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Influence of science teacher gender, qualification and experience on predicting senior secondary school students' academic performance in West Coast Region, The Gambia

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Abstract

This study investigated how science teachers' gender, qualification, and experience influence students' academic performance in The Gambia's senior secondary schools. The research involved 121 science teachers from 29 public schools in the West Coast Region, using a descriptive ex post facto design.

The study revealed that teacher qualifications, teaching experience, and gender all significantly predicted students' academic performance. Qualifications (β = .548), experience (β = .656), and gender (β = .079) were all positive and statistically significant predictors. The analysis revealed a strong correlation (R = 0.852) between these variables, with approximately 71.8% of students' academic performance variance explained by the independent variables. Multiple regression analysis confirmed the significant influence of all three factors.

The recommendations of the study include promoting gender equality in teacher recruitment, motivating teachers, and encouraging unqualified teachers to pursue educational courses to enhance their teaching capabilities.

Keywords: Science teachers' gender, qualification, experience, students' academic performance

Introduction

The academic performance of senior secondary school students in the Gambia has generated considerable interest in the field of educational studies over the past years. The differences in academic performance among students are likely to contribute to irregularities in the allocation of rational roles in the world of work. Faleye (2011) buttresses this by defining academic performance as the outcome of education, that is, the extent to which a student, teacher, or institution has achieved their educational goal. Academic performance is commonly measured by examination body West African Examination Council (WAEC) in the Gambia or continuous assessment which the schools conduct but there is no general agreement on how it is best tested. Individual differences have been linked to differences in intelligence and personality. Students with higher mental ability as demonstrated by IQ test and those who are higher in diligence tend to achieve highly in academic setting. Dzenver (2015) argued that academic performance is a supreme goal of any student irrespective of their areas of specialization. This refers to the level of performance, accomplishment or success in school. He asserted that academic performance is the core of educational growth and the process of developing the capacities and potentials of the individual student to prepare him to be successful in a specific society or culture. It is important to remember that students' academic performance is a function of teacher characteristics such as teacher gender, qualification, and experience.

Faleye (2011) observed that teachers are the major indicator and determinant of quality education. While Gbore (2013) believed that one critical overriding factor for the success of students' academic performance is the teacher's gender. It was found out that teachers' gender has a significant effect on students' performance mean scores as male teachers were discovered to be more effective than their female teachers. Gender inequality in education has remained a perennial problem of global scope. Edun (2012) affirmed that gender bias could occur within subject areas and school activities. For example, in subjects such as Mathematics and sciences, there are different participation patterns for female teachers and male teachers, 'that male teachers' are naturally better at mathematics and science than females. John (2011) evidence suggested that male teachers tend to be more authoritative, whereas female teachers are more supportive and expressive. Also, John (2011) noted that male teachers are likely to select a more aggressive disciplinary approach towards boys. Teachers of either gender tended to ignore boys' disruptive behavior more than girls when the behavior was not aggressive. John (2011)

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indicated that students of the same gender as their teacher score better on reading and writing and were overall more likely to pass the final examination than students of the opposite gender than their teachers. This position indicated that students benefit from being instructed by teachers of similar gender. In addition, Mkpa (2007) asserted that the teacher's gender shapes communication between teacher and pupil, while the teacher acts as a gender-specific role model, regardless of what he or she says or does. In this regard, students are more engaged, behave more appropriately, and perform at a higher level when taught by one who shares their gender. Girls have better educational outcomes when taught by women and boys are better when taught by men (Faleye, 2011).

Literature has also proved that not only teacher gender influence student academic performance, but teacher qualification and experience were part of the predictors. Abe (2014) opined that a teaching qualification or teacher qualification is one of some academic and professional degrees that enables a person to become a registered teacher in school. Abe (2014) recommended that academically qualified teachers and those that are professionally qualified should be the one to be engaged in carrying out the instructional process in schools. Professionally-trained teachers, in this regard, will refer to those who have academic certification as a result of enrolment into educational institutions in the Gambia and obtained qualifications such as PTC, HTC BSc., B.Ed., M.A, amongst others.

