratio. The internet has become a current avenue of accessing information and learning skills including food related skills.

The Purpose of the Study

The main purpose of this study was to determine the effect of digital resources on learning outcomes in batter making among Home Economics Education students in University of Uyo, Nigeria. Specifically, the study sought to:

1. determine the mean scores of the learning outcome of Home Economics Education students in batter making (puff puff) when taught with Google classroom and expository method.
2. determine the mean scores of the learning outcome of Home Economics Education students in batter making (puff puff) when taught with youtube and expository method.

Research Questions

The study sought to answer the following research questions;

1. What are the mean scores of the learning outcome of Home Economics Education students in batter making (puff puff) when taught with Google classroom and expository method?
2. What are the mean scores of the learning outcome of Home Economics Education students in batter making (puff puff) when taught with Youtube and expository method?

Research Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance:

1. There is no significant difference between the mean scores of learning outcome of Home Economics Education students in batter making (puff-puff) taught with Google classroom and expository method.
2. There is no significant difference between the mean scores of learning outcome of Home Economics Education students in batter making (puff-puff) taught with youtube and expository method.

Theoretical Framework

This study is premised on the Technological Pedagogical Content Knowledge (Tpck) Framework by Mishra and Koehler (2006). The Technological Pedagogical Content Knowledge (TPCK) framework, proposed by Mishra and Koehler (2006), serves as a foundational theory for understanding the integration of digital resources in educational settings. TPCK emphasizes the dynamic interplay between three essential knowledge domains: Technological Knowledge (TK), Pedagogical Knowledge (PK), and Content Knowledge (CK).

In the context of this study, the TPCK framework suggests that successful integration of digital resources in dough and dough preparation education (Content Knowledge) requires an intricate understanding of both pedagogical approaches (Pedagogical Knowledge) and the effective use of digital technologies (Technological Knowledge).

Digital Learning Resources (DLR) are digital resources that aid in the instructional process on both teaching and learning. According to Dillion (2023), most digital learning resources are accessed through a connection to the internet. Technology in classrooms has become increasingly prevalent, as more and more schools move to a one-to-one device model and imbibe more virtual and blended classrooms. SmartBoards are becoming more common in many classrooms, which allows the teacher to interact with digital learning resources during their presentation of new content. This has created an immense impact on how students learn new information. The most integrated digital resources are the google classroom and youtube.

YouTube has made educational resources to become more accessible to all cadres of students. The evolution of youtube from an entertainment platform into a valuable educational tool that students are leveraging to enhance their learning experience beyond the classroom. The YouTube platform provides a range of educational channels with contents covering a wide range of subjects. From tutorials on complex math problems to a step-by-step process of cooking with recipes and other help content. Other areas where youtube has been to improve the educational process are supporting diverse learning styles, essential for supplementary Learning, supports flexibility in learning, allows for visual demonstrations, increases access to global experts, supports Interactive Learning: Many educational channels encourage viewer engagement through quizzes, Skill Enhancement, Access to Current Events, cost-Effective and it is central to Global Learning Community. (Dillon, 2023)

Google Classroom is a free blended learning platform developed by Google for educational institutions that aims to simplify creating, distributing, and grading assignments. The primary purpose of Google Classroom is to streamline the process of sharing files between teachers and students (Magid, 2020). In the year 2021, approximately 150 million users use Google Classroom (Google groups, 2018). Classroom uses a variety of proprietary user

applications (Google Applications for Education) with the goal of managing student and teacher communication. Students can be invited to join a class through a private code or be imported automatically from a school domain. Each class creates a separate folder in the respective user's Google Drive, where the student can submit work to be graded by a teacher. Teachers can monitor each student's progress by reviewing the revision history of a document, and, after being graded, teachers can return work along with comments and grades.

Batter is a versatile mixture that plays a key role in the culinary world. It is essentially a liquid-based preparation that consists of a combination of dry and wet ingredients, such as flour, eggs, milk, water, or other liquids, and various seasonings or flavorings. Batters can vary in consistency from thin and runny to thick and fluffy, depending on the desired end result. Batters are often used to coat or cover food items before they are cooked, providing a protective layer that helps seal in moisture and add texture and flavor. The process of coating food in batter is known as battering or breading. When the batter-coated food is cooked, the batter forms a crispy, golden crust on the outside, while the interior remains moist and tender (Schultz, 2017).

