

# Computer-Assisted Instruction in the Teaching and Learning of History: A Systematic Review in Africa

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More than a decade has passed since the introduction of computer-assisted instruction (CAI) within schools in Africa. Computer-assisted instruction has enhanced teaching and learning at all levels of education in Africa. However, many aspects of the issues facing CAI implementation, as well as its effects on students' performance in the history classroom are unclear. This necessitated the systematic review into two aspects. Firstly, the effects of CAI on students' performance in the teaching and learning of history in Africa, and secondly, the various challenges facing CAI's implementation in Africa. Furthermore, to facilitate future research, the researchers summarised several research methodologies used in the studies reviewed. The results from a systematic review of 11 studies revealed that CAI has a positive effect on students' academic performance in history. The challenges to CAI implementation that were identified included: a lack of funding, training of teachers, and of motivation on the part of teachers; inadequate technological infrastructure; a lack of Internet; an unstable power supply; a lack of technological support; the poor information communication technology (ICT) skills of history and social studies teachers; a lack of school-based policies; and a digital divide between male and female students. Moreover, a quantitative approach was the preferred design with both descriptive and inferential statistics as the main statistical tools used for the data analysis. Additionally, there is a scarcity in research studies that employ an experimental design to test for the effect of CAI upon academic performance in history teaching. Lastly, the studies that use a questionnaire tool for data analysis can take a progressive step further by conducting structural equation modelling, which is an advanced quantitative analysis.



**Keywords:** *Computer-assisted instruction (CAI), Academic performance, History teaching, Social studies teaching, Education, Africa.*

## **Introduction**

Education is the key to the development of any nation because it develops human resources, which are highly essential for transformation socially, politically, and economically. As Agyeman, Baku and Gbadamosi (2000) noted, “it is universally accepted that one of the benefits of a good education is that, it enables individuals to contribute to development and improvement in the quality of life for themselves, their communities and the nation as a whole” (p.9). Before the twenty-first century, classrooms were mostly characterised by the use of the conventional method of instruction. However, in the twenty-first century, the traditional method of instruction is gradually giving way to the integration of information communication technology (ICT) in education. Computers have completely revolutionised the relationship between knowledge and pedagogical practices (Oulmaati et al., 2017).

Several calls have been made concerning the integration of ICT in teaching. This is because although ICT has begun to have a presence in education, its impact and utilisation have not been as extensive as in other fields (Oliver, 2002). Information communication technology utilisation in the teaching-learning process can enhance the quality of education in several ways, such as increasing learner motivation, collaboration, and engagement. Since history is one of the subjects offered at the basic, secondary, and tertiary levels across Africa, its sustenance requires adequate integration of computer-assisted instruction (CAI). Computer-assisted instruction enhances the ability of individuals to learn concepts through conceiving and not memorisation (Bartlett et al., 2000).

Several studies conducted on the effects of CAI upon students’ academic achievement have shown that the achievement level with CAI is higher when compared with traditional and/or conventional modes of instruction (Cotton, 1991; Aheto et al., 2013; Wahyuni, 2016; Ahiatrogah et al., 2013). In Africa, the literature on the effectiveness of CAI in the teaching and learning of history is relatively scarce. Thus, it has necessitated this systematic review to explore the effectiveness and challenges of CAI integration in the teaching and learning of history by teachers and students respectively.

## **Research Questions**

1. What were the effects of CAI upon history students’ academic performance?
2. What challenges have been encountered in using CAI for history teaching?
3. What were the country distributions in terms of CAI/ICT research in history teaching?



4. What methodologies were used in research on CAI with regards to the teaching of history?
5. What were the distribution of studies in terms of the level of education?
6. What were the various types of CAI used by researchers to examine CAI effectiveness in the teaching and learning of history?

## **Review of Related Literature**

### **The Brief History of CAI**

The term ‘computer-assisted instruction’ or ‘computer-aided instruction’ (CAI) refers to the use of computer software to deliver instruction. Initially, CAI was used to describe systems that consist of discrete hardware and software, which were targeted to different teaching methodologies, and focussed upon a curriculum core; reading, language arts, and mathematics (Poole & Sky-McIlavin, 2009). The current use of CAI embraces a range of instructional solutions, ranging from courseware applications to web-based learning systems (Poole & Sky-McIlavin, 2009). Computer-based training, computer-assisted learning, web-based instruction, and web-based training are some of the terminologies that are used interchangeably with CAI.

Historically, CAI is rooted in the various teaching machines and the punchboard device, particularly that of Pressey, Crowder, and Skinner. Pressey, in 1925, invented the first teaching machine. It is believed that Pressey conceived the idea of the teaching machine as far back as 1915, however, World War I delayed the pursuit of his idea (Pressey, 1946 as cited in Benjamin, 1988). Mann (2009:1) pointed out that Pressey’s “multiple-choice machine presented instruction, tested the user, waited for an answer, provided immediate feedback, and recorded each attempt as data”.

