

**DEMOGRAPHIC VARIABLES AND INSTRUCTIONAL EFFECTIVENESS
IN SENIOR SECONDARY SCHOOLS IN CROSS RIVER STATE**

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ABSTRACT: *The main purpose of this study was to investigate on how Mathematics teachers' demographic variables could influence their instructional effectiveness in Senior secondary schools in Cross River State, Nigeria. To achieve the purpose of this study, two research hypotheses were generated to direct the study. Literature review was done according to the variables and hypotheses for the study to facilitate the discussion of findings. Ex-post facto research design was adopted for the study. Purposive sampling technique was used by the researcher, were all the members in the population were selected. The questionnaire was the main instrument used for data collection. The data were collected personally by the researcher and the assistants. To test the hypotheses formulated to direct the study, the independent and dependent variables were identified. Independent t-test and One-Way Analysis of Variance (ANOVA) were considered most appropriate to test the hypotheses for the study. The .05 level of significance was used for the statistical testing of each of the hypothesis for the study. The result of the analysis indicated that educational qualification and teaching experience significantly influence instructional effectiveness of Mathematics teachers. Based on the conclusion of the study it was recommended that Government should organize regular seminars and workshops for all the Mathematics teachers in secondary schools, irrespective of their qualification towards effective utilization of instructional materials and methods of teaching.*

KEYWORD: demographic, variables, instructional, effectiveness, school

INTRODUCTION

The problem of effective teaching and learning of Mathematics in Nigerian schools has become a sensitive issue that needs urgent attention. It has been observed that this issue is affecting the performance of students at all levels of education in both internal and external examinations adversely. Government, educational administrators/planners and parents are so much concerned about what has led to the widely attained fallen standard of education in Cross River State and Nigeria at large. Over the years, students' performance in Mathematics at West African Examination Council (WAEC)/National Examination Council (NECO) has not been encouraging. Many factors have been identified as causes to this situation at different instances. A number of strategies have also been adopted both at governmental and non-governmental levels to find solutions to students low achievement in Mathematics,

but all to no avail. This may be due to the fact that these agencies have been addressing problems related to facilities, equipment and staffing in the schools. They have not taken time to address problems related to students' classroom behaviour such as interest, class participation, initiation of question/discourse, which have been lacking and the influence of teachers' demographic variables as it affects Mathematics achievement.

This study however, is one of the steps taken towards identifying some of the teachers' demographic variables that may contribute to the problem of instructional effectiveness in senior secondary schools as the quality of education may also depend on teachers as reflected in the performance of students. It was aimed at answering the question: How would Mathematics teachers' demographic variables influence their instructional effectiveness?

Despite the importance of the teaching profession and the emphasis placed on education the world over, the desire to find effective and qualified teachers to fill the vacancy in the classroom has persisted. Anita (2005) requested that the question of whether the teacher's qualification has any significant influence on teaching effectiveness has not been disputed. Otu and Bassey A (2018) reported in a doctoral dissertation that teachers enrolled in graduate programmes were adjudged to be more effective than those not so enrolled. This conclusion was derived from measures of qualification effect on teaching effectiveness among teachers.

Otu and Bassey (2019) studied students taught by 293 newly recruited certified and under-certified teachers. Analysis of scores from the mandatory achievement test showed that students of certified teachers performed significantly better than students of teachers who were under-certified. This was true of all three sub-test of the examination administered to the students. The conclusion from this finding was that qualification plays a major role on teaching effectiveness. It is self-evident that no teacher can afford to abandon reading and study that goes beyond the present status. However, we should be careful to avoid making reduction in technical skills to reduce mechanical operation.

Shawo (2002) examined the idea that a major aspect of improving the effectiveness of schools hinges on obtaining a better qualification of what makes teachers' effective. The authors surveyed 178 university students from Botswana (n=54), Zimbabwe (n=54) and the United States (n=70) who were training to be teachers. The study investigated what the teacher trainee remembered of their primary school teachers and sought to identify qualification as associated with effective and ineffective teachers. Among the findings of the study was that United States of America students tended to place more importance on qualification as a measure of teacher effectiveness, while students from Botswana and Zimbabwe tended to give greater weight to instructional skills.

