

Teachers' Perceived Effect of School-Based Planning (SBP) on Chemistry Achievement in Kano Metropolis Secondary Schools, Nigeria

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Article DOI: 10.48028/ijprds/ijiretss.v10.i1.02

Abstract

This study investigates the teachers' perceived effect of School-Based Planning (SBP) on chemistry achievement in Kano metropolis, Nigeria. Having adopted a descriptive survey design, 2,267 teachers of the 176 schools selected constituted the study population. Three hundred and forty teachers (340) Chemistry teachers were sampled via the multistage sampling technique, using the Taro Yamane (1980)'s formula of sample size determination. The researchers' designed instrument entitled; Teachers' Perception of SBP on Chemistry Achievement (TPSBPCA) was used to collect data for the study. The instrument was validated by 3 experts in: Science Education, Educational Administration and Planning, as well as Test and Measurement respectively. The reliability coefficient of the instrument "r" was established to be 0.88 using the Test-re-test method and Pearson's Product Moment Correlation Coefficients (PPMCC). Simple percentage was used to answer research questions. The t-test of independent variables was used to test the hypotheses at 0.05-level of significance. The study revealed that irrespective of gender, school types and location, there is a positive teachers' perception of SBP in Students' Academic Achievement Chemistry in the selected secondary schools in Kano State. It is hereby recommended that SBP should be integrated into the teacher's training programme to enhance the implementation of Chemistry Curriculum towards academic achievement.

Keywords: *Chemistry; Academic Achievement; Educational planning; School-Based Planning; Perceptions; Teachers' Perception.*

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Background to the Study

Chemistry is a subdivision of science which describes substances in our environment in the form of atoms, molecules, elements, and compounds so as to exhibit their properties, structural changes as well as the laws and principles that govern their reactions and uses for mutual benefits. At the tertiary level of education, Chemistry is not just a discipline, but a research field, responsible for producing scholars and scientists for higher institutions of learning, research centers and other forms of scientific organization (Rosly, Hamid and Rahman, 2021). The immense contributions of chemistry to the economic wealth of the nation cannot be underrated through entrepreneurship activities, scientific discoveries, health care service and industrial production of profitable merchandise (Nja, Ukpepi1, Edoho, and Neji, 2020). For instance, the discovery of graphite, which is an allotrope of carbon with a single delocalized electron capable of carrying electric current round its structure, which accounts for its applications in industrial production of batteries, is a giant stride in the chemical world for economic development. Nevertheless, at the secondary school level, Chemistry is regarded as the core or the central science involving the teaching and learning of matter, where matter is anything that has mass and occupied space (Rosly, Hamid, and Rahman, 2021). The knowledge of chemistry is incredibly vital for students who wish to pursue their career either in the chemical industry or other scientific fields such as biotechnology, engineering and medicine. Chemistry is also a prerequisite for the training of manpower in science disciplines, including Science Education.

In spite of these benefits and many more attached to the knowledge of chemistry at the secondary school level in modern global society, the learning of chemistry is bedeviled and strongly characterized by poor performance. Students' poor performance in chemistry is hereby an academic disaster with grave consequences including students' fail-out and drop-out, all of which constitute severe wastages of educational resources (Babalola and Aliyu, 2015). One of the most annoying parts of poor knowledge of Chemistry at the secondary school echelon is that the students usually take that poor conceptual understanding of chemistry to tertiary institutions, causing them to be on probation even in their first year at the institutions. It is therefore, necessary for the Chemistry Teaching Community (CTC), including chemistry teachers, curriculum developers, researchers and textbook authors, to strive towards improving conceptual understanding and, in turn, students' academic achievement in chemistry.