Furthermore, in 1950, Crowder also developed a system for the United States Air Force. The system presented course content as text, tested the user, provided feedback, and then branched to corrective instruction or new information based on supplied answers given by the user (Mann, 2009). Crowder, the founder of branched programming, believed that students should be able to correct their own mistakes. In the Branch Method, if a student inputted a wrong answer, he or she goes to remedial frames, which further explain the lesson content. The student progresses to the next frame only if he or she answers correctly. The student is branched to one or more remedial frames if the answer is wrong. These frames explain the subject-matter anew, ask questions to elicit the right answer and reveal previous wrong responses, and then return the student to the original frame (Chuaungo, nd).

In 1954, psychologist B. F. Skinner, who was affiliated with the University of Pittsburgh, demonstrated a teaching machine for reinforcing teaching, spelling, and arithmetic. With Skinner’s teaching machine, a user could access auditory material, listen to a passage as often as possible, and then transcribe it. The machine then reveals the correct text (Mann, 2009).



During the mid-nineteen-fifties and early nineteen-sixties, there was collaboration between educators at Stanford University in California and the International Business Machines Corporation (IBM) to introduce CAI into several selected elementary schools. The initial CAI programs that were introduced were a linear presentation of information with drill and practice sessions. These early CAI systems were limited by the expense and the difficulty of obtaining, maintaining, and using the computers that were available at that time (Arnold, 2000).

Furthermore, in the early nineteen-sixties, a scientist at the University of Illinois initiated the Programmed Logic for Automatic Teaching Operations (PLATO) system, which was another early CAI system (Alderman, Appel, & Murphy, 1978; Aslan, 2011). There was a single central computer and nearly one thousand independent computer terminals at a dispersed location for the students to access using a touch-sensitive screen and a keyboard. The PLATO system supported graphics, which was ideal for simulations. It also supported drill and practice, tutorials, and problem solving (Aslan, 2011). The PLATO system also introduced a communication system between students that was a forerunner of modern electronic mail (Arnold, 2000).

The popularity of CAI continued, and in 1971, the National Science Foundation was contracted with the MITRE Corporation (MIT Research Corporation) for the production of an experimental system to test the computer-assisted delivery of information and instruction to homes. This resulted in the development of Time-shared Interactive Computer-Controlled Information (Gibbons & O'Neal, 2014). The TICCIT linked minicomputers through coaxial cables to colour television technology. According to Gibbons and O'Neal (2014), the TICCIT system specifications supported learner control (Aslan, 2011). The TICCIT system was first used in the early nineteen-seventies to teach freshman-level mathematics and English courses (Arnold, 2000). The early CAI programs were mainly text-based.

## Types of CAI

***Drill-and-practice:*** drill and practice fit the behaviourist model with repeated practice on lower-level cognitive skills (Ward, 2002). Although learning by repetition is frowned upon, drill and practice methods help students' master skills, concepts, and principles (Mohan and Balan, 2005, as cited in Mohan et al., 2018).

***Tutorial:*** the tutorial activity includes the presentation of multimedia information, such as text, audio, video, and audio-visual. Such information is presented in a unit by unit format that is followed by questions. The students' responses to questions are then analysed by a computer software and appropriate feedback is given.



**Gamification:** it is defined as “the use of game design elements characteristic for games (rather than play or playfulness) in non-game contexts” (p. 13). Thus, gamification endeavours to tap into the motivational power of games and apply it to real-world situations and problems (Lee & Hammer, 2011, p.1). Game mode or gamification creates a contest between two or more individuals or an individual versus a computer bot. Some of the common game design principles are those of visible status, social engagement, goals and challenges, customisation, access to unlock content, freedom of choice, freedom to fail, and rapid feedback (Dicheva et al., 2015).

**Simulation:** it is a technique to replace real-world experiences with an immersive one. Simulation is often ‘immersive’ in nature (Gaba, 1999; 2004). It is immersive because it emulates a physical world and a perception of being physically present in a non-physical world. Simulation is utilised when it is not practical or feasible to provide the learning in a real-world situation. For example, placing a student in a World War I simulation.

**Problem-Solving:** this focusses on the process of finding an answer to a problem rather than the answer itself. Here, students use programs that can make them think about the ways and means of solving a problem systematically. One of the most challenging techniques used in CAI is problem-solving. Problem-solving CAI helps in developing logic and problem-solving skills, as well as augmenting higher order thinking skills (USUN, 2003).