There are different types of batters used in cooking, each with its own specific purpose and characteristics. For example:

- i. Pancake batter is thin and pourable, creating light and fluffy pancakes when cooked on a griddle.
- ii. Tempura batter is light and crispy, commonly used in Japanese cuisine to fry vegetables and seafood.
- iii. Cake batter is thick and creamy, resulting in tender and moist cakes when baked.

Batters can be sweet or savory, depending on the ingredients added. Sweet batters often include sugar, vanilla, or other flavorings, while savory batters may contain herbs, spices, or cheese. Batters can also be gluten-free or vegan, using alternative flours or plant-based ingredients.

Overall, batter is a fundamental component in cooking that adds texture, flavor, and visual appeal to a wide range of dishes, from breakfast favorites to crispy fried delights. Its versatility and adaptability make it an essential technique for chefs and home cooks alike to explore and experiment with in their culinary creations (Rosele, 2019).

A study by Lee and Kim (2018) explored students' perceptions of using an online platform for sewing techniques. The results revealed that students appreciated the convenience of accessing instructional videos and virtual simulations, allowing them to practice sewing skills at their own pace. However, some students expressed concerns about the lack of immediate feedback, suggesting that incorporating interactive quizzes or assessments within the platform could further enhance their learning experience.

Ajayi (2019) investigated the application of Information and Communication Technology in Nigerian Secondary Schools. The descriptive survey design was used for the study. The population consisted of all the teachers and principals of the secondary schools in Ondo and Ekiti States. A sample of 320 teachers and 40 principals were used for the study. Questionnaire was the instruments used to collect data for the study. Frequency counts and percentage scores were used to analysed the data. The study revealed that TEL facilities were

lacking in schools and teachers and students were to a little extent exposed to the use of TEL. The study also revealed the perceived benefits of using TEL in schools which include making teaching and learning interesting; helping the distance learning programme; helping teachers to be up-to-date; enhancing quality of work by both the teachers and the students.

Akinyemi and Oye (2017) examined the impact of mobile technology on learning effectiveness in Nigerian higher education. The authors used a sample of 327 undergraduate students from Babcock University and collected data through a structured questionnaire. The study found that the use of mobile technology had a significant positive impact on learning effectiveness. The authors noted that mobile technology enabled students to access educational resources and communicate with their lecturers and peers more efficiently. The authors also observed that the use of mobile technology improved student engagement and motivation, leading to better learning outcomes.

Also, Nnadozie (2018) carried out utilization of e-learning technologies amongst selected undergraduate students in a Nigerian university of agriculture. The design of the study involved a combination of descriptive survey research and linear correlation. Six objectives and two hypotheses were formulated to guide the study. A blend of accidental and stratified sampling technique was used to select a sample of 420 undergraduate students. Four hundred and eleven (411) copies of the self-designed questionnaire was returned which gave a 97.9% response rate. Descriptive and inferential statistics were used for data analysis while hypotheses were tested with PPMC and t-test analytical techniques. The findings revealed that awareness of e-learning technologies amongst undergraduate students is quite high (mean=2.89); several types of e-technologies are used (mean=2.70); there is a high preference for audio conferencing (mean=2.98), applications sharing (2.96) and forum (2.94) as media of

Methodology

The study adopted a quasi-experimental research design, utilizing the pre-test, post-test non randomized group design. The design implies that intact classes will be used for the study. The structure of design process is presented below.:

$O_1 \times O_2$ (E) (Google classroom = experimental)

$O_3 \times O_4$ (E) (Youtube = experimental)

$O_5 - O_6$ (C) (Demonstration = control)

Where O_1 , O_3 and O_5 , are the initial observations (pretest measurement) of experimental and control groups O_2 , O_4 and O_6 , are the final observations (post-test measurements of experimental and control groups)

Students in Home Economics Education Department, University of Uyo Akwa Ibom State were used as case studies and area of the study. The population of the study comprised 46 Home Economics Education Students year one students (2022/2023) University of Uyo. The sample for the study was 30 students from the Department of Home Economics Education.

