Social Studies Education and Citizenship Education: Theoretical Review and Implication for Effective Citizenship Development

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Abstract
This paper attempts a theoretical review of Social Studies and Citizenship Education , and conclude that they are partners in progress in the moulding of effective citizenry The focal point of social studies is to produce individuals that will be able to surmount problems being faced in the environments. On the other hand, citizenship education has as one of its roles; the development of a good sense of judgement, moral and social responsibility in an individual in order for such individual to become a useful member of the society.

Key words: Social Studies, Citizenship education, Citizenship Development, Theoretical Review

Introduction

Citizenship education is needed to achieve the objective of having a virile nation, where individual will possess necessary knowledge and understanding and hold the values and ideals that will lead them to perform their roles as citizens of the country rather than seeing themselves as from a particular region or ethnic group. Falade (2008) opine that it is difficult to build a nation when the nation builders (citizens) are not manifesting the trait of good citizenship. The manifestation of these traits of good citizenship; the roles of citizenship education as designed for Nigerian schools from the objectives of social studies cannot be over looked. Therefore, social studies plays significant roles in the moulding of effective citizenry because an effective citizen is one that is able to find solutions to problems confronting him/her in the environment. Such individual must be innovative and be able to think out of the box, creative and understand the world around him/her to be able to sort out the confused social world. The central thesis of this paper is that there is a nexus between social studies education and citizenship education and that both are inseparable because the end product of both is "effective citizenry".

Social Studies Defined

There are many definitions of social studies arising from different conceptualizations and emphases. Hence, social studies varies from place to place in details and orientation. This is responsible for the fact that the subject is society-oriented and culture bound, which means that the materials and knowledge gathered in the social studies are those that are connected to the society, valuable and useful to a particular society and culture. Therefore, there is no social studies of the World or Social Studies of Africa but individual country develops her social studies to suit her peculiar environment. Every country has her own national objectives cum purposes and social studies is seem to be in a best position to help in achieving these objectives because it is seen as a tool for achieving national objectives.

According to Ogundare (2003) social studies as a school subject tries to teach children the total summation of all experiences within their environment, which they need to become active in the world. It is particular in developing their appropriate skills and attitudes which will make them to become activists and contributors to the community. He further stated that the children need to know their society; its nature, problems and prospects. Hence, individuals should be brought up with approved social responsibility. The bringing up of individuals as purposeful, useful and functional members of the society is the focus of social studies because individuals cannot be left to develop by chance or accidentally. Social studies imbibe in a child good character and attitude from tender age through adolescent to adulthood.

To this end, the subject, social studies has been defined various by experts. The definition is classified into three groups as follows:

1. Definition according to contents of Social Studies
2. Definition according to Purpose of Social Studies; and
3. Definition according to Methods of Social Studies (Ogundare, 2003)

Definition according to Contents

This is the earliest and the most popular. It attempts to clarify what social studies should be as a school subject. Contents areas in social studies are specified because it is believed that not everything under the sun should be in social studies. This definition helps the curriculum planners, teachers and students to know the limit and clarify its area of focus. Example of such definition are:

(a). Social Studies are those whose subject matters relate directly in the organization and development of human society, and to man as a member of social group (1916 committee on secondary school, U.S.A.)

The definition above states that for a subject to be qualified and called social studies, it is expected to have topics, issues, facts and generalizations on the types of human arrangement (such as by age, location, wealth etc) and the topics should concern the progress of human beings. This definition also expects that the social studies syllabus should contain things about human groups because the definition emphasized learning of an organized body of knowledge in the human society, and because many authors simply see social studies as simplified social sciences. Sharing similarities with the 1916 definition in the U.S.A are:

(b). Social Studies consist of adaptation of knowledge from social sciences for teaching purposes at the elementary and secondary levels of education (The Thesaurus of ERIC Descriptions).

(c). "Those common learning of man's interaction with his social and physical environment. It is not only a study but a way of life of how man influences and is influenced by his physical, political, economic, psychological and cultural

environments (NERC 1980, Adaralegbe, 1981).

(d). The study of man in his physical and social environment (Aiyetoro, 1971).

The contents definition conceived social studies as the subject matter of the academic discipline which is "simplified", "adapted", "modified" or selected for school instruction.

Definitions According to Purpose

Definitions according to purpose set out to connect the error in the definition by content. These definitions define by purpose describe what Social Studies actually is rather than what social studies should be: These definitions aligned itself with the fact that countries around the world adopted social studies for reasons best known to them to help solve one problem or the other and therefore social studies is taught to achieve those goals which are peculiar to them. In most cases social studies is for National development; to instill right orientation in the citizens, hence the definitions in this group focus on instructional goals. These definitions include:

(a). Social Studies is a set of goals which prescribes how the content of citizenship education is to be selected, organized and taught (Birth & Shermis, 1970).

(b). Social Studies is a programme of study which a society uses to instill in students the knowledge, skills attitudes and actions it considers important concerning the relationships human beings have with each other their world and themselves (Kissock, 1981).

(c). Social studies is an integration of experience and knowledge concerning human relations for the purpose of citizenship education (Barr, 1977).

(d). It is a field of study that deals with the integration of knowledge, experiences and the effective use of the resources for the purpose of citizenship education (Onyabe, 1980).