### **The Integrated Nature of Historical Facts**

History began to develop as a subject as the result of the effort of humankind to understand and explain the human past rationally, and systematically. The subject imparts a sense of patriotism into students, imbibes students with ethics, develops the writing skills and communication skills of students, enables students to acquire enough information about the world, promotes socialisation among pupils, helps resolve our contemporary social and individual problems, and fosters the development of international understanding, as well as training the mind, which leads to critical thinking skills (Owusu-Ansah, 2011).

As Oppong and Quan-Baffour (2004:137) argued: “Integration is one of the major attributes or characteristics of historical facts”. Hence, historical fact integrates with the social sciences and humanities (Oppong & Quan-Baffour, 2004). For the social sciences and humanities, history integrates some of the approaches, principles, and generalisations to human behaviour in such cognate fields as geography, economics, political science, sociology, anthropology, psychology, law, and statistics (Matloff, 1979; Oppong & Quan-Baffour, 2004). In history, all human experiences occur in time and place (Turner as cited in Rocca, 1994). Therefore, integrating history and geography provides for a complete picture and a deeper understanding of historical events (Rocca, 1994).



Furthermore, with the help of psychology, a historian can probe into the human psyche more deeply in biographical and social history. For anthropology, a historian can better grasp cultural differences, as well as similarities among preliterate societies. Political science provides a unique approach and understanding of the problems and issues in the art of governance and decision making. Sociology is also utilised to help historians question and gain insight into group dynamics. Statistics allow historians to make sense of large data, and to reach generalisations, among others (Matloff, 1979; see also Oppong & Quan-Baffour, 2004). It should be noted that there is no way history can be taught without elements of other social sciences and humanities due to its integrated nature (Oppong & Quan-Baffour, 2004).

## **Methodology**

The systematic literature search consisted of specific terms and word combinations related to CAI and ICT integration in history teaching within Africa. Popular databases, such as Science Direct, Scopus, and Google Scholar, were utilised for the search. Combinations of the search terms were run in all databases. We used the following search words and their combinations to identify relevant articles for this review: computer-assisted instruction, computer-assisted learning, computer-aided instruction, computer-based instruction, ICT integration in teaching, history teaching, social studies teaching, geography teaching, Computer-based instruction (CBI), Computer-assisted learning (CAL), and Computer-assisted instruction (CAI). Subsequently, an eligibility criterion based upon inclusion and exclusion strategies was employed. The data obtained was then analysed quantitatively by using descriptive statistics, and thematic analysis, respectively. The whole data extraction process using the inclusion and exclusion criteria is presented in the figure 1 below.

## **Eligibility Criteria**

### ***Inclusion Criteria***

The articles that were deemed relevant for the study were based on:

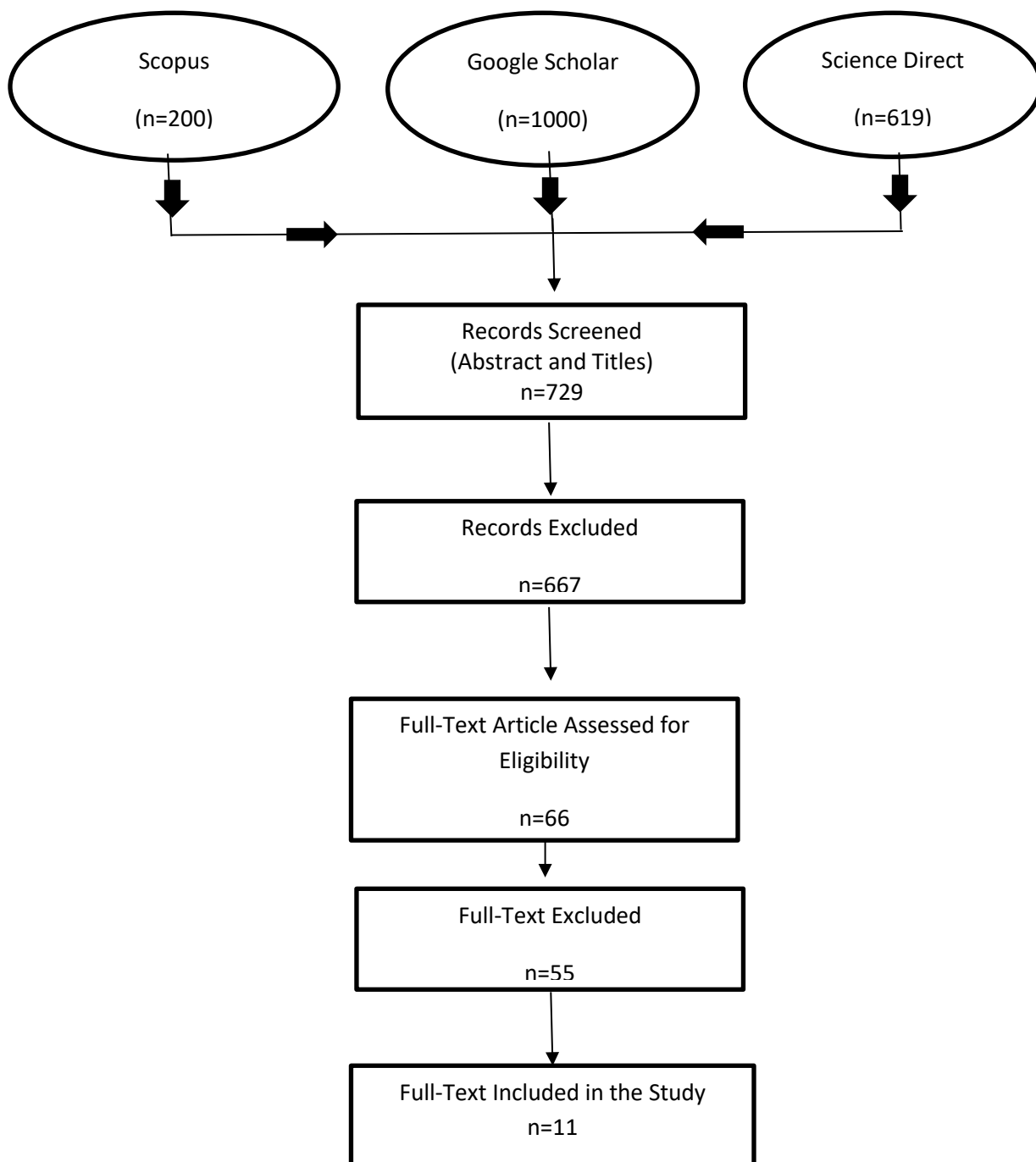
1. Publications in the English language.
2. Publications on CAI/ICT effectiveness/integration/challenges in teaching history, social studies, and geography in Africa since history integrates with social studies and geography.
3. Publications within the period of 2008–2020.
4. Publications that emphasised the country of study.

### *Exclusion Criteria*

The articles which were excluded were based upon:

1. Publications outside Africa.
2. Publications in a non-English language.
3. Publications that assessed general ICT/CAI usage/integration, perceptions, and attitudes.

**Figure 1.** The data extraction process



## Studies Included in the Systematic Review and their Relevance to the Research Questions

**Table 1:** A summary of the final studied articles

S/N	Researcher(s) Name	Year	Study Context
1	Boadu et al.	2014	Challenges facing the integration of ICT/CAI in teaching history
2	Lawal et al.	2019	Effectiveness of CAI in teaching social studies
3	Bariham et al.	2019a	Challenges facing the integration of ICT/CAI in teaching social studies
4	Bariham	2019b	Challenges facing the integration of ICT/CAI in teaching social studies
5	Oyedele	2014	Effectiveness of CAI in teaching geography
6	Oulmaati	2017	Challenges facing the integration of ICT/CAI in teaching history
7	Moga et al.	2017	Challenges facing the integration of ICT/CAI in teaching geography
8	Makhasane	2008	Challenges facing the integration of ICT/CAI in teaching history
9	Adesote & Fatoki	2013	Challenges facing the integration of ICT/CAI in teaching history
10	Dar	2014	Effectiveness of CAI in teaching social studies
11	Adeyemi	2012	Effectiveness of CAI in teaching social studies



## **Results and Discussion**

### ***Research Question One***

#### ***The Effect of CAI on History Students' Academic Performance***

Four articles on the effect of CAI in the teaching and learning of geography and social studies were identified for the review (Lawal et al., 2019; Oyedele, 2014; Dar, 2014; Adeyemi, 2012). Three studies revealed that CAI was highly effective compared to the use of conventional teaching approaches, while one study reported no significant improvement of students' performance when taught with CAI. For instance, in the study of Lawal et al. (2019), students who were taught undergraduate social studies using CAI had a higher academic performance than those who were taught without CAI. Similarly, Oyedele (2014) also found that computer-assisted instruction helped students to perform better in geography compared to those taught using the conventional teaching method. However, Adeyemi (2012) reported that there was no significance difference between the performance of social studies students taught with or without CAI.

These findings are consistent with the findings on CAI's effectiveness from other continents, such as Asia, Europe, and North America (Xeferis et al., 2018; Raghaw et al., 2018). Furthermore, although the four studies are inadequate to ascertain the effectiveness of CAI in the teaching and learning of history, the findings from other CAI studies suggest that the use of CAI in teaching and learning improves students' academic achievement.