Edun (2012) argued that no one gives what he/she does not possess. This is because irrespective of how good a course curriculum may be, the achievement of desired goals remains a mirage if there are no well-trained, qualified, and motivated teachers. This perception was hinged on the fact that a teacher has been exposed to a good measure of training in a teaching subject area and professional education that would enhance their professionalism, effectiveness and efficiency in handling the curriculum using a student-centered approach. Mkpa (2007) regarded a trained teacher as someone who underwent and completed his education in a formal teacher training institution or in a planned training programme. Among such training areas may include principles and practice of education and exposure to an observed internship period either after or as part of the training period. People who fall within this category should be able to fulfill the various functions expected of teachers within and outside the four walls of the classroom. Mkpa (2007) perceived a professional teacher as one who possesses professionally based knowledge in the theory and practice of education as well as find job satisfaction in the belief that he is making an important contribution to the social, cultural and economic development of his country. Such a teacher should equally, be able to understand students' abilities to exploit educational benefits of the social context within which he lives. He should be able to assist students in reaching their full intellectual and social potential. Aina (2015) listed the teachers' qualifications to include all the skills a teacher requires to teach effectively. Such skills include formal education, experience, subject matter knowledge, pedagogy studies, duration of training, certificate/licensing and professional development.

Edun (2012) asserted that teachers' qualifications are more than just holding a certificate of any institution as it consists of seven indicators namely:

i. Teachers' formal education
ii. Teachers' education in the subject matter of teaching (in-field preparation)
iii. Teacher education in methodology studies
iv. Duration of the preparation
v. Certification and status
vi. year of service

Without properly upgrading themselves for years, this category of teachers may not be able to cope with the new trends in education because of recurring changes in subjects curricular almost every year as the world is changing with technology. Adeyemi (2008) arguments centered on the fact that teacher experience would improve teaching skills as pupils tend to learn better in the hands of teachers who have taught them continuously over a period of years. This position was contingent on the observation that experienced teachers' perception of their teaching objectives was significantly more subject-oriented than the first-year teachers. Hence, effective teaching as a prime predictor of student's academic performance would be measured by the level of a teacher's subject

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matter mastery since teachers' theories about teaching are being guided by their previous experience as learners and as teachers.

Senior Secondary school students' academic performance nowadays, is worrisome and a concern to all stakeholders in the education sector. Many arguments have been provided on the related factors that may have triggered this low level of performance. Some believed that students' study habits, lack of parental care, un-conducive teaching environment, and insufficient instructional aids among others, are causal factors of poor students' academic performance. However, a common observation of the secondary school system in The Gambia shows many young teachers with limited years of teaching experience. Many of these teachers were perceived to lack the much-needed experience that could bring about effective teaching and learning in schools in terms of teaching approach. Hence teaching tends to be done in the abstract while learning is perhaps by habit memory. The extent to which the teachers' qualifications, experience, and gender differentials could influence students' academic performance therefore calls for questioning. Therefore, this study is an attempt to unstitch the influence of teachers' gender, qualification and experience as predicting factors of senior secondary school students' academic performance in the West Coast Region of The Gambia.

This study covered all the senior secondary schools in the West Coast Region of The Gambia. Teachers' gender examined the quality of either being a male or a female while teacher qualification attempted to differentiate between holders of Bachelor degrees in Education, Postgraduate diploma certificate in Education, Higher Teachers Certificate (HTC) and Primary Teachers Certificate (PTC) holders, who are teaching in the senior secondary schools. Teachers' experience examined the total number of years spent as science subject teachers across schools in The Gambia. Lastly, students' academic performance in West Coast Region of The Gambia was analyzed by their performance in science subject namely: Biology, Chemistry and Physics in the West Africa Senior Secondary School Certificate Examinations (WASSCE) during the 2022 academic session.

The findings of this study provided useful data to the Ministry of Basic and Secondary Education (MoBSE), Regional Educational Directorate Region two (RED2)., the School of Education University of the Gambia, the Gambia College, teachers teaching science subjects and finally the senior secondary school students in West Coast Region.