(e). It is a study of problems of survival in an environment and how to find solutions to them (Ogundare, 2000).

Definitions according to Method

These definition are about how social studies should be taught or how it is being taught to students. Such definitions include:

(a). Social Studies is concerned with processes of thinking, decision-making, value analysis and inquiry skill (Barr, 1970).

(b). The investigation of human activities (DuBey, 1980).

(c). Helping students increase the number of meaning they derive from their social environment and equipping them to judge the validity of their meaning according to widely accepted canons of a scientific culture (Ogunsanya, 1984).

(d). A discipline in which the teaching and learning of attitudes and skills overshadow the acquisition of facts and information (Ogunsanya, 1984).

Though, the definition of social studies is done by experts and in countries to suit each countries whims and caprices but the fact remains that it is used for national development in most places it appears. Then, it should be noted that an office does not have a life of its own, same goes for a country; a country cannot develop without her citizens. Therefore, the national development in a country depends on effective citizenry through good leadership. Without mincing words, the definitions of social studies and its method encourage citizenship education, common experiences of the society and solving of societal problems. But, for an individual to become effective to the extent of being able to solve society problems, to be able to contribute to the development of the society, such individual must be thoroughly taking through citizenship education either formally and informally. Social Studies assumed the responsibility of teaching individual social responsibilities and problems solving abilities using facts and figures derived from social sciences, behavioural sciences and history.

Citizenship Education Defined

The end product of citizenship education is effective citizenship. For an individual to be effective he/she must go through a planned process; either formal or informal education. An individual has to go through this process for him/her to be able to contribute effectively to the development of the society, there must be certain changes in his/her belief, behaviour, perception, ideals and the way he/she views the society. Therefore, the individual must have undergone the process of socialization which Otite and Ogionwo (2014) defines as an interactional process whereby a person's behaviour is modified to conform with the expectation held by members of the group to which he/she belongs.

Then, to evolve a society where unity, tolerance, values of honesty, hardwork, self esteem, fairness, justice, cooperation, equity, respect for humanity and patriotism flourish there is the need to impact the citizens with the values and traits of effective citizenship though citizenship education. The relationship between an individual and the state is his/her responsibilities to the state and his/her personal allegiance to the state as citizen, which compel him/her to contribute his/her quota to the development of the country for the benefit of all and sundry.

Education is an inevitable and veritable tool for citizenship training. The National Policy on Education (1987) described citizenship education as a nationalistic course that is designed for the promotion of responsible citizenry. It is a field designed for the achievement of specific national education objectives, hence, it is designed to inculcate in the citizens desirable attitudes and values (Otelaja and Ayoade, 2009), such as;

a. respect for the worth and dignity of the individuals;
b. faith in man's ability to make rational decisions;
c. moral and spiritual values in inter-personal and human relations;
d. shared responsibility for common good of society; and
e. promotion of the emotional, physical and psychological health of all children (NPE 1987).

Scholars have defined citizenship education variously. Obasi and Erandu (2000) opine that citizenship education is the form of education which is specifically

designed in content and function to produce healthy good and active citizens. It is their belief that a good citizen is not born but made through citizenship education, whether formal or informal. Fageyinbo (2004) in his own view described citizenship education as a continuous formal and non-formal education given to all citizens irrespective of their location, sex and wealth; in order to produce informed, nationalistic, participatory, rational and articulate leaders and followers. Omolade (2006) posited that citizenship education is the development of the ideas, beliefs, habits, behaviour and attitude of the individual so that he/she may become a useful member of the society. It is an educational programme fashioned to build in learners, knowledge, understanding and skills crucial for full and effective participation in the society. Adetoro (2004) sees citizenship education as a nationalistic course that is designed for the promotion of responsible citizenry. It is a field of study for desirable citizenship transmission towards the promotion of national consciousness, good leadership and followership.

Above all, citizenship education is the planned process through which individuals understand, acquire and internalize the values, attitudes, and norms of the society in which they live and are actively involved in the activities within it to guarantee the collective good of every members.

The Interface between Social Studies and Citizenship Education

Social Studies education and citizenship education are synonymous, though they are often treated separately. The objectives of social studies include the promotion of effective citizens. Citizenship education on the other hand is nationalistic education that is designed for the promotion of responsible citizenry. It is also a course for the achievement of specific national education objectives, hence, it is designed to impart in the students desirable attitudes and values that will lead them to becoming effective citizens as stated and listed earlier.

According to Ololobou (1989), social studies is "an organized integrated study of man and his environment; both physical and social, emphasizing cognition, functional skills, desirable attitudes and actions for the purpose of creating effective citizenry. It should be noted that the central focus of the definition are man and his environment; his becoming a good citizen or effective citizen to be able to contribute to the development of the society. In the past, the National Policy on Education (2004) merged social studies and citizenship education to become a new curriculum known as social studies for effective citizenship development. This was done in a bid to refocus social studies for effective citizenship development.

In another development, there are two basic schools of thought on the nature of social studies as pointed out by Ogunyemi (2005). The first school of thought subscribes to the pedagogical conception, which is science of teaching whole the second school of thought sees the goal of social studies as that of producing effective citizens. He claimed that, the protagonists of this view point contend that the modern, complete and dynamic society requires a comprehensive and balanced education in order to understand and cope with personal and social problem, an education they believed could be provided by the integrated social studies. The federal government's commitment to citizenship education is reflected in the educational objectives it has set down for each level of the educational system (Otelaja & Wojuade, 2009). These objectives are:

Primary Education: The objectives of primary education include the ability to communicate effectively, to think critically, to participate in the democratic process, and to process, and to pursue further educational advancement and self-improvement in a changing society.