### ***Research Question Two***

#### ***The Challenges Facing CAI/ICT Integration in the Teaching and Learning of History in Africa***

Despite the potential benefits of CAI and/or ICT in history teaching, its implementation in Africa occurs with numerous challenges. Six out of the eleven studies which were used for the review reported that schools, students, and teachers face challenges in the implementation of CAI in history teaching. Makhasane (2008) identified technological support, management support, and financial resource challenges are encountered in the smooth implementation of CAI/ICT in history teaching within South Africa. In Nigeria, Adesote and Fatoki (2013) reported a lack of funding, training of teachers, and of motivation on the part of teachers to adopt ICTs as the challenges facing the implementation of ICT integration into the teaching of history at the secondary school level. In Ghana, Boadu et al. (2014), and Bariham (2019a; 2019b) identified several challenges facing the smooth integration of CAI/ICT in history teaching at the basic, and secondary levels. Boadu et al. (2014), and Bariham (2019a) reported a lack of time, and inadequate technological equipment and/or infrastructure as the challenges facing CAI implementation in Ghana. Other challenges raised by the authors included a lack of motivation, lack of internet, unstable power supply, lack of technological support, poor ICT skills in history and social studies teachers, and a lack of school-based policies (Boadu et al., 2014; Bariham 2019a). Furthermore, Bariham (2019a)

found that males and older teachers tend to utilise video and radio more in the teaching of social studies in Ghana compared to females and younger teachers. Similarly, Olumati et al. (2017) also found that there is unequal access to ICT by male and female history students at Abdelmalek Essaadi University in Morocco. Furthermore, in Kenya, Moga et al. (2017) also identified a lack of basic gadgets, such as computers; no prerequisites for ICT implementation; and a lack of teacher, administrative, and curriculum motivation for the implementation of ICT in teaching geography as the challenges in secondary schools.

The successful implementation of CAI in the history classroom largely requires the provision of adequate computers, projectors, good Internet access, a stable electricity supply, and the technological support and motivation of teachers. However, it is apparent from the result that these elements are lacking in Africa. For instance, in Ghana, there has been inadequate technological equipment and/or infrastructure; a lack of motivation, Internet access, technological support, and school-based policies; an unstable power supply; and poor ICT skills in history and social studies teachers. The situation in Ghana is not vastly different from that of Kenya. Furthermore, there is also a digital divide between males and females. Males tend to implement technology in history, social studies, and geography teaching more so than their female counterparts. Although CAI is effective, its successful implementation in Africa requires that these challenges be addressed.

### ***Research Question Three***

*The Countries and Areas of Africa that have Contributed to CAI Research in History, Social Studies, and Geography*

The initial results revealed the countries where the studies were conducted, along with the corresponding number of studies. This information is shown in the Table 2 below.

**Table 2:** The studies' country, area of Africa, and corresponding frequency

Country	Area of Africa	Number of studies	Percentage %	No. of Studies by Area of Africa	Percentage %
Ghana	West Africa	3	27.3%	7	63.6%
Nigeria	West Africa	4	36.3%		
Kenya	East Africa	1	9.1%	1	9.1%
Zimbabwe	Southern Africa	1	9.1%	2	18.2%
South Africa	Southern Africa	1	9.1%		
Morocco	North Africa	1	9.1%	1	9.1%
<b>Total</b>		<b>11</b>	<b>100%</b>	<b>11</b>	<b>100%</b>

Regarding the Table 2, the studies spanned across six countries from the African continent. Out of these numbers, a majority of seven were from West Africa. Two studies were from Southern Africa, and there was one study each from East Africa, and North Africa. Concerning the number of studies, Ghana had three (27.3 per cent); Nigeria had four, representing 36.3 per cent, and the remainder of the countries — Kenya, Zimbabwe, South Africa, and Morocco — had 1 or 9.1 per cent each.

The result of the study revealed that West Africa had the highest number of studies. This was comprised of Nigeria, which had the highest number of studies, followed by Ghana. Furthermore, the number of studies in CAI effectiveness or integration or application in the teaching and learning of history, social studies, and geography from Africa are considered to be too low, observing the fact that there are 54 countries in Africa. This suggests that attention has not been given to research in CAI integration and effectiveness in the teaching and learning of history by African scholars and researchers.

#### ***Research Question Four***

##### *Methodologies Employed in CAI Studies In Africa*

This section sought to examine the methodologies employed in CAI research within history teaching and learning. The methodology was subdivided into the research approach, research design, data collection instruments, subjects and sample size, and statistical instrument and/or tools used for analysis.