The study would help the Ministry of Basic and Secondary Education in the identification of relevant parameters for the appointment of new teachers into all the secondary schools under its jurisdiction. The items generated will assist in determining the training needs of old science teachers in the employment of the Ministry of Basic and Secondary Education, West Coast Region of The Gambia. The Regional Educational Directorate Region two (RED2) would also find the data generated in this study invaluable in the recruitment of new teachers and also in posting them according to their specialized field of studies.

The School of Education, the University of the Gambia and the Gambia College would benefit maximally from this study by identifying relevant variables that would assist in re-designing the curricular for teacher-trainees at different levels for optimum job performance. This would assist culminate into improved students' academic performance in the science subject. The study would help the teachers teaching science subjects to improve in their methodology and finally it will help the students in performing and improving in the science subjects.

Research Questions

1. 1.What is the gender status, academic qualifications and teaching experience of teachers teaching science subjects in West Coast Region Senior Secondary Schools?
2. What is the relative influence of teacher gender, academic qualifications and teaching experience on secondary school students' academic performance in West Coast Region, The Gambia?

Hypothesis

Ho1: There is no significant composite

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contribution of teacher gender, academic qualifications and teaching experience on secondary school students' academic performance in West Coast Region, The Gambia.

Methodology

The study adopted the descriptive design of the *ex post facto* type. This design helped in revealing the facts of the research data without any embellishment. The choice of the *expost-facto* research was appropriate because it sought to gather data regarding the gender status, qualification and work experience of the teachers without any alteration of the data.

The population of the study consists of 1573 senior secondary school teachers from 29 public senior secondary schools in West Coast Region of The Gambia. This population consists of 979 males and 594 females. Regional educational directorate region two west coast region. Red2 (2022).

The sample size for this study was estimated at approximately 87 science teachers teaching science in West Coast Region the Gambia. The total enumeration sampling technique was used to select all the teachers teaching Biology, Chemistry and Physics at Grade 12 in all the senior secondary schools in West Coast Region.

Two researcher self-designed instruments titled Teacher Gender, Qualification and Experience Questionnaire (TGQEQ) and Students Academic Performance in Science Subjects Record (SAPSSR) were used to gather relevant data for this study. The TGQEQ contains 6 items on the demographic data of the respondents while SAPSSP was designed to gather data on the academic performance of the science students taught during the period under study.

The content validity of the instruments (TGQEQ and SAPSSR) was ensured through a thorough scrutiny by some experts in Educational Administration and Management. All corrections and suggestions made were aptly affected in order to ensure the content validity of the instruments.

A test re-test study was carried out. The instruments (TGQEQ and SAPSSR) were administered twice within two weeks' interval on 5 senior secondary school teachers teaching Agricultural science in West coast region of The Gambia. The Students' Academic Performance in Science Subjects Record (SAPSSR) was modified for this purpose. This pilot test was repeated within two weeks' interval on the same group of respondents. The responses from the two tests were analyzed using Pearson Product Moment Reliability Test. The reliability coefficient obtained from TGQEQ and SAPSSR ($r = 0.96$ and $r = 0.94$ respectively) indicated that the instruments were highly reliable for gathering relevant data for this study.

The respondents (teachers and the principals) were briefed on the purpose of the study, and clarification made on its importance. Data collection was done by the researcher in company of 3 trained research assistants. While in the schools, a total of 84 copies of the questionnaire (TGQEQ) were administered to the teachers teaching Biology, Chemistry and Physics subjects at Grade 12 in all the 29 senior secondary schools in West coast region of The Gambia. All the Principals of the selected schools were given the other instrument (SAPSSR) for the purpose of collecting the students' academic performance results in the science subjects as indicated. While the TGQEQ was collected instantly, the principal was given a week to provide the data required because a few found it difficult to respond to the instrument immediately due to the schedule of their duty. A total of 120 copies of questionnaires were administered and only 109 copies were retrieved. Retrieval rate was 90.8% while mortality rate was 9.2%. For records purpose, retrieval rate was used for data analyses

Research question 1 was answered using percentages and bar-charts while Research question 2 was answered using regression analyses. The lone hypothesis was tested using multiple regression analysis.