Secondary Education: The objectives for secondary education reinforce the objectives of the elementary grades with the additional focus on the development of Nigerian culture, art and languages and the ability to function effectively in a modern, technological society.

Teacher Education: Objectives for teacher education include production of motivated and efficient class teachers who encourage the spirit of inquiry and posses the ability to adapt to social change.

Consequently, the above objectives will assist in the moulding of an effective citizen who will be intellectually capable and verse in the skills of decision making.

Furthermore, Adegbehin (1998) pointed out two types of traditions within social studies curriculum. The traditions are good citizenship tradition and disciplinary or social science tradition. He stated as well that there are eight categories of citizenship traditions identified by Donald Oliver (1969). The traditions are:

The Harmonist Approach: This is an instructional approach with emphasize on the growth and development of students and it centers on cooperation

The Jurisprudent Approach: It is instructional approach that emphasizes the relationship between knowledge and values by exposing students to controversial issues.

The Civic Action Approach: This is an instructional approach that emphasizes students' participation in the solution of real societal problems.

The Image of Greatness Approach: This required the instructional approach that emphasizes the use if inspiring images and symbols as criteria for dealing with basic human problems.

The Social Science Approach: This emphasizes instructional importance in validating information according to the importance of academic methodologies.

The Wisdom Approach: This is an instructional approach that emphasizes the transmission of factual knowledge, which eventually leads to student wisdom.

The Citizenship Transmission: This is an approach that emphasizes the use of persuasion and description in order to convince students to accept the values and principles of African/Nigerian ways of life.

Reflective Thinking: This is an instructional approach that lays emphasis on the process of thinking and problem solving.

From the foregoing, it is glaring that in a changing environment, humans cannot remain static they should continue to change with the environment to function well within it. To achieve this objective, humans must seek to expand their knowledge in order to become effective citizens in the environment/society. In the same vein, citizenship education has certain roles to perform in the school system in the production of effective citizens. The roles as designed from the objectives of social studies (Adetoro, 2004), showed that citizenship education cannot be separated from social studies. The roles include the following:

a. developing a good sense of judgement, moral and social responsibility in order to become a useful member of the society;
b. appreciating the culture and cultural heritage of the people within the locality and national environment;
c. understanding the world in order to sort out the confused social world;
d. promoting positive attitudes and opportunity, values of honesty, hardwork, self esteem, fairness, justice, cooperation, tolerance and equity for national unity and development; and
e. acquiring relevant knowledge and resources for national utilization of our natural resources and conservation of the environment and the resources.

Conclusion

The implication of the interface of social studies and citizenship education is the promotion of effective citizenry. They both show that the acquisition of good skills, is a must for the citizens. The skills if acquired, will enhance the citizens to have self-fulfillment, self-esteem, self-realization and self-development. These consist of comprehension, understanding, critical thinking, enquiry decision making, rational judgement, appreciation and value judgement. Therefore, the acquisition of knowledge is a must for human beings because they need it to succeed in life and for upward mobility. This knowledge includes knowledge of immediate and distant environments which will reveal the hidden aspect of the world. In the final analysis, the ability of social studies to promote effective citizenship remains unquestionable, rather what is paramount is the prevention of the curriculum developers from putting a wedge between the two subjects and experts in the two fields, thereby seeing themselves from two opposing camps. This is because the body and soul of social studies is citizenship education. Therefore, citizenship education is social studies with the soles objective of moulding or producing an informed, effective and responsible citizens and also need citizens who have the required knowledge, skills and disposition that will enable them contribute to the development of the society for the benefit of all.

References

Adegbehin, A. (1998). Citizenship education and social studies: The education dilemma. Journal of Arts and Social Sciences. 4, 79 - 87.

Adetoro, R.A. (2004). "Citizenship education". In Fageyinbo, M.O. (Ed) Topics in tertiary social studies. Ijebu-Ode: Lucky Odoni.

Fageyinbo, M.O. (2004). Topics in tertiary social studies. Ijebu-Ode: Lucky Odoni.

Federal Government of Nigeria (2004). National policy on education (4th Edition) Lagos's NERDC

Falade, D.A. (2008). Civic education as a tool for nation building in Nigeria. Nigerian Journal of Social Studies. Vol. xi(1). 15-27.

Obasi, O. O. and Erandu, N. A. (2000). Basic text in citizenship education (Part Two). Owerri: CREMO

Ogundare, S.F. (2003). Fundamentals of teaching social studies. Oyo: Immaculate-City.

Ogunyemi, B. (2005). Curriculum implications of the education for sustainable development for primary social studies. A paper presented at the 18th annual conference of the curriculum organization of Nigeria (CON) held at University of Benin, Benin City. September, 13th – 16th.

Ololobou, Y.P.S. (1989). Social Studies: The search for a definition. Nigerian Journal of Social Studies. Vol. 1 & 2. Pp 222-24.

Omolade, Z.A. (2006). Nigeria culture and citizenship education. Ijebu-Ode: Lucky Odoni.