Furthermore, Otu and Bassey (2019)) noted that a well-trained teacher is expected to discover more than his students. He should develop in his students' method of clear

thinking, correct perception of relationships and love for further reading; in order to enhance better academic achievement. This is so because teachers occupy a important position in the classroom and can influence to a large extent the students' achievement. This assertion is in line with views of Darling Hammond, Berry and Thorenson (2001).

Otu, Eduwem, and Umoinyang (2017) study supports the relationship between educational qualification and students' achievement. The researcher investigated the relationship between teachers' qualification and students' achievement in Chemistry. Using 180 teachers and 280 students in 10 secondary schools in Calabar Municipality, a survey research design with well validated research instrument and Pearson Product Moment Correlation Coefficient as statistical tool, he found a significant relationship between teachers' educational qualification and students' performance. This signifies that the more students are taught by competent teachers, the better their performance.

A similar study was conducted by Onyene and Adetoro (2005) on intuitional factors and academic achievement of students in public and private secondary schools in Lagos State. They tested hypothesis that there is no significant relationship between teachers' qualifications and academic performance of students at 0.05 level of significant; using Pearson Product Moment Correlation Coefficient analysis, it was revealed that a significant relationship exists between teachers' qualification and academic achievement of students.

A study was moreover conducted by Fakeye (2012), to investigate teachers' qualification and subject mastery could predict students' achievement of secondary school students in Oyo State. A descriptive research design of survey was adopted. Twenty (20) schools were randomly selected from each school which constituted a total of one thousand (1000) senior secondary two students and all the English teachers in SS two in the sampled schools were selected. Multiple regression analysis was used for data analysis. The findings of the study showed that teachers' teaching qualification has a significant influence on students' academic performance. Oyama, and Otu (2021) researched on educational attainment of students and teachers' effectiveness. He used a sample size of two hundred and forty (240) teachers, with a survey research design and Pearson Product Moment Correlation Analysis he found out that, proper training enhances teacher effectiveness and thus high students' achievement. This assertion is collaborated by the work of MarZawo (2007) that qualified teachers are competent in their teaching work. According to Jegede (1994), teachers with lower educational will definitely implement the curriculum the wrong way because of their lower skills and experience.

Iheanacho (2002) argues that teachers with higher qualification, and that skilled teachers are more productive than the unskilled teachers. Probably in the light of the above, the Federal Government of Nigeria in the National Policy on Education proposed, "The minimum qualification for entry into the teaching profession shall be the Nigeria Certificate in Education (NCE)" NPE 2004:39. Due to the importance of

educational qualification in teaching profession, Mohammed (2001) emphasized the necessity of re-imposing the prescribed qualification for teachers in the secondary schools, which is compelling University graduate without a background in teaching to obtain a Post Graduate Certificate in Education (PGDE). This suggestion was in line with the provision in the (NPE, 2004).

Therefore teachers with higher qualification are expected to be more productive especially as they earn more. These groups of teachers equally see themselves as experts in their areas (Iheanacho, 2002). This assertion was in line with Rockoff (2004) who asserted that teaching profession is in a constant state of change. Teaching strategies are emergent and not absolute therefore, quality professional development is critical to the retention and improvement of any teacher in the classroom.

Strauss and Vogt (2001) posited that highly qualified teachers present their materials in an interesting way that gives the students a feeling of understanding and mastery of the subject. Higher level of education results in teachers having more egos and at the same time higher expectations on the part of the parents and public for more effectiveness and efficiency and thus, for better academic achievement of students. Teachers' qualification makes him outstanding and gives him more confidence that he can change the behaviour of the learners positively. This assertion is in line with Ingersoll (2004) that teachers have been recognized as indispensable factor in the classroom.

In a causal model, Amaefuna (2006) found that teacher qualification is seen to influence academic achievement of students both directly and indirectly. She concluded that the lack of suitable teachers who lack pedagogical skills commitment and practical orientation seriously affect academic achievement of students. Akinsolu (2010) revealed that there exist a positive relationship between teacher qualification and instructional effectiveness. In their separate research, it was disclosed that qualified teachers are likely to be more effective than unqualified teachers; since the former knows the different strategies to employ during instructions in order to illicit the desired change and enhance students' understanding of the subject.