**Table 3:** Research approach and design

<b>Research Paradigm</b>	<b>Frequency</b>	<b>Percentage %</b>	<b>Research Design</b>	<b>Frequency</b>	<b>Percentage</b>
Quantitative	7	63.6%	Descriptive	3	27.3%
Qualitative	2	18.2%	Experimental	1	9.1%
Mixed – Method	2	18.2%	Quasi-Experimental	3	27.3%
			Correlational	2	18.2%
			Review	2	18.2%
<b>Total</b>	<b>11</b>	<b>100%</b>		<b>11</b>	<b>100%</b>

The details from Table 3 demonstrate that the quantitative research approach dominated most of the studies followed by the combined use of both the qualitative approach, and the mixed-method approach. Seven out of nine studies, representing a total of 63.6 per cent, employed a quantitative research approach. This was followed by both qualitative, and mixed-method approaches recording two (18.2 per cent) respectively. With regards to the research design, both descriptive, and quasi-experimental research designs dominated, representing 27.3 per cent respectively, followed by review, and correlation designs, which were also each represented by 18.2 per cent. Experimental research designs were the least patronised design representing 9.1 per cent. Here, the majority of the studies used for the review employed a quantitative approach. Although the quantitative method deals with the collection and analysis of information statically, it tends to ignore narrative details that could help augment findings obtained via a quantitative analysis (Creswell, 2013; Almalki1, 2016). By using a mixed-method approach for information systems research, it will help cater to the inherent weaknesses that come with the use of only the quantitative or qualitative approaches. Finally, there is a gap in the use of advanced quantitative analyses such as structural equation modelling in the studies that were questionnaire-based; as well as minimal studies which focused on an experimental design.

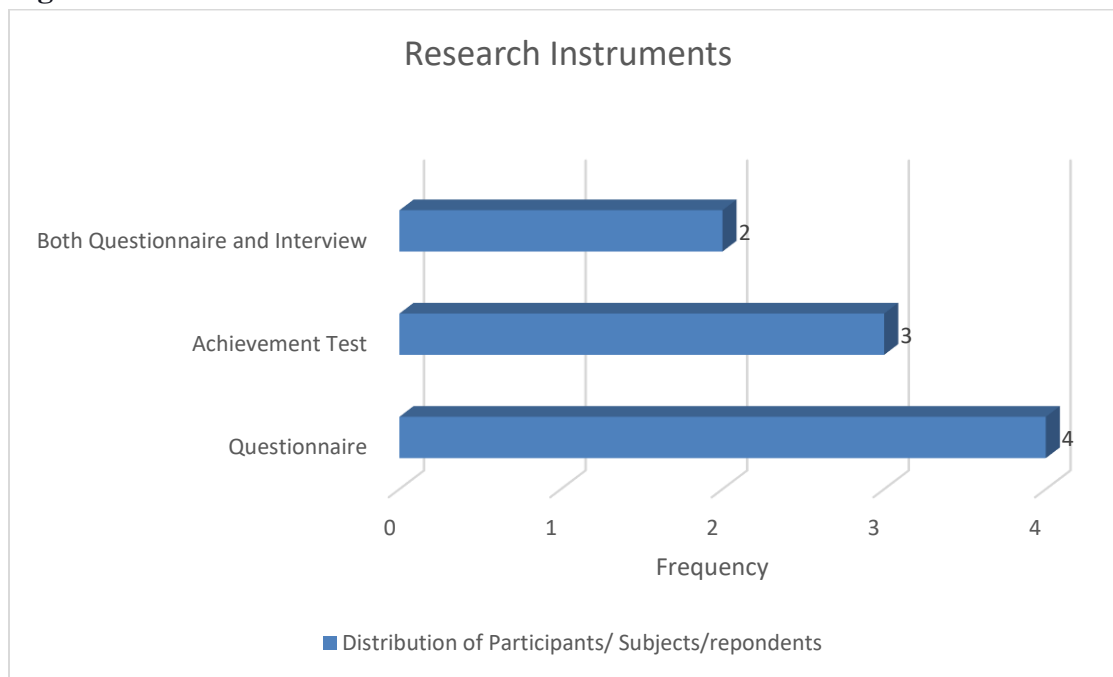
**Table 4:** Sample size and participants

Sample Size	Frequency	Percentage %	Subject/Participant	Frequency	Percentage
Small (<=150)	5	55.6%	Teachers/instructors	2	22.2%
Medium (>150<=250)	3	33.3%	Students	4	44.4%
Large (>250)	1	11.1%	Both students and teachers/instructors	3	33.3%
<b>Total</b>	<b>9</b>	<b>100%</b>		<b>9</b>	<b>100%</b>

The results from Table 4 indicate that of the nine studies reviewed to answer research question four, four of them, representing 44.4 per cent, used students as their subject of study. Three (33.3 per cent) studies used a mix of students and instructors as the subjects of the study, whilst the least used subjects were the teacher and/or instructor, representing just two (22.2 per cent) studies. Concerning the sample sizes, the range was between five (55.6 per cent) studies for small, three (33.3 per cent) studies for medium, and one study for large representing 11.1 per cent. The findings

revealed that the majority (44.4 per cent) of the studies used students as subjects or participants of the study. The use of students as participants and/or subjects in a study that seeks to examine students' academic performance is imperative and necessary. However, to examine the challenges facing the implementation of CAI, both students and teachers are preferred as the subjects of study to ascertain and document the challenges facing both groups.