The students were randomly assigned to treatment and control groups, with 10 students chosen from each class. Ten (10) students in each class, representing one of the teaching methods which are the google classroom and youtube (experimental groups) and expository method representing control group.

The researchers' developed instructional packages for google classroom, YouTube and expository methods of instruction with the same objectives used for teaching batter making. A multichoice assessment instrument titled "Batter Making Achievement Test BMAT)" was used to collect data for the study. The instrument had a total of 20 items. The instruments were subjected to face and content validation by three experts, one from the Department of measurement and evaluation and two from Department of Home Economics Education all from the University of Uyo. The experts' comments and inputs were incorporated and used for modification of the final copy of the instrument.

To determine the reliability of the instrument, the instrument, Batter Making Achievement Test (BMAT) were administered to 10 respondents who were drawn from the population who did not constitute part of the main study. A reliability coefficient of 0.86 was obtained using Cronbach Alpha, an indication that the instrument was considered suitable for use in conducting the research study. The research was carried out with the researcher partnering with the Home Economics Education lecturers to teach batter making using conventional expository method, application of Youtube and google classroom. Ten (10) students were purposely assigned to the three different classrooms, however, they were all taught batter making. The making of batter (puff puff) was taught of he students using Youtube videos, expository learning and the setting up of google classroom. The lecturers were also briefed on the application of youtube and google classroom for instructional purposes. The "Batter Making Achievement Test BMAT)" was first pretested on the all the groups of students before instruction began. Thereafter, the lectures and practical sessions were taught using Youtube videos, expository and google classroom instructional strategies. The post-test was then administered and the scores collated for analysis. The research questions were analysed using mean and standard deviation, while the hypotheses were tested using analysis of covariance at .05 alpha level.

Result

Research Question 1: What are the mean scores of the learning outcome of Home Economics Education students in batter making (puff puff) when taught with Google classroom and Expository method?

Table 1: Summary of mean difference in students' performance in batter making (puff puff) when taught using Google classroom and expository method

Group	N	Pretest		Posttest		Mean gain
		Mean	SD	Mean	Std Dev	
Google classroom	9	5.33	1.13	19.24	1.68	13.91
expository method	10	6.25	.95	13.57	1.21	7.32

Table 1 gives the summary of the Mean and standard deviation of performance scores of students in batter making when taught using google classroom and expository instructional strategies. The result shows that the Mean gain score for students taught with google classroom is 13.91, while those taught with expository is 7.32. The result shows that students taught with google classroom performed better than students taught with expository. This shows that google classroom is an effective method for teaching students batter making.

Research Question 2: What are the mean scores of the learning outcome of Home Economics Education students in batter making (puff puff) when taught with Youtube and Expository method?

Table 2: Summary of mean difference in students' performance in batter making (puff puff) when taught using Youtube and expository method

Group	n	Pretest		Posttest		Mean gain
		Mean	Std Dev	Mean	Std Dev	
Youtube	9	4.8	1.55	16.73	3.29	11.93
Expository method	10	6.25	.95	13.57	1.21	7.32

Table 2 gives the summary of the Mean and standard deviation of performance scores of students in batter making when taught using Youtube and expository instructional strategies. The result shows that the Mean gain score for students taught with Youtube is 11.93, while those taught with expository is 7.32. The result shows that students taught with Youtube performed better than students in the expository classroom. This indicates that Youtube is an effective method for teaching students batter making.

Null Hypothesis 1: There is no significant difference between the mean scores of learning outcome of Home Economics Education students in batter making (puff-puff) taught with Google classroom and Expository method.

Table 3: Summary of Analysis of Covariance Test for significant mean difference in students' performance in batter making when taught using Google classroom and expository method

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Model	27708.968 ^a	3	9236.323	4464.275	.000
Pretest	.012	1	.012	.006	.938
Group	2478.048	2	1239.024	598.869	.001
Error	211.032	40	2.069		
Total	27920.000	46			

*Significant at $p < .05$._{.001}

The result of analysis on Table 3 gives the summary of the Analysis of Covariance (ANCOVA) test. The result shows that the calculated F value is 598.85. The probability of F, that is, the P value is .001. Since the P-value is less than the alpha level of .05, the result is statistically significant. Thus, the null hypothesis is rejected. Hence, there is a significant difference between the mean scores of learning outcome of Home Economics Education students in batter making (puff-puff) taught with Google classroom and expository method, with students in the google classroom performing better than students in expository.