Research Question 1: What is the gender status, academic qualifications and teaching experience of teachers teaching science subjects in West Coast Region Senior Secondary Schools?

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Table 1: Gender status of teachers teaching science subjects in West Coast Region Senior Secondary Schools

Biology		Chemistry		Physics	
Male	Female	Male	Female	Male	Female
26(23.85%)	19(17.43%)	23(21.10%)	15(13.76%)	5(4.5%)	21(19.27%)
45 teachers		38 teachers		26 teachers	

Source: Field Survey, 2023

Table 1 presents the gender status of teachers teaching science subjects. From the table, it was depicted that 45 teachers comprising 26 males and 19 females were teaching Biology. Likewise, 38 teachers comprising 23 male and 15 females were teaching chemistry and 26 teachers comprising 5 male and 21 female teaching Physics.

Table 2: Academic qualification of teachers of science subject in West Coast Region Senior Secondary Schools

M.Ed./ MA, M.Sc.	B. Ed, BA(Ed)	B.Sc.	HTC	HTCP
13(11.93%)	47(43.12)	8(7.339%)	22(20.18%)	19(17.43%)
Male 9(69.23%) Female 4(30.76%)	Male 22(46.81%) Female 25(53.19%)	Male 5(62.5%) Female 3(37.5%)	Male 11(50%) Female 11(50%)	Male 7(36.84%) Female 12(63.16%)

Source: Field Survey, 2023

Table 2 reveals that 13 respondents comprising 9 male and 4 female were M.Ed./ MA, M.Sc. holders, 47 respondents comprising 22 male and 25 female were B. Ed, BA(Ed), 8 respondents comprising 5 male and 3 female were B.Sc. holders, 22 respondents comprising 11 males as well as 11 females were with HTC and 19 respondents comprising 7 male and 12 female were HTCP holders. This further implied that larger percentage numbers of the teachers possessed teaching qualifications

Table 3: Range of teaching experience of teachers handling science subjects in West coast Region Senior Secondary Schools

Below 1 year	1 – 5 years	6 – 9 years	10 – 15 years	16 years and above
7(6.422%)	11(10.09%)	21(19.27%)	45(41.28%)	25(22.94%)
Male 2(28.57%) Female 5(71.42%)	Male 7(63.63%) Female 4(36.36%)	Male 10(47.62%) Female 11(52.38%)	Male 24(53.33%) Female 21(46.67%)	Male 11(44%) Female 14(56%)

Source: Field Survey, 2023

Table 3 presents the range of teaching experience of teachers handling science subjects in West Coast Region Senior Secondary Schools. From the Table, it was revealed that 7 respondents comprising 2 male and 5 female fell within below 1 year, 11 respondents comprising 7 male and 4 female fell within 1-5 years, 21 respondents comprising 10 male and 11 female fell within 6-9 years, 45 respondents comprising 24 male and 21 female fell within 10-15 years and 25 respondents comprising 11 male and 14 female fell within 16 years and above. The highest years were 15 years and the smallest year was also 1 year. The range of teaching experience of teachers handling science subjects in West Coast Region Senior Secondary Schools was 14 years.

Research Question 2:

What is the relative influence of teachers' gender, qualification, and experience on students' academic performance in the West Coast Region?

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Table 4: Relative influence of teachers' gender, qualification and experience on students' academic performance in West Coast Region

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	20.944	3.578		5.854	.000
	Gender	.124	.070	.079	1.788	.000
	Qualification	.489	.112	.548	4.353	.000
	Experience	.556	.123	.656	4.522	.000

a. Dependent Variable: Students; academic performance

Table 4 showed that the sign of the coefficient of qualification, experience, and gender were positive which implied that an increase or improvement in any of these would increase the students' academic performance of the sampled schools. Out of the three variables examined, all were found to be significant predictors of students' academic performance, with their p-values less than 0.05. Qualification ($\beta = .548$, $t = 4.353$, $p < .05$), Experience ($\beta = .656$, $t = 4.522$, $p < .05$), and Gender ($\beta = .079$, $t = 1.788$, $p < .05$) were all positive and statistically significant. This implies that teacher qualification, experience, and gender each contributed to students' academic performance in the sampled schools.