Otelaja, O.R. and Wojuade A. (2009). Re-focusing social studies education for effective citizenship education. Journal of Arts and Social Sciences Vol. 1. (1 & 2) October.

Otite, O. and Ogionwo, W. (2014). An introduction to sociological studies. Nigeria. Heinemann Plc, Ighodaro Road, Jericho, Ibadan.

Effects of Gallery Walks and Mind Mapping Strategies on Students' Achievement Genetic Concepts in Biology in Kwara State, Nigeria

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Abstract
This study determined the effects of Gallery Walks and Mind Mapping teaching Strategies on students' achievement in Biology. The pretest-posttest control group quasi-experimental design was adopted. 365 SSS Biology students from nine co-educational schools in three Local Government Areas (LGAs) of Kwara state were randomly selected. Participants were randomly assigned to treatment groups. The instruments used were: Biology Student Achievement Test (r=0.86), Biology students Learning Style Scale (r=0.81) and Teachers Instructional guides on Gallery walks and Mind Mapping strategies. Two hypotheses were tested at 0.05 level of significance. Data were subjected to analysis of covariance Treatment had significant main effect on students' achievement in Biology ($F_{(2, 361)}$ =17.62; partial η^2 = 0.10). Students' in Mind Mapping strategy treatment group has the highest adjusted mean achievement scores ($\overline{x}$ = 19.34) than those in the Gallery Walk Strategy (GWS) treatment group1 ($\overline{x}$ =16.52) and the students in Conventional Strategy (CS) control group group has the least adjusted mean achievement scores (x = 14.76). This order is represented MMS > GWS > CS. Based Gallery walks and Mind Mapping strategies should be adopted for the improvement of students' achievement in biology.

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Keywords: Gallery Walks and Mind Mapping strategies, Achievement in Biology and Learning Style and Genetics Concepts.

Introduction

Biology is a unique captivating field of study, and an interesting subject that has been intriguing scientific minds for several centuries. It is so significant in our world, it is the basis of our origin and existence on earth lies within the depths of the Biological science. It plays a crucial role in every ones lives and touches almost every aspect of our existence it helps human life in many ways. It helps in increasing production of food, combating diseases and aids in protecting and conserving our environment. The advances in the field of biology have resulted in high standard of living in the field of food and health sectors. Production of plants has increased by improving the varieties based on high yield, drought resistant and diseases resistant varieties of plants and animals that are used as food. Biology is an important field because all other fields of study are dependent on the facts that are revealed by the studies that are carried out in field of biology. Sallau, Abubarkar and Sani (2018) reported that biology is the science of life.

Chukwuemeka (2011) stressed the importance of Biology in the following areas; health sector, management of natural resources, food supply and others.

The specific objectives to be achieved by Biology curriculum, as stated in the National Policy on Education, (FRN, 2013), include the following among others; to understand certain key biological concepts necessary for successful living and; to illuminate the problems reproduction, growth, pollution, health and to disperse superstitions beliefs.

In spite of the fact that Biology curriculum has robust and reliable objectives for biology as a teaching subject, students still find some Biological concepts difficult to understand such as genetics, enzyme, and chromosome. Cimer (2012) reported that genes, chromosomes, mendelian genetics and hormones are considered difficult concepts by secondary school students. John (2006) also remarked that there are many difficult concepts such as gene, genetic crossing and organs in biology.

Available statistics from West Africa Examination Council (WAEC) and Chief Examiners Reports on senior secondary school student's performance in biology revealed a very poor performance at Senior Certificates Examinations. Also, table 1.1 showed the Percentage Distribution of Students' Performance in May/June Senior Secondary Certificate (SSCE) in Biology in Nigeria from 2006-2017. This is supported by Ogundiwin, (2013) and Awolere, (2015) that the achievements of students in Biology remain low in Nigeria especially in public examinations.

The analysis of Senior Secondary Certificate Examination (SSCE) Result in Table 1.1 made available from the West African Examination Council (WAEC) Statistics Unit on enrolment of students and their performance in Biology showed the extent of this problem.

Table 1.1: Percentage Distribution of Students' Performance in May/June Senior Secondary Certificate (SSCE) in Biology in Nigeria: 2008-2019

YEAR	Total no of students that sat for the examinations	Total no of credit passes	% Credit A1-C6	% Failure
2008	1,259,964	427,644	33.94	66.06
2009	1,903,552	644,733	33.87	66.13
2010	1,300,418	427,644	33.90	66.06
2011	1,505,199	579,432	38.50	61.50
2012	1,672,224	649,156	38.81	61.20
2013	1,646,741	850,772	51.66	48.34
2014	1,356,243	511,956	29.34	70.66
2015	1,145,228	371,628	24.39	75.61
2016	1,200,367	740,345	61.68	36.32
2017	580,449	394,299	68.03	30.92
2018	Xxk 1,087,063	678,299	62.48	35.52
2019	1 1,033,304	775,103	75.01	8 23.93

Sources: Statistics Section, WAEC National Head Office, Yaba Lagos Nigeria

The table 1.1 showed the percentage of credit passes and failure from year 2008 to 2019. In year 2013 and 2016 to 2019, good academic achievement was recorded in which the percentage credit passes jumped from 38.81% to 75.01% and the percentage failure dropped from 61.20% to 23.93%. But, subsequent years (after 2013) , the percentage of passes drastically reducing from 51.66% to 24.39% , while the percentage of failure was increased from 48.34% to 75.61% .The students performances were inconsistent in the years under consideration. It is glaring that the percentage numbers of students that do pass Biology at the Credit level fluctuates over the examined years (2008 – 2019). For example in Year 2016, 61.68% of students passed at credit level. In Year 2017, it jumped up to 68.03% but descended to 62.48% in Year 2018. Year 2019 student make high improvement with 775,103 students out of 1,033,304 which is 75.01% passing at credit level.