Teachers' years of teaching experience in the teaching profession/functional classroom situation is a beacon for achieving the expected academic results. The numbers of years in the teaching field have offered the teachers' experiences of tackling negative behaviour among learners to pave the way for educational yearning results. The said "experienced is the best teacher" on this note, teaching experience is not synonymous with number of certificates/degrees, but the years the teacher have been teaching consistently and interacting with students on daily basis.

Komonye (2000) carries out a study to ascertain the place of the teacher in curriculum implementation. A hypothesis was formulated, teacher experience does not significantly influence students' academic performance in Social Studies. As such, Analysis of Variance was used as statistic technique to test the hypothesis at 0.05

level of significant. The result clearly showed that those teachers who have put in 20-30 years in service have greater mean of teaching effectiveness 56.332 and 10-20years 40.23 mean while 1-10years of experienced got 3.438. The result justified that teachers with good numbers of years in the teaching profession use the wealth of teaching experience to bring about teaching effectiveness that may reform the learners' behaviour.

It has been observed that students who are taught by experienced teachers do better than those taught by inexperienced teachers. Teachers' experiences are taken into consideration on the number of years the teacher has been romancing with the contents of curriculum. The more the teacher is in constant touch with the curriculum, the more effective and versatile he is, because he has acclimatized himself with the logics, and diverse behaviour of the students geared towards the yearning of the society.

According to Davies (2005) teachers' instructional effectiveness may be cemented with years of teaching experiences which is very influential to submerge the negative behaviour of the learners through years of repeated encounter with the students. The number of years in the teaching as a classroom teacher fundamentally makes the teacher to be familiar with all loopholes that would have hindered the assimilation of the curriculum contents.

In another development, Thoreson (2000) carries out a study related to years of teaching experience and students' academic performance. A sampled of three thousand four hundred and sixty nine (3469) science teachers were used for the study. The mean score attached to teachers with less than (1-5) years was 60.45, which signified teachers that just put in few years in the profession performed better. Though, teachers with M.Ed and first degree that had spent close to 20 years and above in the system scored 39.55, proven ineffective in the implementation of curriculum contents.

It boils down to the assertion that experienced is really the best teacher. This is because experience enables the teacher to psychologically overhaul that deviant attitude of the learner for educational forage. The teachers' years of experience from the onset in public schools attract some financial remuneration on yearly basis depending on the grade level of the teacher. In this case, a step is usually added base on the number of years, thus, buttresses/influences more input from the teacher for productivity and efficiency.

Ubi (2009) reiterates in a research conducted on teacher teaching experience that experiences are catalyst that facilitate teaching effectiveness. This was based on hypothesis formulated thus; teachers' experience does not significantly influence students' academic achievement in Social Studies. Teaching experience was therefore categorized and academic achievement was continued. As such, One Way Analysis of Variance (ANOVA) was implored in testing the hypothesis and the result as represented in table four (4) which showed that students taught by teacher with 11-

15years experiences have the highest mean academic achievement ($X=47.431$, $S=4.258$). They were followed by those taught by teachers with teaching experiences of 6-10years ($X=45.00$, $S=4.850$), 1-5years ($X=44.364$, $S=4.726$), 21years and above ($X=43.725$, $S=4.834$) and lastly 16-20 respectively.

Based on the above result, teachers' years of teaching experience appears a decisive factor that influences instructional effectiveness in Mathematics. The number of years has made the teacher to be conversant with the nook and cranny of the learners' academic problems, thereafter remedial is being proffered for the learner willful growth. The basis at which learning strives in the academic environment in relation to teachers' experience ranges from 10years and above. Though teachers with M.Ed, due to this higher degree have chances of enhancing learning on account that the M.Ed 1-5 experience competes favourably with their counterparts of 10years and above. The experience a teacher may have acquired in the system, offers him techniques that enable students submissive in Mathematics as a discrete subject in the secondary system. The experience of reasonable number of years offers the teacher the techniques which enable the development of cognitive faculties of students to occur.

Adenle (2014) conducts a study with particular reference to learning effectiveness of students in the project work when taught by technical teachers with less than 10years of teaching experience in the science and technical institutions in Kaduna State. In that study, hypothesis three (3) was stated, there is no significant difference in the performance of students in the project work when taught by technical teachers with less than 10years teaching experience and those taught by teachers with 10years and above teaching experience in the science and technical institutions. In the analysis of the result, none of the t-values calculated was significant at 0.05 level of probability. Therefore, the null hypothesis was accepted. It then indicated that the competency attained by the individual students depend on the teaching experience of their teachers.