Null Hypothesis 2: There is no significant difference between the mean scores of learning outcome of Home Economics Education students in batter making (puff-puff) taught with Youtube and expository method.

Table 4: Summary of Analysis of Covariance Test for significant mean difference in students' performance in batter making when taught using Youtube and expository method

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Model	26823.378 ^a	3	8941.126	772.469	.000
Pretest	24.361	1	24.361	2.105	.150
Group	1679.472	2	839.736	72.549	.001
Error	1180.622	40	11.575		
Total	28004.000	46			

*Significant at $p < .05$._{.001}

The result of analysis on Table 6 gives the summary of the Analysis of Covariance (ANCOVA) test. The result shows that the calculated F value is 72.549. The probability of F, that is, the P value is .001. Since the P-value is less than the alpha level of .05, the result is statistically significant. Thus, the null hypothesis is rejected. Hence, there is a significant difference between the mean scores of learning outcome of Home Economics Education

students in batter making (puff-puff) taught with Youtube and expository method, with students in the Youtube classroom performing better than students in expository.

Discussion of Findings

The result of analysis reveals that the Mean gain score for students taught with google classroom is 13.91, while those taught with expository is 7.32. This shows that google classroom is an effective method for teaching students batter making. This finding is in line with Lee and Kim (2018) who examined students' perceptions of using an online platform for sewing techniques. Findings showed that students appreciated the convenience of accessing instructional videos and virtual simulations, allowing them to practice sewing skills at their own pace.

This finding is also supported by Ajayi, et al (2019) who investigated the application of information and communication technology in Nigerian secondary schools. The study revealed that application of TEL has a positive effect on students' learning and performance.

The findings from the related research question indicates that the Mean gain score for students taught with Youtube is 11.93, while those taught with expository is 7.32. This indicates that Youtube is an effective method for teaching students batter making. Youtube videos in addition to their explicit nature, also appeals to the learners. This finding is in agreement with Owoyemi and Jegede (2017) who investigated the effect of e-learning on academic performance among undergraduate students in Covenant University. The findings of the study indicated that e-learning had a positive and significant impact on the academic performance of undergraduate students at Covenant University.

This finding is further supported by Akinyemi and Oye (2017) who examined the impact of mobile technology on learning effectiveness in Nigerian higher education. The study found that the use of mobile technology had a significant positive impact on learning effectiveness.

This finding is also in tandem with Nnadozie (2018) who investigated the utilization of e-Learning technologies amongst Selected Students. The result also revealed that undergraduate students use e-learning technologies for different educational purposes.

The findings of this study supports the hypothesis test that confirms that there is a significant difference between the mean scores of learning outcome of Home Economics Education students in batter making (puff-puff) taught with Google classroom and expository method, with students in the google classroom performing better than students in expository. The google classroom is interactive and allows teachers to introduce videos and other instructional aids that facilitate learning.

The findings of this study also support the hypothesis that indicates that there is a significant difference between the mean scores of learning outcome of Home Economics Education students in batter making (puff-puff) taught with Youtube and expository method, with students in the Youtube classroom performing better than students in expository. The benefit of youtube is that it can be downloaded and played again, more so, it has related videos that could help learners clarify concepts and seek deeper meaning.

Conclusion

The research focused on identifying Digital Resources and Home Economics Education Students learning outcomes in batter making in University of Uyo. The resources includes the use of Google classroom and Youtube to teach batter making. The study recommends teachers should endeavour to use a variety of techniques that involves, activity based and hands-on instruction in classrooms to spur students' interest and relate learning to real world activities

Based on the findings of the study, it is concluded that the adaptation of digital resources for instructional purposes has a positive effect on learning outcome in batter making among Home Economics Education Students of University of Uyo.

Recommendations

Based on the findings of the study, the following recommendations are made

1. Heads of schools should encourage their teachers to regularly use google classroom method when teaching students batter making.
2. Heads of schools should encourage their teachers to regularly use youtube videos when teaching students batter making.
3. Teachers should endeavour to use a variety of techniques that involves, activity based and hands-on instruction in classrooms to spur students' interest and relate learning to real world activities.

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