Academic achievement is the summative performance scores or grades of students obtained from a standardized test. In Nigerian secondary schools, external examinations such as West African Examination Council (WAEC), National Examination Council (NECO) and Joint Admission and Matriculation Examination (UTME) results are used as yardsticks for measuring academic achievement. Literature has established that poor academic achievement in chemistry among students in Nigerian secondary schools is a major concern presently, not only for the students but the entire educational stakeholders (Alani, 2016). In order to resolve this issue, much research has been conducted by several Chemistry Education Scholars globally to examine the factors responsible for poor achievement among students and many suggestions have been raised to ameliorate the situation (Zakariya & Bamidele

(2015). Among such factors identified are poor location of the school, home school distance, high students' teacher ratio, inadequate supervision, monitoring and evaluation machinery, lack of good textbooks, poor content and context of instruction, and a non-conducive environment among others. However, one of the most unusual remedies suggested by the Rochester City District in the USA is School-Based Planning (SBP). Thus, two of the numerous aspects of teaching-learning processes which were not adequately addressed through efficient management that emerged recently as core concerns, are teachers' perception and School Based Planning component of educational planning.

Educational planning on its own is the process of preparing activities, tactics and strategies for school implementation with the aim of realizing its goals. Technically, there are centralized, decentralized and semi-decentralized forms of educational planning (Babalola & Umar, 2016). A nation is said to be using a Centralized Planning Model (CPM), if she is using a single uniform plan in her entire schools. In most of the African countries, the CPM has been used until relatively recent times, when countries such as Nigeria established national institutions to support planning preparation by building planning capacities at different layers of government. This was possible because Nigeria is a country with a well-established federal system. Nevertheless, other African countries like South Africa, Ghana and Mali, to mention a few, have opted for more de-concentrated systems rather than stronger forms of decentralization. Recently in Nigeria, the focus of decision making has shifted from centralized to a decentralized form, making it more participatory. This is because, despite the similarities in challenges of Science Education in Nigeria, many of the schools still bend to dichotomies. Hence, the need for planning the teaching of science in schools arises as a core remedy to poor achievement.

As reported by Ezazi and Nourian (2016), planning in science teaching was first initiated in 1930, but prior to this development, educational planning had appeared in 1918 in which Franklin Bobet had published his book named "teaching planning". After this, the second attempt was in the year 1937 in which the first Department of education programming and planning was built at Chicago University. Afterwards, an attempt to bring serious planning closer to each school's doors, leads to the emanation of a decentralized model of planning called SBP. This type of planning, unlike other types which focus on educational policies and practices, transcends from the provision of facilities to what is happening inside the schools. It entails planning from input to process and output. This may be due to the realistic belief that SBP improves overall school performance, including the supervision process and other pedagogical support systems. Nevertheless, in recent century, the systematic tool of direct intervention for secondary schools' planners is SBP. And so, the concern for quality of learners' achievement has transformed the public investment arena in the education system using SBP as a tool.

Previously, in May 1992, the New York State Board of Regents adopted Section 100.11 of the Regulations of the Commissioner of Education, which requires that every school district in the State adopt a district plan by February 1994 (Rochester City School District, (2018). This calls for the participation of teachers, parents, administrators and school board members in

School-Based Planning (SBP) and shared decision-making. The regulation was adopted by the Regents to help implement the “Compact for learning”, a strategy for improving students' academic achievement. Using their understanding of the existing committee structures, the steering committee for SBP arrived at consensus on the development of this plan. It was implemented in 1994 and has been reviewed periodically since then. In view of that, the Rochester City School District (2019) describes SBP as the organizational structure for improving students' achievement and the overall school productivity.

Nevertheless, school-based planning represents the shift of decision-making authority from school districts to individual schools. Similarly, SBP provides a viable means of broad-based consultation to ensure the types of communication which will promote academic excellence (Rochester City School District, 2019). This structure provides for the formation of a planning team at each school, consisting of representatives of the full school community who hold primary responsibility for the design of a multi-year school improvement plan. At the secondary school level, the planning team, chaired by the principal, will assess students' performance and school effectiveness, set improvement goals, and design instruction and other services in the context of those goals. The SBP Team is a deliberative, decision-making body whose focus will be directed towards instruction, curriculum, and support for student learning, rather than school operations. The planning team is charged with the work of school improvement, empowered to make decisions and shape programs that will strengthen the education provided to students and lead to the highest standards of achievement (Rochester City School District, 2018). At the tertiary level, the dominant thrust of institutional planning has shown a high level of improvement in operational efficiency rather than resource mobilization. SBP is therefore the closest form of planning to all educational stakeholders such as parents, NGOs and other resources in the school. The figure1 shows the scopes of School-Based Planning covered by this study.