Teachers long time in service provides a platform in which students who are almost deviating from their routing and social responsibility may be reformed in line with the acceptable norms and values of the school. Every institution has internal norms which teachers with experience in all schools are the only ones allowed to derive these ideologies and this experience has helped them in term of instruction delivering in the class. Teachers' years of teaching experience vis-à-vis with instructional effectiveness of Mathematics is not out of place. This is because they years of experience may adequately assist the teacher in the class to effectively engage learners in order to acquire mathematical skills.

Teachers' years of teaching experience remain a burning issue in the school system. Esu (2012) points out in a study carried out, to compare academic performance between teachers' taught by experienced and inexperienced. The experienced and inexperienced were grouped into two. The hypothesis was formulates thus, there is no significant difference in the academic performance of students taught by

experienced and those taught by inexperienced. The results emerged when academic performance was compared between those taught by experienced teachers performed better than those students taught by inexperienced teachers.

METHODOLOGY

The design used for this study is the Ex-post facto design. This study was conducted in Calabar Education Zone in Cross River State. Calabar Education Zone is made up of seven (7) Local Government Areas which include: Akamkpa, Akpabuyo, Bakassi, Biase, Calabar South, Odukpani and Calabar Municipality. The Zone lies between latitude 04°15'North and longitude 08°25' East. The population of this study covers all the Mathematics teachers in public secondary schools in Calabar Education Zone. There are one hundred and forty four (144) Mathematics teachers in Calabar Education Zone. Since all the teachers in the public schools in the area were used which was the population. The sampling techniques adopted for this study was the purposive sampling technique. Therefore, the sample for this study consisted of all the teachers that made up the population (144 Mathematics teachers) selected from all the public secondary schools in Calabar Education Zone. Two instruments were used for this study. The first instrument titled Teachers/School Profile questionnaire (TSPQ) was personally constructed by the researcher for this study. The second instrument used for the study was Instructional Effectiveness Evaluation Form (IEEF) to measure instructional effectiveness of Mathematics teachers in the research area. To ensure that the instrument measure what it is purported to measure, it was subjected to face validity by two educational measurements lecturers in the Department of Educational Foundations in University of Calabar for scrutiny. In this study, the reliability of the instrument was established using Cronbach alpha reliability coefficient estimate. The questionnaire was administered to 40 Mathematics teachers who were not part of the sample. The retrieved copies were coded and the data obtained was used to calculate the reliability coefficient. The reliability coefficient of the instrument was 0.737.

Presentation of result

In this section each hypothesis is re-stated, and the result of data analysis carried out to test it is presented. Each hypothesis of the study was tested at .05 level of significance.

Hypothesis one

Teaching experience has no significant influence on instructional effectiveness of Mathematics teachers The independent variable in this hypothesis is teaching experience (Below 10 years, 10years-20years and 21years and above); while the dependent variable is instructional effectiveness of Mathematics teachers. To test this hypothesis, instructional effectiveness of Mathematics teachers from teaching experience Below 10 years, 10years-20years and 21years and above were compared using One-Way Analysis of Variance (ANOVA). The result of the analysis is presented in Table 1.

TABLE 1: Summary data and one-way ANOVA of the influence of Teaching experience on instructional effectiveness of Mathematics teachers (N=124)

Teaching experience	N	\bar{X}	SD		
Below 10 years – 1	30	56.03	5.26		
10years-20years – 2	60	58.23	4.76		
21years and above – 3	34	59.18	4.68		
Total	124	57.96	4.96		

Source of variance	SS	Df	Ms	F	Sig of F
Between group	166.157	2	83.076	3.509*	.033
Within group	2864.641	121	23.675		
Total	3030.798	123			

* Significant at .05 level, critical F=3.00, df= 2, 121.

The result on Table 1 revealed that the calculated F-value of 3.509 is higher than the critical F-value of 3.00 at .05 level of significance with 2 and 121 degree of freedom. With this result the null hypothesis was rejected. This result therefore implied that, teaching experience significantly influenced instructional effectiveness of Mathematics teachers. Since teaching experience had a significant influence on instructional effectiveness of Mathematics teachers, a post hoc analysis was employed using Fishers' Least Significant Difference (LSD) multiple comparison analysis. The result of the analysis is presented in Table 2.