The drop and inconsistent in the percentage of credit passes may be as a result of changed in the subject status from compulsory to elective for secondary school students (FRN, 2013). The percentage passes for the year 2008 to 2012 and 2014 to 2015 were not good enough especially for most candidates that may include Biology as one of the relevant five subjects, passed at credit level in order to be admitted into any higher institution in Nigeria. This was supported by Ogundiwin,(2013). Awolere (2015) Opined that students' performance in biology is poor despite several crucial efforts that have continually been made over the years to remedy the yearly poor performances. This was supported by Chief Examiner's Reports. The West Africa Examinations Council's Chief Examiner's report May/June (2014) stated that candidate performance was poor. In the Chief Examiner's reports WAEC in Nigeria May/June (2013) reported that many Candidates could not define gene and gene mutation. In addition, Chief Examiner's Reports of WAEC in Nigeria (2010) revealed that most of the candidates could not list transmittable characteristics. Most candidates who attempted the genetic diagram perform it wrongly.

In addition, Chief Examiner's Reports NECO (2011) stated that students have poor knowledge of the application of genetics in marriage counseling. The same trend of poor performance in genetics concepts occurred in Chief Examiner's Report's WAEC and NECO (2012 to 2018. In fact, WAEC Chief Examiner's Report (2018) pointed out the following observed weaknesses of students- poor grasp of genetics and not putting 'X' as a sign of genetics crossing.

All these dependent variables (achievement and learning style) need to be improved upon on the students' through teaching using appropriate instructional strategies. Among the strategies that have been previously used are; Experiential strategy by Awolere (2015), Inquiry strategy by Akinwumi (2009) , Critical exploration strategy by Oloyede (2014),Adewumi (2014), Puzzled Based Critical Thinking Motivation Strategies by Ogundiwin (2013) to mention few.

In spite of all these strategies, students still experienced high rate of poor performance in the senior secondary school certificate examination as seen in Table 1.1. The poor performance of students' in achievement in Biology have all been attributed to the inappropriate strategies of teaching mainly employed by most Biology teachers. Researchers have revealed that the teacher-centered strategy normally used by the teachers would not assist the learners to be active recipient of knowledge by which the achievement can be improved, (Ogundiwin, 2013; Babayemi, 2014 and Awolere, 2015.) Scholars have therefore suggested the use of active learning strategies to take care of the deficiencies. Awolere (2006) support the scholars suggestion of the use of active strategies, he stated that active learning, as opposed to passive learning, involves students directly and actively in the learning process. This is to say, instead of simply receiving information verbally, students are receiving, participating and doing, cumulating into experiences.

One of the suggested active strategies is Gallery Walks Strategy. Mark (2014) defined Gallery walks Strategy as a teaching and learning strategy that allows students' to be actively engaged as they walk throughout the classroom. They work together in small groups of three to six share ideas and respond to meaningful questions, documents, images, problem-solving situations or texts. The scholar attribute the usage of gallery walk strategy to the science subject, Mark (2006) confirmed it that gallery strategy is an exciting strategy that for promote class discussion in the science classroom. John (2013) pointed it out that gallery walk strategy enable learners to improve their work through the use of feedback from multiple sources such as peers, teachers and experts. During gallery walks according to Mark (2006) and David (2015) students' explore multiple texts or images that are placed around the room. Carolyn (2012) opined that gallery walk is a discussion strategy that engages groups of participants as they examine and respond to a document; often these document (or items) is displayed on a wall and the participants move as a group from one to the next station. The teacher use gallery walk strategy as a way to have students share their works with peers, examine multiple documents or respond to a collection of quotations, This is supported by John (2013) who confirmed that gallery walks is a way of sharing of knowledge by students after they have read something or done research or as a way for students to share research or to generate discussion on a topic or concept. Gallery walk strategy introduced students to new materials that will help them to obtain specific information that will allow them to develop cognitively. According to David (2015) a traditional gallery walk requires teams of students to rotate between stations to answer or build on other teams answers at each station. Once all teams have visited each station oral presentation and discussion by the class follows.

Mind mapping is another active strategy. Busan (2000) defined mind mapping strategy as a teaching strategy which is visual and non-linear representation of ideas and their relationship. He described the strategy as student-centered. Another proponent of mind mapping strategy were Lea, Stephenson and Troy (2003) they defined mind mapping strategy as the one that allows learners to be active rather than passive listener and emphasized deep learning and understanding. Mind mapping has been described as one of the teaching strategy that promotes creative thinking, ability and high retention in learners. It is also a powerful tool that teachers can use to enhance learning as it is evident in brainstorming, note taking, problem solving, memory learning and visual thinking technique used by

psychologist, educationist and other professionals (Batdi and Yusuf, 2015). It enhances the development of certain skills in learners such as thinking skills, reasoning skills, and ability to make decision, taking action, information gathering and generating skills. Mind Maps use letters, numbers, color and image, which means that they engage the left and the right sides of the brain. The thinking power of learner will increase synergistically when using Mind Maps. Gregory (2002) and Trevino (2005) said there are studies showing also that mind maps contribute to longer retention of the information through mind maps. Good-enough and Long (2002) found that Mind Mapping is useful for introducing new concepts, providing a whole-class focus for a large research project, assessing learning of individuals and offering greater choice in how people chose to complete assignments and projects.