Table1: Model of School-Based Planning in Science Education Schools

Scopes of SBP	Composition of each scope
1 Students' management planning	<ul style="list-style-type: none"> • Disciplined and morally upright students. • Students' physical, social and mental fitness. • Effective Students' counseling • Good Student attitudes towards learning
2 Teachers' management planning	<ul style="list-style-type: none"> • Effective classroom teaching and learning • Peaceful students-teacher relationship • Teachers commitment to work • Morally sound and hardworking teachers
3 Students' management planning	<ul style="list-style-type: none"> • Avoidance of bushy school environment • Tidy classrooms and school environment • Prevention of school environment from odors • Silent school environment
4 Schools' Funding planning	<ul style="list-style-type: none"> • Effective school-community relationship • Adequate school financing • Public-private partnership in school finance

Source: Babalola (2023)

Nevertheless, no matter how great School-based planning could be theoretically, perception and most importantly the teacher perception is a significant factor to reckon with. This is because such perception is significantly important in determining if the planning process will be completed or the entire school system will accept to implement the plan or not. Hence, it is important to examine the concept of perception.

Perception can be defined as a psychological term used to express belief in the efficacy of an educational variable to achieve the purpose for which it was introduced. As described by Agogo and Onda, (2014), it is a cognitive activity in learning, which is seen as the process of making sense out of something. Hereby, perception as a concept can be summarized as one of the mental processes or skills by which people attach meaning to experience which reflects on the way they see, judge or evaluate a particular variable, policy, programme or concept. Perception is critical because it influences the information that enters working memory (Uchegbu, Anozieh, Mbadiugha, Ibe, and Njoku, (2015). However, in Science Education and its specific discipline, such as Chemistry Education, there are two types of perceptions that researchers usually investigate which include teachers and Students' perception. Both are cognitive activity encompassing the process of making meaning out of a particular educational variable.

On the other hand, “Teachers' Perception” is one of the mental processes or skills by which teachers attach meaning to experiences which reflect the way they see, judge or evaluate educational variables or concepts towards the expected outcome. It is an internal drive of teachers which determines their acceptance, motivations and activities towards implementation or otherwise of a suggested solution to an educational problem. Nevertheless, the way teachers perceive their students' academic ability influences their teaching motivation and interaction with the students. Specifically, Udoh (2012) found that the teachers' perception of school activities contributes significantly to students' academic achievement in Chemistry. Traditionally, in the education system, implementation of any educational policy, plan and program often needs general acceptance of the school stakeholders, in which teachers are a significant figure.

As an example, in this 21st Century, social survival is absolutely difficult for illiterate citizens as virtually all activities in life require reading, writing, understanding and computer operation. This positive perception of education for good living and in all round development motivated all parents to keep educating their children. Consequently, for developmental purposes, UNESCO member States recommended that between 15% and 20% of their national expenditure should be allocated to education (UNESCO, 2021). Similarly, due to the same positive perceptions of elites, including teachers, on the role of science and technology in poverty eradication, job creation, sustainability of the mother earth as well as the security of life and property, Science Education and Technology Education have become generally acceptable subjects in the property secondary school curriculum. Since teachers often play remarkable roles in school goal realization, especially when promoted to the rank of school leader. Their perceptions as teachers have become a predominant influence on both their leadership styles and the strategies, they are likely to adopt in order to effect positive changes

in schools. These, among others, provide for rationales behind investigating the teachers' perception of School-Based Planning on chemistry Achievement in Chemistry.

Statement of the Problems

In contemporary Nigerian schools, traditional and stereotypical approaches to problem solving seem grossly inadequate in the face of complex realities. School stakeholders keep complaining of numerous issues, such as students' lack of funds, poor school location, unfavorable school environments, unmotivated teachers, indiscipline among students, students' laziness, and teachers' absenteeism, which are the precursors of poor academic achievement in Chemistry among students. We hereby need to fine-tune the way forward and come up with alternative remedies to seemingly naughty challenges of our educational system. Thus, school-based planning may be the right remedy. Unfortunately, the traditions of education and the thinking culture of our society as well as the teachers' perception make no provision for new design, as applicable to architectural buildings and furniture. The great secret in every episode of contemporary Nigerian schools is adequate planning. That is, the education system seems to be making planning a neglected area, particularly at school-based level. Recently, a series of studies have suggested the importance of school' social environment for learning (Ojating, 2012; Sun, Hendrick, Goetz, Wubbels, and Mainhard, 2022).