TABLE 2: Fishers' Least Significant Difference (LSD) multiple comparison analysis of the influence of teaching experience on instructional effectiveness of Mathematics teachers LSD

(I) TEACHING EXPERIENCE	(J) TEACHING EXPERIENCE	Mean Difference (I-J)	Std. Error	Sig.
Below 10 years	10years-20years	-2.20000(*)	1.08800	.045
	21years and above	-3.14314(*)	1.21880	.011
10years-20years	Below 10 years	2.20000(*)	1.08800	.045
	21years and above	-.94314	1.04446	.368
21years and above	Below 10 years	3.14314(*)	1.21880	.011
	10years-20years	.94314	1.04446	.368

* The mean difference is significant at the .05 level.

The result of the analysis in Table 2 showed that respondents whose teaching experience was Below 10 years were significantly different in their instructional effectiveness of Mathematics teachers from those whose teaching experience was either 10years-20years or 21years and above. Also respondents whose teaching experience was 10years-20years were significantly different from those who were 21years and above in instructional effectiveness of Mathematics teachers.

Hypothesis two

Academic qualification has no significant influence on instructional effectiveness of Mathematics teachers. The independent variable in this hypothesis is Academic qualification (Low, Moderate and high); while the dependent variable is instructional effectiveness of Mathematics teachers. To test this hypothesis, instructional effectiveness of Mathematics teachers from Academic qualification low, moderate and high were compared using One-Way Analysis of Variance (ANOVA). The result of the analysis is presented in Table 3.

TABLE 3: Summary data and one-way ANOVA of the influence of Academic qualification on instructional effectiveness of Mathematics teachers (N=124)

Academic qualification	N	\bar{X}	SD
NCE/OND – 1	52	56.46	5.20
B.A/B.Sc/PGDE+HND – 2	57	58.44	4.74
M.Ed/ M.Sc/Ph.D – 3	15	61.33	2.58
Total	124	57.96	4.96

Source of variance	SS	df	Ms	F	Sig of F
Between group	300.507	2	150.253	6.659*	.002
Within group	2730.291	121	22.564		
Total	3030.798	123			

* Significant at .05 level, critical F=3.00, df= 2, 121.

The result on Table 3 revealed that the calculated F-value of 6.659 is higher than the critical F-value of 3.00 at .05 level of significance with 2 and 121 degree of freedom. With this result the null hypothesis was rejected. This result therefore implied that, Academic qualification has a significant influence on instructional effectiveness of Mathematics teachers. Since Academic qualification had a significant influence on instructional effectiveness of Mathematics teachers, a post hoc analysis was employed using Fishers' Least Significant Difference (LSD) multiple comparison analysis. The result of the analysis is presented in Table 4.

TABLE 4: Fishers' Least Significant Difference (LSD) multiple comparison analysis of the influence of Academic qualification on instructional effectiveness of Mathematic teachers LSD

(I) Academic qualification	(J) Academic qualification	Mean Difference (I-J)	Std. Error	Sig.
NCE/OND	B.A/B.Sc/PGDE+HND	-1.97706(*)	.91093	.032
	M.Ed/ M.Sc/Ph.D	-4.87179(*)	1.39220	.001
B.A/B.Sc/PGDE+HND	NCE/OND	1.97706(*)	.91093	.032
	M.Ed/ M.Sc/Ph.D	-2.89474(*)	1.37846	.038
M.Ed/ M.Sc/Ph.D	NCE/OND	4.87179(*)	1.39220	.001
	B.A/B.Sc/PGDE+HND	2.89474(*)	1.37846	.038

* The mean difference is significant at the .05 level.

The result of the analysis in Table 4 showed that respondents whose Academic qualification was NCE/OND were significantly different in their instructional effectiveness of Mathematics teachers from those whose Academic qualification was either B.A/B.Sc/PGDE+HND or high. Also respondents whose Academic qualification was B.A/B.Sc/PGDE+HND were significantly different from those who were high in instructional effectiveness of Mathematics teachers.