There are many intervening or moderating variables that may affect any research work, irrespective of the strategies used. Some of them are learning style, mental ability, gender, socio-economic status of the parents, parental educational background, school type, school location, cognitive style and many more others.

Students are not the same especially when we find out the way at which they learn and process information in science class. This is to say that, there is disparity in the in ways students think, perceive and analyze a stimulus configuration. It is the view of Norasyikin, Mini and Aini (2015) that learning style helps students to achieve good academic record in science class. Rajshri (2013) defined learning style as the the ability of learners to perceive and process information in learning situations. Learning styles are the ways that students' learn or process information. Everyone has a mix of learning styles. Some people may find that they have a dominant style of learning, with far less use of the other styles. There is no right mix. Nor are your styles fixed. You can develop ability in less dominant styles as well as further develop styles that you already use well. Those who use less favored learning styles often find themselves in lower classes, with various not-so-complimentary labels and sometimes lower quality teaching. One of the most important uses of learning styles is that it makes it easy for the teachers to incorporate them into their teaching. Student learning styles have been found to have significant influenced on the achievement of the students' in biology Okoye (2014). Most of the differences encountered in students' learning could be described in terms of different ways in which student think, perceive and analyze a stimulus configuration. Each individual responds differently when exposed to a stimulus environment.

However, the researchers has attributed the poor achievement of students in science to teaching methods and learning style of the students.

Many studies had been carried out on similar topic both at the national and international levels, focusing on the use of instructional strategies to improve students' achievement. Works have been carried out on each of the two strategies separately and on different subjects. However, not much has been done using these two strategies together in the area of genetics in Biology. It is this gap that this research work stands to fill. This research work seek to find out the impart that Gallery Walks and Mind Mapping strategies will have on students Achievement in genetic concepts in Biology. It examined the influence of learning style of the students on genetics concepts in biology.

Statement of the Problem

As important as Biology is to career pursuant in sciences courses, reports have shown that science students in Kwara State have problem of achievement in genetics concepts in Biology. This has been blamed on poor instructional strategies adopted by teachers in teaching genetics concepts.

Previous studies largely focused on instructional strategies such as experiential strategy, Inquiry strategy, Critical exploration strategy, Enhanced explicit strategy, Generative-learning strategy among others with little emphasis on Gallery walk and Mind mapping strategies. Therefore, this study is designed to determine the effects of Gallery Walk and Mind Mapping Strategies on Students' Learning Outcomes in Genetics Concepts in Biology. The moderating effects of Learning Style

Hypotheses

Two hypotheses were tested at 0.05 level of significance.

$H_0$1: There is no significant main effect of treatment on students' Achievement in Biology

H02: There will be no significant main effect of learning style on students' Achievement in Biology

Methodology

This study adopted the pretest-posttest control group quasi-experimental research design. Three local government areas were randomly selected in Kwara State, and nine secondary schools were randomly selected (three per LGA). The participants were randomly assigned to treatment and the control groups. An intact class of the representative schools was used for the research study. Six instruments were used in the study. They include; Biology Students Achievement Test (r=0.86), Learning Stule Inventory(0.78),Teachers Guides on Gallery walk, Mind mapping and Conventional Strategies. The researchers administered the instruments to pre-test the students and their scores were recorded. The researcher exposed the experimental group I and 2 to genetics concepts using Gallery walk and Mind mapping strategies, while the control group was taught with lecture methods. The treatment lasted for six weeks. The data collected were analyzed using descriptive statistics, Analysis of covariance and Bonferroni post-hoc test at 0.05 level of significance.

Results

Ho1: There is no significant main effect of treatment on students' achievement in biology

Table 2: Analysis of Covariance (ANCOVA) of Post-Achievement by Treatment, Mental ability and Learning style

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2567.620	27	95.097	3.264	0.000	0.209
Intercept	5318.241	1	5318.241	182.536	0.000	0.353
Pre-Achievement	79.460	1	79.460	2.727	0.100	0.008
Treatment	1026.495	2	513.248	17.616	0.000*	0.095
Learning style	19.394	2	9.697	0.333	0.717	0.002
Error	9731.200	334	29.135			
Total	113511.000	362				
Corrected Total	12298.820	361				

R Squared = 0.21 (Adjusted R Squared = 0.15) * denotes significant p<0.05

Table 2 indicates that the main effect of treatment on students' achievement in biology ($F_{(2, 361)}$ =17.62; p<0.05, partial η^2 = 0.10) is significant. The effect is 10.0%. This indicates that 10.0% out of the total 15.0% variation (Adjusted R^2 = 0.15) in students' post-achievement scores in biology in this ANCOVA model is due to the significant main effect of the treatment on students' achievement in biology. Hence, hypothesis 1 was rejected. In order to explore the magnitude of the significant main effect across treatment groups, the estimated marginal means of the treatment groups were carried out and the result is presented in Table 2