Some of these studies examined location planning and its attendant consequences on achievement of students in various states of the Federation. Actually, in Nigeria, just as in other countries of the world, there are many policies, programs, strategies and plans which are good but dormant. Such policies were not implemented due to such bad perceptions and/or excuses on the part of teachers and school heads alike. This fact is evident in the mismatch which often exists between the National Policy on Education (NPE) and what is being practiced in the school system across the nation. So, implementation of SBP depends on teachers' perception and its effectiveness towards improving students' academic performance.

Objectives of the Study

Based on the background of this study, the objectives of the study are to:

1. Examine the teachers' perception of School-Based Planning on Academic Achievement in Chemistry among the students in Boys' Secondary Schools in Kano State, Nigeria.
2. Find out the teachers' perception of School-Based Planning on Academic Achievement in Chemistry among the students in Girls' Secondary Schools in Kano State, Nigeria.
3. Investigate the impact of school location on teachers' perception of school-based planning on academic achievements in Chemistry.
4. Explore the impact of gender on teachers' perception of school-Based Planning on Academic achievements in Chemistry.
5. Assess the impact of school type on teachers' perception of school-based planning on students' academic achievement in Chemistry.

However, these objectives were transformed into two research questions and three null hypotheses based on better ways to achieve them.

Research Questions

The research questions are:

1. What is the teachers' perception of School-Based Planning on Academic Achievement in Chemistry among the students in Boys' Secondary Schools in Kano State, Nigeria?
2. What is the teachers' perception of School-Based Planning on Academic Achievement in Chemistry among the students in Girls' Secondary Schools in Kano State, Nigeria?

Research Hypotheses

The three null hypotheses formulated to pilot the study are;

Ho₁: There is no significant impact of school location on teachers' perception of School-Based Planning on Academic achievements in Chemistry.

Ho₂: There is no significant impact of gender on teachers' perception of School Based Planning on Academic achievements in Chemistry.

Ho₃: There is no significant impact of school type on teachers' perception of School Based Planning on Students' Academic achievement in Chemistry.

Research Methodology

Descriptive Survey Research Design was engaged for the study, where 2, 267 teachers of the 176 schools selected constituted the study population. 340-Chemistry teachers were sampled via a multistage sampling technique using the Taro Yamane's formula $[n=P/1+P (0.05)^2]$. A researcher-designed instrument entitled; Teachers' Perception of SBP on Chemistry Achievement (TPSBPCA) was used to collect data for the study. The instrument was validated by 3 experts in; Science Education, Educational Administration and planning, as well as measurement and evaluation, respectively. The reliability coefficient of the instrument "r" was established to be 0.88 using the Test-re-test method and PPMCC. Simple percentage and T-test were used to answer the research questions and test the hypotheses respectively.

Results of the Study

Table 2: Teachers' perception of SBP on chemistry achievement in Boys' Secondary Schools.

S/N		A	D
1.	Students' management plans such as; student discipline, motivation, counseling, sports and classroom management will improve students' academic achievement in Chemistry.	289 (85.0%)	51 (15.0%)
2.	Teachers' management plans such as lesson plans, teachers' placement and control, motivation, discipline, and welfare will improve students' Academic Achievements in Chemistry.	284 (83.5%)	56 (16.5%)
3.	School environmental planning such as regular sweeping; proper waste management and toiletry, a quiet environment and school safety plans will improve Academic Achievement in Chemistry.	201 (59.1%)	139 (40.9%)
4.	Adequate school finance plans such as school-community relations, internally generated revenues; public-private partnership and regular PTA and alumni meetings will improve students' Academic Achievement in Chemistry.	218 (64.1%)	122 (35.9%)
5.	Time management plans such as timetables, examination timetables, a steady school calendar and students' personal timetables will improve students' academic achievement in Chemistry.	220 (64.7%)	120 (35.3%)
	Universal percentage	71.28%	28.72%

Source: Field Study (2023).