Hypothesis Testing

Ho1: There is no significant composite contribution of teachers' gender, qualification, and experience on students' academic performance in the West coast region.

Table 5: Nature of students' academic performance in Biology in West Coast Region Senior Secondary Schools

Academic Years	No of students	Grades								
		A1	B2	B3	C4	C5	C6	D7	E8	F9
2020/2021	115	5	22	14	20	18	18	4	4	10
2021/2022	124	0	13	13	17	14	24	13	12	18
Percentage number of students passed in 2020/2021	97(84.35%)									
Percentage number of students passed in 2021/2022	81(65.32%)									

Source: Field Survey, 2023

The above table presents the nature of students' academic performance in Biology in West Coast Region Senior Secondary Schools for the academic session 2020/2021 and 2021.2022. From the analyses so far, it was indicated that 97 students representing 84.35% of the total number of students that sat for the exam passed Biology at grades level A1, B2, B3, C4, C5 and C6 respectively. Only 15.65% failed Biology during same period. For the academic session 2021/2022, 65.32% passed and 34.68% failed. This showed 19.03% decline in the numbers of students that passed Biology in 2020/2021 academic session from that of 2021/2022.

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Table 6: Nature of students' academic performance in Chemistry in West Coast Region Senior Secondary Schools

Academic Years	No of students	Grades								
		A1	B2	B3	C4	C5	C6	D7	E8	F9
2020/2021	111	1	9	13	12	15	34	6	5	16
2021/2022	130	6	4	12	17	19	19	14	19	20
Percentage number of students passed in 2020/2021	84(75.68%)									
Percentage number of students passed in 2021/2022	77(59.23%)									

Source: Field Survey, 2023

Table 6 presented the nature of students' academic performance in Chemistry in West Coast Region Senior Secondary Schools for the academic session 2020/2021 and 2021.2022. It was revealed that 75.68% of the total number of students that sat for the exam passed chemistry at grades level A1, B2, B3, C4, C5 and C6 respectively. Only 24.32% failed Chemistry during same period. For the academic session 2021/2022, 59.23% passed and 40.77% failed. This revealed 16.45% decline in the numbers of students that passed Chemistry in 2020/2021 academic session from that of 2021/2022.

Table 7: Nature of students' academic performance in Physics in West Coast Region Senior Secondary Schools

Academic Years	No of students	Grades								
		A1	B2	B3	C4	C5	C6	D7	E8	F9
2020/2021	113	5	6	14	9	19	20	10	8	22
2021/2022	118	4	8	8	12	13	15	15	20	23
Percentage number of students passed in 2020/2021	73(64.60%)									
Percentage number of students passed in 2021/2022	60(50.85%)									

Source: Field Survey, 2023

Table 7 presented the nature of students' academic performance in Physics in West Coast Region Senior Secondary Schools for the academic session 2020/2021 and 2021.2022. It was indicated that 64.60% of the total number of students that sat for the exam passed Physics at grades level A1, B2, B3, C4, C5 and C6 respectively. Only 35.40% failed Physics during same period. For the academic session 2021/2022, 50.85% passed and 49.15% failed. This indicated 13.75% decline in the numbers of students that passed Physics in 2020/2021 academic session from that of 2021/2022.

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Table 8: Composite contribution of teachers' gender, qualification and experience on students' academic performance in West Coast Region

R = .852 R^2= .726 Adj R^2= .718 Std. Error = 3.285					
ANOVA					
Source of Variation	SS	df	MS	F-ratio	P
Regression	3000.961	3	1000.320	92.710	0.000
Residual	1132.929	105	10.790		
Total	4133.890	108			

Source: Field Survey, 2023

Table 8 indicates that there was significant composite contribution of teachers' gender, qualification, and experience on students' academic performance; R = 0.852, P< .05. The table further reveals {71.8% (Adj. R^2 = 0.718)} that about 71% of the variance in students' academic performance was accounted for by the linear combination of the independent variables. The ANOVA results from the regression analysis showed that there was significant of the independent variables on the dependent variables; F (3, 105) = 92.71, P <.001.**Discussion**

The findings of this study provide critical insights into the gender, academic qualifications, and teaching experience of science teachers in Senior Secondary Schools in the West Coast Region of The Gambia. The analysis sheds light on how these teacher characteristics influenced students' academic performance and highlights areas of strength and opportunities for improvement in the educational system.