Table 3: Estimated Marginal Means for Post-Achievement by Treatment and Control group

Treatment	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Gallery Walk Strategy (GWS)	16.52	0.61	15.31	17.72
Mind Mapping Strategy (MMS)	19.34	0.54	18.28	20.40
Conventional Strategy (CS)	14.76	0.56	13.65	15.87

Table 3 shows that students exposed to theMind Mapping Strategy (MMS)treatment group 2 had the highest adjusted post-achievement mean score in biology ($\bar{x}$ = 19.34) than those in the Gallery Walk Strategy (GWS)treatment group1 (($\bar{x}$ =16.52) and the Conventional Strategy (CS) control group ($\bar{x}$ = 14.76). This order is represented MMS >GWS > CS. To determine which of the groups causes this significant main effect of treatment on students' achievement in biology, the Bonferroni post-hoc test is carried out across the groups, while the result is presented in Table 3

Table 4: Bonferroni Post-hoc Analysis of Post-Achievement by Treatment and Control Group

Treatment	Mean	GWS	MMS	CS
Gallery Walk Strategy (GWS)	16.52		*	
Mind Mapping Strategy (MMS)	19.34	*		*
Conventional Strategy (CS)	14.76		*	

Table 4. indicates that the post-achievement in biology mean score of students exposed to the Mind Mapping Strategy (MMS) is significantly difference from those in the Gallery Walk Strategy (GWS) but not different from those in the Conventional Strategy (CS). The difference in the post-achievement mean scores of students exposed to gallery walk strategy and those in the conventional strategy is significant. This indicates that the significant difference revealed by the ANCOVA result is due to the difference between the treatment groups (mind mapping and gallery walk strategies) but between one of the treatment groups (gallery walk strategy) and the control group as students' post-achievement scores in biology is concerned.

Ho2: There is no significant main effect of learning style on students' achievement in Biology.

Table 2 reveals that there is no significant main effect of learning style on students' achievement in biology ($F_{(2, 361)}$ =0.33; p>0.05, partial η^2 = 0.00). Hence, hypothesis 3a was not rejected. This means that learning style had no effect on students' achievement in biology.

Discussion of Findings

Main Effects of Treatment on Students' Academic Achievement in Biology

The results obtained in this study revealed that there was significant main effect of treatment on students' achievement in Biology. The result proved that Mind Mapping Strategy was more effective at improving the students' performance in Biology and followed by Gallery walk strategy and the conventional strategy. The effectiveness of Mind Mapping strategy and that of Gallery Walk strategy over the conventional strategy may be due to the fact that Mind Mapping and Gallery walk strategies are learner-centred strategy. This may be due to

the fact that the two strategies helped the students to create their own knowledge through the experiences. This finding is in agreement with the submission of Ogundele (2015) Jibriu et al, (2012), Adodo (2013), Gemma (2009) ,Ogundele (2015) reported that Mind mapping strategy is an effective strategy for facilitating students' achievement in biology. The reason why Gallery walk strategy is more effective than Conventional strategy was that it allow active participation of all members of the group and the experiences of students' are valured and they share idea among themselves, this is supported by Taylor (2011), Nwanekezi et al, (2018), David (2015) and John (2013).

Conclusion

The findings of this study have shown that Gallery walk and Mind Mapping strategies were effective and in improving student's academic achievement in genetics concepts in Biology than the traditional or conventional teaching strategy. The reason for this was that the two instructional strategies enhanced the development of critical thinking of students' allowed them to be actively involve in learning activities and create positive environment for effective interaction of students with one another i.e both strategies were student-centred. It is noteworthy that students showed a higher level of commitment and involvement to solving the genetics problems in Biology when taught using these strategies. The two strategies also encouraged active participation of students to master the genetics concepts; therefore the students were able to solve problems on genetics easily.

Recommendations

From the results obtained, the following recommendations are made:

- Gallery Walk strategy and Mind Mapping strategy should be adopted as effective and viable strategies for studying of genetics in Biology. The strategies involved the students in their learning process and they improved their academic achievement in genetics concept.
- Teachers of Biology should develop activities that will give room for the learners to be active participants in the teaching and learning process in the biology class.
- There should be organization of seminars and workshops for biology teachers where the various steps involved in Gallery Walk Strategy and Mind Mapping Strategy would be made known to them
- It is recommended that biology teachers should make use of Gallery Walk Strategy and Mind Mapping Strategy as they are activity-based and students-centered, hence the quality and quantity of learning will be improved
- Both Gallery Walk Strategy and Mind Mapping Strategy steps should be integrated into the school science curriculum so that the teachers and would-be teachers can be trained in the use of the two strategies, not only for teaching of genetics concepts but should be applied to other concepts in biology. If this is done, more qualified biology students would be groomed and produced for biology-related courses in higher institutions of learning..
- It is also recommended that the Biology education researchers should replicate and improve upon this study making use of the two strategies by conducting it among larger sample size, and at other educational levels in the nation's education system.