DISCUSSION OF FINDINGS

The result of the first hypothesis indicated that there is a significance influence of teaching experience on instructional effectiveness of Mathematics teachers. The findings of this hypothesis supported Darwing (1991) who opined that for a teacher to be experienced, there is need for long training and majority of the teachers in public school have acquired experience with formal education which influence their effectiveness in the class.

The result of the second hypothesis stated that, there is a significant influence of Academic qualification on instructional effectiveness of Mathematics teachers. The findings of this hypothesis is in agreement with Knoboco (2000) who reported in a doctoral dissertation that teachers enrolled in graduate programmes were adjudged to be more effective than those not so enrolled. This conclusion was derived from measures of qualification effect on instructional effectiveness among teachers. The conclusion from this finding was that qualification plays a major role on teaching effectiveness. It is self-evident that no teacher can afford to abandon reading and study that goes beyond the present status. However, we should be careful to avoid making reduction in technical skills to reduce mechanical operation.

CONCLUSION

Based on the results and findings of the study it was concluded that teaching experience and Academic qualification significantly influence instructional effectiveness of Mathematics teachers. Based on the conclusions of the study, the following recommendations are made: Mathematics teachers should be encouraged by government through various incentives like increment in salaries, allowances, promotion to enable those with experience impart to the students ideas that would make them productive. Teachers' qualification should be given more emphasis so that people with right qualifications should be in the classroom for high academic achievement of students.

Implication/Justification of the study

The significance of this study cannot be overstated as the result will be useful to government, school principals, Mathematics teachers, educational policy makers as well as future researchers.

This study will be of great importance to the Cross River State Government that has committed a very significant portion of its budget to finance education especially in

the intervention programme through the State Universal Basic Education Board (SUBEB) for the development of Mathematics teachers in the state. It will help the government to ensure that the aim and objectives of teaching are translated into reality to provide quality assurance and expose areas where loopholes are discovered for immediate attention and procurement of educational facilities to maintain the standard. It will help government to organize the yearly training and re-training of Mathematics teachers for professional competency, experience through conferences, workshops, seminars and symposia ahead of 21st Century challenges. It will further ensure that government initiate policies that eliminate the spirit of indolence and aloofness amongst teachers and students to compete favourably with their counterparts in other parts of the country in terms of academic excellence.

This study will stimulate attention towards the teaching and learning of Mathematics in the minds of educational policy makers and other beneficiaries of the education process. They will evaluate to what extent the goals of the education policies with regards to the teaching and learning of Mathematics are being achieved. Ineffectiveness amongst teachers could be as a result of dissatisfaction of needs.

Educational planners could devise a suitable means of satisfying the needs of teachers to enhance efficient school management. This can be achieved by identifying those needs that do not motivate teachers any longer and concentrate on those needs which spur them to action. The result of this study will also give feedback information to the Mathematics teacher trainers to modify, correct or redirect their efforts or skills in guiding the trainees in order to yield good results in the school system.

School administrators will gain grossly from this study because knowing what Mathematics teacher variables influence their instructional effectiveness will help them make adjustments in the leadership styles, quality of materials and serve as useful information in the counseling of Mathematics teachers for improved performance to foster students' achievement in Mathematics.

The findings of this study shall be able to disabuse the minds of parents and general public who have lost confidence mostly in public schools due to poor academic performances of students in Mathematics that students' performances should not be attributed to teachers alone because there might be other extraneous factors beyond the school that is also capable of unleashing similar harm.

The findings of this study will enlighten Mathematics teachers on the demographic variables that could influence their instructional effectiveness. It will help the teachers identify their strengths and weaknesses and proper ways of overcoming them. This shall make them to see the need to consciously control these variables in order to enhance students' achievement in Mathematics. This study may also stimulate interest in teacher effectiveness research through focusing on the various dimension of teachers' effectiveness and how each dimension contributes to overall teacher effectiveness.

Finally the students who are at the centre of the teaching and learning processes will benefit immensely from this work because as the teachers themselves improve, their performance in Mathematics will also improve as this research may also create an appreciable awareness in the students on the problem faced by their teachers. This may help them adjust their relationships in the right direction in order to foster achievement in Mathematics and be part of the solution and not part of the problem.

This research shall open new grounds for more researchers to delve into particularly the area of dimension of teaching effectiveness. It may also add to existing scholarship which will invariably serve as a reference material to future researchers in the field.

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