Table 2 shows that the universal percentage of respondents that agreed (71.28%) is higher than those who disagreed (28.72%). Hence, the teachers in Boys Secondary school in Kano State believe that school-based planning will improve students' academic achievement in Chemistry.

Answering Question 2

Table 3: Teachers' perception of SBP on Chemistry achievements in Girls Secondary Schools.

S/N	Students' management planning	A	D
1.	Students' management plans such as; student discipline, motivation, counseling, sports and classroom control management can improve students' achievement in Chemistry.	240 (70.6%)	100 (29.4%)
2.	Teachers' management plans such as lesson plans, teachers' placement and control, motivation, discipline, and welfare will improve students' Academic Achievements in Chemistry.	276 (81.2%)	64 (18.8%)
3.	School environmental planning such as; regular sweeping, waste management and toiletry, quiet environment and school safety plans will improve Academic Achievement in Chemistry.	274 (80.6%)	66 (19.4%)
4.	Adequate school finance plans such as school-community relations, internally generated revenues; public-private partnership and regular PTA and alumni meetings will improve students' Academic Achievement in Chemistry.	185 (54.4%)	155 (45.6%)
5.	Time management plans such as timetables, examination timetables, a steady school calendar and students' personal timetables will improve students' academic achievement in Chemistry.	255 (75.0%)	85 (25.0%)
	Universal percentage	72.36%	27.64%

Source: Field Study (2023).

Table 3 shows that 72.36% of Girls Secondary School teachers perceived that school-based planning will improve chemistry achievements while 27.64% disagreed.

Testing Hypothesis One (H_{01})

Table 4: Impact of school location on teachers' perception of SBP on Chemistry achievement

Variable	Sch. Location	N	Mean	Std	Std. Error	95% Conf. Interval	t-value	Df	Remark
Perception	Rural	170	51.18	12.359	.948	-14.299	-13.11	338	NS
	Urban	170	68.00	11.284	.865	-19.348			

Source: Field Study (2023); Table value 1.945

Table 4 on school location and teachers' perception of SBP on students' academic achievement in chemistry shows that the table value (1.945) is greater than the t-cal value. Hence, we retained the null hypothesis; there is no significant difference across school location on teachers' perception of SBP on Chemistry achievement in Kano State Secondary schools.

Testing Hypothesis Two (H_{02})

Table 5: Impact of gender on Sec. Sch. teachers' perception of SBP on Chemistry Achievement

Variables	Gender	N	Mean	Std	Std. Error	95% Conf. Interval	t-value	Df	Remark at 0.05-Sg
Perception	Male	85	52.94	11.425	1.239	7.245	1.876	168	NS
	Female	85	49.41	13.057	1.416	-.186			

Source: Field Study (2023).

Table 5 shows that the t-critical value (3.020) is greater than the t-calculated value (1.876). Hence, there is no significant gender difference on teachers' perceptions of SBP on Chemistry achievement in Kano State Secondary schools. That is, gender has no significant effect on secondary school teachers' perception of School based planning on Chemistry Achievement.

Testing Hypothesis Three (H_{03})

Table 6: Impact of school type on teachers' Perception of SBP on Chemistry Achievement

Variable	School Types	N	Mean	Std	Std. Error	95% Conf. Interval	t-value	Df	Remark
Perception	Boys	85	66.35	10.333	1.121	-6.685	-1.918	168	NS
	Girls	85	69.65	11.997	1.301	0.096			

Source: Field Study (2023).

Table 6 shows that the t-critical value (0.234) is greater than the t-calculated value (-1.918). Thus, the null hypothesis "There is no significant difference between Boys' and Girls' school

teachers' perception of School Based Planning on Academic achievement in Chemistry is accepted. Hence, there is no significant difference across school type on teachers' perception of SBP on Academic achievement in Chemistry among secondary school students in Kano State, Nigeria.