References

Adewumi, G.S. (2014). Effect of project and inquiry strategies on students' academic achievement in abstract concepts in biology. An unpublished M.Ed Thesis, University of Ibadan

Adodo, S.O (2013). Effect of mind mapping as a self-regulated learning strategy on students achievement in basic science and technology. *Mediterranean Journal of Social Science.* Published by MCSER – Sapienze University of Rome. 4 .6: 163-172.

Akinwumi, I.O. (2009). Effects of inquiry strategy on the achievement of senior secondary school students in Biology. Unpublished M.Ed Thesis University of Ibadan.

Awolere, M.A, (2006). Teacher-students classroom interaction as correlates of students level of participation and learning outcomes in environmental pollution in biology- An unpublished M.Ed Thesis, University of Ibadan

Awolere,S. (2015). Effects of experiential and generative learning strategies on students academic achievement in environmental concepts. *Journal of human ecology*. 56.3: 251-262.

Babayemi, J. O. (2014): Effects of crossword-picture puzzle and enhanced explicit teaching strategies on students' learning outcomes in basic science in southwestern nigeria- *An unpublished Ph.D Thesis, University of Ibadan*

Batdi,V.(2015). A meta-analysis study of mind mapping techniques and traditional learning methods. Anthropologist. 20.1,2: 62-68.

Buzan T. (2000). Use your head London BBC consumer publishing.

Carolyn,P. (2012). Gallery walks for middle school. NSTA Conference Pennsylvania.http;// www.nsta .org/ Publications / news /Story aspx.

Cimer, A.()2012. What makes biology learning difficult and effective. *Students views educational research and reviews.* 7.3:61-71

Chukwuemeka, P.C. (2011). Competency-based biology teacher education section reforms in Nigeria. *Proceeding of the 52nd Annual Conference Science Teacher Association of Nigeria.* 217-224.

David, W.R. 2015. Maximize a team based learning gallery walks experience ,herding cats is easier than you think . *Advances in Physiology Education*. 39.4: 411-413

Federal Republic of Nigeria (FRN) 2013. *National Policy on Education (4th Edition)* .Lagos: NERDC Press

Gemma, B. (2009). Use of mind mapping in teaching and learning. The learning institutes assignment.

Goodnough, K. and Long, R. (2002). Mind mapping: A

graphic organizer for the pedagogical toolbox'. *Science scope*, 25.8: 20-24

Gregory, G. H and Chapman, C. (2002).Differentiated instructional strategies: one size doesn't fit all. Thousand oaks, CA: Corwins press, inc.

Ibe, H. N. (2015). Effects of learning styles on the performances of senior secondary school Biology student. www.researchgate.net International Multidisciplinary *Journal of Education and Research*. 9.1: 214-226.

Ihejirika, N.C. (2010). The impact of global economic crisis on students performance in Biology in senior secondary school certificate examination (2005-2009) In some selected schools in Kano State .*51st Annual Conference of Science Teachers Association of Nigeria.*

John, S. (2013). Take digital strategy as a dimension at everything in Tate paper. https://www.fate.org.uk/research/publications/tate-papers/19/tate-digital strategy. (ISSN 1753-9854). Is a peer *reviewed research journal that publishes articles on British and modern international art, and on museum practice today*

Mark, F. (2006). Promoting discussion in the science classroom using gallery walk strategy. Journal of college science. Avaiklable at http:// blog stettson.edu/Jrseminars /wp-content/ uploads /Gallery-Walk .pdf.Retrieve online

Mark,F. (2014). Promoting discussion in the science classroom using gallery walk strategy. National science teachers association .Central Michigan University

Press.*Educational Science (WAJES) Dokuz Eylul University Institute, Izmir,* Turkey. 1:467-476.

Norasyikin,O,Mimi,M.M and Aini,N.P.(2015). Dimension of learning styles and students' academic achievement. *Procedia Social and Behavioral Science.*

Ogundiwin, O.A. (2013). Effect of pre-theoretic intuition quiz and puzzle-based critical thinking motivation strategies on students learning outcomes in selected environment related concepts, in biology. *Unpublished Ph.D. Thesis University of Ibadan.*

Okoye P.O. (2014). Influence of cognitive styles on student's achievements in biology in senior secondary schools, in Anambra State. *An international journal of science and technology* Bahir Dar Ethiopia. 3.16:197-207

Oloyede,O.O. (2014). Effects of anchored and cognitive flexibility instructional strategies on secondary school students' knowledge, attitude and practices in biology in Oyo State. Unpublished Ph.D. Thesis University of Ibadan.

Rajshri, V. (2013). Learning style and academic achievement of secondary school students

Sallau,I.A. Abubakar,B.B. and Sani,Y. (2018). Biology education a panacea for sustainable national development. Frontiers in environmental microbiology. 4.2;71-74.

Taylor, P. (2001). Gallary walk. http://www.cct.umb.edu/gallary htm6

Trevino, C. (2005). Mind mapping and outlining: Comparing two types of graphic organizers for learning seventh-grade life science, Texas Tech University: *Unpublished PhD Thesis*.

WAEC May/June 2006, *Chief Examiner Reports'* WASSCE (2006)

WAEC May/June 2007, *Chief Examiner Reports'* WASSCE (2007)

WAEC May/June 2010, *Chief Examiner Reports'* WASSCE (2010)

WAEC May/June 2011, *Chief Examiner Reports'* WASSCE (2011)

WAEC May/June 2018, *Chief Examiner Reports'* WASSCE (2018)