The study found a notable gender imbalance, with male teachers dominating the teaching of science subjects in the region. This observation mirrors global trends in STEM education, where women are underrepresented both as students and educators. While male teachers may bring valuable expertise, the limited presence of female science teachers might inadvertently perpetuate the stereotype that science is a male dominated field. This imbalance can discourage female students from pursuing science related careers, as they lack role models of the same gender in these fields. Further analysis suggests that female teachers, when present, can play a significant role in inspiring and mentoring female students. Evidence from other regions has shown that having female science teachers positively influences girls' attitudes toward science, boosts their confidence, and improves their academic performance. Addressing this gender gap by recruiting more female science teachers could create a more inclusive and motivational learning environment for all students. The study revealed that a significant proportion of teachers held relevant qualifications, such as bachelor's degrees in education with a specialization in science, or degrees specialized certifications, demonstrated a greater ability to deliver complex scientific concepts effectively. This finding aligns with research by Abedayo (2012), which established a positive relationship between teacher qualifications and student academic performance. Qualified teachers are better equipped to employ diverse teaching methods, design engaging learning activities, and assess students' understanding accurately. These abilities contribute to creating a stimulating learning environment that fosters higher academic achievement among students. The findings also revealed gaps in teacher qualifications in some schools, particularly in rural or underserved areas, where unqualified or

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underqualified teachers are often employed. Such disparities can create uneven educational opportunities for students, limiting their ability to compete academically. To address these challenges, targeted efforts are needed to upgrade the qualifications of teachers in these areas through professional development programs, scholarships, and access to higher education opportunities.

The study demonstrated that teaching experience significantly influenced students' academic performance. Teachers with extensive teaching experience were better at delivering science content effectively, managing diverse classroom dynamics, and addressing individual student needs. Experienced teachers were also more adept at using innovative teaching techniques, integrating practical activities, and linking theoretical concepts to real world applications, which enhanced students' understanding and interest in science. Newer teachers, while enthusiastic, often lack the classroom management skills and nuanced instructional strategies that come with years of experience.

The study also highlighted that schools with a higher concentration of inexperienced teachers tended to face greater challenges in achieving high student performance, particularly in complex subjects like Biology, Chemistry, and Physics. Establishing mentorship programs where experienced teachers guide novice educators can help bridge this gap, ensuring that students benefit from effective teaching regardless of their teacher's years of service.

Conclusion

This study examined the influence of teachers' gender, qualifications, and experience in predicting secondary school students' academic performance in The Gambia. The findings established that all three variables significantly contributed to students' academic performance, with qualifications and experience exerting the strongest effects, while gender also had a meaningful though smaller impact. Together, these teacher characteristics explained about 71% of the variance in students' academic outcomes, underscoring the central role of teacher quality in shaping educational achievement. The study concludes that improving teacher qualifications through professional development, valuing teaching experience, and addressing gender imbalances in science teaching are essential strategies for enhancing student achievement in The Gambia's senior secondary schools.

Recommendations

The following recommendations are provided for this study:

a. The government should put gender equality in consideration while recruiting teachers.
b. The government should be concerned with how best to motivate teachers to perform effectively.
c. Teachers without teaching qualifications should be encouraged to go for courses in education in order to acquire adequate methods of passing instruction to students.
d. The government should give immediate recognition to teaching as a profession. This would raise the quality of people coming into the profession.
e. Appointment of professional teachers into government positions must be encouraged. Some specific posts should be restricted to practicing teachers; for instance, the commissioner for education of any state should be for a practicing classroom teacher.
f. The government should encourage experienced teachers to stay on the job by providing them with more incentives and fringe benefits. The promotion prospects of the teachers should also be improved.
g. The State Ministry of Education intensifies efforts in the inspection and monitoring of schools to ensure that teachers stay in school and perform the job

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