Discussion of Major Findings

Despite that school-based planning has been accepted in the developed world, such as the USA, as a remedy for poor academic achievement, as seen from practice in the Rochester City District, the Nigerian secondary school teachers' perception of the concept is still very necessary for its acceptance and implementation in Nigeria. However, this study found that the teachers in boys' secondary school in Kano State have a positive perception of school-based planning and emphasized that if well implemented, it will surely improve students' academic achievement in Chemistry. This study agrees with the result of research conducted by [8] which indicated that pre-service teachers have a positive perception towards the chemistry laboratory and encouraged chemistry educators to improve on chemistry laboratory participation for pre-service teachers because perception towards the laboratory is also related to pre-service teachers' learning interests. Similarly, a positive teachers' perception of school-based planning on chemistry achievement was also found in Female Secondary School in Kano State. This finding is in agreement with Espinosa, Datukan, Butron, Tameta, and Danica (2018), whose study of teachers' perception of collaborative lesson planning on effectiveness, intellectual quality, connectedness, recognition of difference and supportive classroom environment revealed that the teachers perceived that collaborating lesson planning will help improve their teaching skills and promote greater achievement in chemistry among students. Also, Udoh (2012) revealed that the teachers' perception of educational environment contributes largely to Chemistry achievement.

This study also revealed that there is no significant difference in school location locations in teachers' perception of SBP on Chemistry achievement in Kano State Secondary schools. Similarly, gender has no significant influence on secondary school teachers' perception of school based on planning on Chemistry Achievement in Kano State Secondary Schools. This study is in agreement with that of Udoh (2012) which revealed that students' problems associated with gender and location do not negatively affect the relationship between students' problems and academic achievement. However, the way teachers perceive their students' academic ability influences their teaching interaction with the students. Hereby, teachers are encouraged irrespective of school location and type to ensure their perception is right about students' academic ability and towards the effectiveness of school policies.

There is no significant difference across school types in teachers' perception of school planning on chemistry based on chemistry achievement in secondary schools in Kano State. This is in line with the findings of Uchegbu, Anozieh, Mbadiugha, Ibe, and Njoku, (2015) which revealed that teachers perceived unqualified teachers, the noisy environment, and students' difficult perception of chemistry as impediments to the effective teaching of chemistry in secondary schools. However, Mumba; Banda and Chambalengula, (2015) found that most teachers perceived that inquiry instruction has several benefits in inclusive chemistry classes but challenging.

Conclusion

It has been discovered in this study and hereby concluded that the school-based planning is perceived positively by the teachers in Kano metropolis to enhance students' academic achievement in Chemistry. Consequently, if the school-based planning is efficiently planned and properly implemented in Kano metropolitan schools, the school challenges such as students' indiscipline, teachers' dereliction of duties, inadequate teachers and their welfares will improve gradually. The improvement of these challenges will surely reflect positively in students' Academic achievement in chemistry. Also, considering the place of chemistry as a central science subject in schools and the society at large, it may be a win-win for government, students and parents alike. The rate of technological development in the nation may increase, the students may have a better mindfulness and the parents may start receiving maximum educational services and benefits that are commensurate with the educational cost paying to the schools. The school host community may start receiving well baked graduates with exceptional intelligence and high moral standard capable of contributing to the social discuss in chemistry and general science related issues. This study has also undoubtedly contributed to Chemistry Education literature being the first of its kind in examining relationship between students' academic achievement and school-based planning as proposed by the Rochester City District Education Ministry (RCDEM) of the United State of America (USA).

Recommendations

Based on the findings of this study, it is hereby recommended that;

1. School Administrators are encouraged to put school-based planning in place in Secondary schools where Chemistry are taught in Nigeria by formulating and empower the school-based planning team/committee to carry out their responsibilities accordingly.
2. Curriculum reviewers should endeavor to incorporate school-based planning into the curriculum of teacher education programs in Nigeria to enlighten the future teachers.
3. Educational forums, such as conferences, workshops and symposia should be organized either by the government of TRCN or STAN to provide in-service training on school-based planning to the school administrators and teachers of secondary schools in Nigeria.
4. Educational Consultant should start recommending school-based planning for schools that are facing the challenges of Academic Achievement in Chemistry among Students.
5. Government of Kano State should give political will to establish school-based planning team in all Kano State secondary schools irrespective of School location and gender type just as it was done in Rochester City School District in USA.

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