**Figure 2:** Research instruments



The Figure 2 reveals that the questionnaire was the most used research instrument representing 44.4 per cent, while the achievement test was the second most used instrument representing 33.3 per cent. Furthermore, the least used research instrument was the use of both the questionnaire, and interview, which had 22.2 per cent.

#### *Statistical and Non-statistical Tools Employed for Analysis*

The reliability of the research findings rests on the instrument or tool utilised for the data analysis. In view of this, the study sought to determine the various statistical and non-statistical tools employed for analysis in CAI research within history teaching in Africa. This is shown in the Table 5 below.

**Table 5:** Statistical and non-statistical tools for analysis

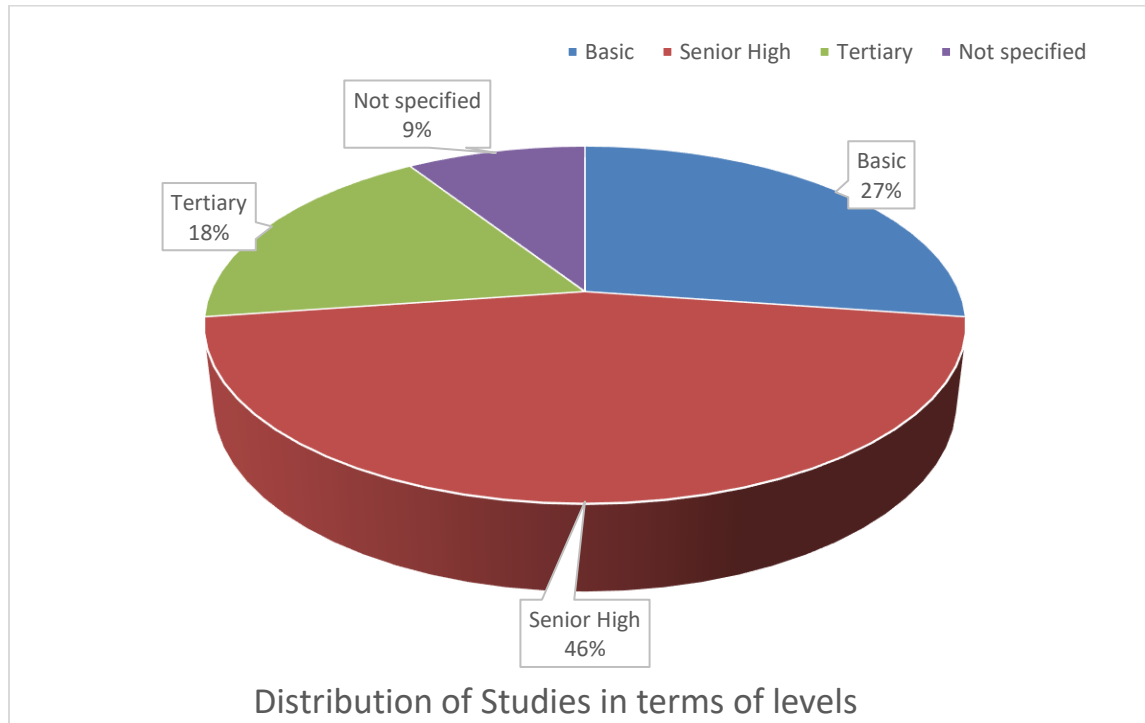
<b>Tools for Analysis</b>	<b>Frequency</b>	<b>Percentage %</b>
Descriptive	2	18.2%
Inferential	2	18.2%
Both descriptive and Inferential	4	36.4%
Both descriptive and Narrative/thematic	1	9.1%
Narrative/thematic	2	18.2%
<b>Total</b>	<b>11</b>	<b>100%</b>

From the Table 5, most of the studies — representing four or 36.4 per cent — utilised both descriptive, and inferential statistics as analysis tools for their data. This was followed by descriptive, and inferential statistics recording two (18.2 per cent) studies respectively. The least used analysis tool or technique was both the descriptive, and narrative and/or thematic. Thus, just one study (9.1 per cent) combined both descriptive, and narrative and/or thematic analysis to perform the data analysis. The dominant statistical tool used was a combination of both descriptive, and inferential statistics. The descriptive statistics observe a data set as the given set. In other words, the final and countable statistical set, and interprets it in that manner (Mičić & Bosančić, 2013). On the other hand, inferential statistics is used to make an inference about a population based on the available data from a sample (Leon, 1998). Combining both statistical methods makes the findings reliable. Singh (2018) remarked that calculating descriptive statistics represents the first step when making inferential statistical comparisons. Hence, both descriptive, and inferential statistics should be utilised, especially when assessing the effectiveness and challenges facing CAI implementation.

### **Research Question Five**

#### *The Distribution of Studies in Terms of the Level of Education*

**Figure 3:** Distribution of studies in terms of the level of education



The results from the Figure 3 show that five studies (representing 46 per cent) were carried out at the senior high school level. Three studies (representing 27 per cent) were also carried out at the basic school level. Furthermore, another two (18 per cent) of the studies were also carried out at the university level. Meanwhile, one (nine per cent) study did not specify the educational level the study targeted. From the result, it is not surprising that the majority of studies targeted the high school level since basically, all high schools across Africa offer history and/or social studies as a subject. However, it is astonishing that although history and social studies are both major subjects offered in universities across Africa, fewer studies have been produced at that educational level. This presupposes that CAI is underutilised in African tertiary institutions.

### **Research Question Six**

#### *The Various Types of CAI Used by Researchers to Assess CAI's Effectiveness in the Teaching and Learning of History*

The findings of the study revealed that of the four studies that focussed on the effect of CAI on students' academic performance in geography and social studies, only two studies used tutorial CAI in their experimental, and quasi-experimental studies. The other two studies failed to specify



the type of CAI that was used as an instructional method for their treatment groups. This makes it impossible to ascertain the efficacy of the individual types of CAI, and whether some types of CAI offer more benefits and advantages over others. Generally, CAI is subdivided into tutorial, drill-and-practice, simulation, gamification, problem-solving, and discovery methods. The fact remains, all the various types of CAI allow students to learn at their own pace, they enhance the learning rate, provide a supportive environment, and improve students' learning. It is also evident that each type of CAI has its strengths and weaknesses (Sedega et al., 2017; Nickerson, 1995; Ahiatrogah et al., 2013). For instance, the drill and practice method is noted for helping students master skills, concepts, and principles (Mohan et al., 2018), while tutorial CAI enables students to study at their own pace. Gamification also uses game mechanics to motivate and arouse students' interest. Simulation, on the other hand, replaces real-world experiences with an immersive one, and it is useful when it is not practical or feasible to provide the learning in a real-world situation. It is, therefore, important for researchers to indicate whether drill, tutorial, and gamification, among others, are used as an instructional method.

### **Limitation**

1. The study concentrated only on history and historical aspects of social studies and geography teaching with the exclusion of the other social sciences.
2. Due to the limited number of studies on CAI in history teaching, the researchers also made use of articles that focused on the historical aspects in social studies and geography since they integrate with history.
3. The study also singled out only CAI and ICT as a technology of focus without considering other technologies for other methodologies in m-learning and e-learning.

### **Conclusion**

The paper reviewed studies on CAI and/or ICT integration in history teaching in Africa. The study revealed that CAI is very effective in the teaching and learning of history. Furthermore, the study also unravelled the numerous challenges faced when implementing CAI and/or ICT in history teaching in Africa. It also examined the contribution of countries in Africa towards CAI in history teaching. West Africa has contributed most studies in relation to CAI integration in history compared to other parts of the continent. Finally, the study further established the current state of the literature, and determined the direction of future studies, policy and practice towards CAI/ICT integration in history teaching within the African sub-region.





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### **Recommendations for Future Research and Practice**

1. The study recommends that future studies should focus more on studying the effect of CAI on history teaching in Africa.
2. Studies should also provide measures to mitigate the challenges faced when implementing CAI in history teaching in Africa.
3. More research is needed in CAI effectiveness in teaching history, as there are no studies on this subject matter in Africa.
4. The leadership and management of educational institutions in Africa should have a re-prioritisation of funds allocation towards a more intentional ICT infrastructural development, and periodic skills training in ICT usage.
5. The leadership and management of educational institutions in Africa should sensitise teachers, instructors, lecturers, and students on the benefits, usefulness and importance of using CAI in instructional delivery in history.
6. There is a scarcity in research studies that employ an experimental design to test for the effect of CAI on history instruction.
7. Additionally, studies that use a questionnaire for data analysis can progress further by conducting structural equation modelling, which is an advanced quantitative analysis for verifying variable interrelationships within CAI integration research in Africa.



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