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Professional Development Strategies and Teacher Productivity in Public Senior Secondary Schools in Rivers State, Nigeria

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ABSTRACT

This study examined the relationship between teacher collaborative learning and technology-mediated learning, as components of continuous professional development, and teacher productivity in public senior secondary schools in Rivers State, Nigeria. The correlational research design was adopted. From a population of 8,526 principals, vice-principals, and teachers across 365 schools, 396 respondents were selected through multistage sampling, and 389 properly completed questionnaires were analyzed. Data were collected using the *Continuous Professional Development Programmes Questionnaire* (CPDPQ) and the *Teacher Productivity Questionnaire* (TPQ), both validated by experts. Cronbach's alpha coefficients were .85 for the teacher collaborative learning subscale and .74 for the technology-mediated learning subscale of the CPDPQ, and .87 for the TPQ. Research questions were addressed using simple linear regression, while hypotheses were tested at the .05 alpha level with the regression coefficient t-test. Findings revealed that teacher collaborative learning had a moderate, positive relationship with teacher productivity ($R = .477$; $R^2 = .227$; $p < .001$). Also, technology-mediated learning also showed a moderate, positive relationship ($R = .331$; $R^2 = .109$; $p < .001$). The study concluded that both components were significantly associated with teacher productivity, with collaborative learning demonstrating the stronger effect. The study recommended that principals establish regular structures for collaborative professional learning. It also recommends that the Rivers State Ministry of Education enhance teachers' access to digital tools, internet facilities, and relevant training support.

Keywords: Teacher collaborative learning, technology-mediated learning, continuous professional development, teacher productivity, secondary schools.

INTRODUCTION

Teachers are at the centre of the process through which education produces knowledgeable, skilled and responsible citizens. Societies invest in education with the expectation that schools will develop human capacity for personal advancement and national development, and this expectation places considerable responsibility on the teachers who deliver instruction. In Rivers State, secondary education is pivotal to this mandate: social returns to schooling in Nigeria are highest at the secondary level (Oyelere, 2011), and secondary education has been found to contribute significantly to state-level economic development (Kofar-Mata & Hamza, 2025; Igbozuruike & Agabi, 2019). The extent to which secondary education can sustainably fulfil this developmental role depends substantially on teachers' capacity to translate educational goals into effective classroom practice through curriculum interpretation, lesson planning and delivery, learner assessment and guidance towards the attainment of school objectives.

Within the Nigerian educational system, secondary education serves as the bridge between primary and tertiary education. The Federal Republic of Nigeria (2014) defined it as the education that

learners receive after primary education and before the tertiary stage. Students at this level are introduced to more specialised subject content and are prepared for further study, the world of work and responsible citizenship. Given that teachers convert curriculum content into lessons, activities and assessment tasks, the extent to which secondary schools realise these purposes depends largely on how productively teachers carry out their work.

Teacher productivity can be defined as the extent to which teachers effectively discharge their professional responsibilities and contribute to the attainment of established school goals (Igbozuruike et al., 2017). These responsibilities include preparing lessons, delivering instruction, managing classrooms, assessing learners, using instructional materials, keeping records, being punctual and committing to assigned duties. Igbozuruike et al. (2017) argued that teacher productivity is essential to the provision of quality secondary education. An initial teaching qualification does not, on its own, sustain such productivity throughout a teaching career, because curriculum expectations, learner characteristics, instructional methods and educational technologies change over time. Teachers consequently require continuing opportunities to update their knowledge, exchange ideas with colleagues and strengthen their professional competence.

Continuous Professional Development (CPD) provides organised opportunities through which teachers can strengthen professional knowledge and competence while remaining in service. The study focused on teacher collaborative learning and technology-mediated learning because. because both extend professional development beyond isolated formal training and create continuing opportunities for teachers to learn through professional interaction and digitally supported resources. Teacher collaborative learning refers to organised professional interaction through which teachers learn with and from one another by sharing expertise, examining instructional problems and developing contextually relevant responses to classroom challenges. Such learning may occur through professional learning communities, departmental meetings, joint lesson planning, peer observation and other structured collegial activities. Khasawneh et al. (2023) examined teacher collaboration within professional learning communities and reported that collaborative practices were meaningfully associated with professional growth, instructional quality and perceived student outcomes. These findings suggest that collaboration is more than routine collegial contact; it represents purposeful professional engagement through which teachers can examine classroom practice collectively and draw on distributed expertise.

The professional value of collaborative learning lies in its proximity to teachers' daily work. Teachers who discuss lesson difficulties, analyse learners' errors, plan instruction jointly and share assessment approaches can develop common understandings of instructional expectations within the school. This school-based orientation may make collaborative learning particularly relevant in settings where external professional development opportunities are irregular. Abakah et al. (2022), for example, found that formal CPD provision for basic school teachers in the Central Region of Ghana was irregular, largely transmissive and weakly aligned with teachers' identified needs. At the same time, collaborative activity does not automatically constitute effective professional learning. Its value depends on whether interaction is purposeful, focused on teaching and learning, and supported by sufficient time and professional trust. The relationship between teacher collaborative learning and teacher productivity thus requires empirical examination rather than assumption.

Technology-mediated learning constitutes another dimension of contemporary professional development. It refers to the use of digital technologies to support teachers' professional learning, access to instructional resources, communication, collaboration and pedagogical development. Jena and Pandey (2024) described technology-integrated professional development as a means of strengthening teachers' digital literacy, instructional efficiency and professional adaptability. This implies that professional development that incorporates relevant technologies can improve teachers' capacity to use digital resources effectively in lesson preparation, classroom instruction and other professional tasks. Amalu and Oyo-Ita (2023) observed that information and communication technology was significantly associated with teachers' job performance in public secondary schools. Teachers' ability to use ICT has practical relevance to how effectively they perform their instructional and administrative responsibilities. Iwuoha et al. (2024) similarly reported a significant relationship between information technology skills and teacher productivity in public senior secondary schools. This evidence suggests that differences in teachers' technological skills are related with differences in

their level of productivity, and that digital tools can support meaningful instructional and professional activities.

The professional value of technology-mediated learning nevertheless depends on more than access to devices. Teachers require sufficient digital competence and opportunities to connect technological resources with lesson preparation, instructional delivery, assessment and professional collaboration. Jena and Pandey (2024) reported that technology-supported professional development could widen access to continuing learning and online professional communities, but they also identified unequal access to technological resources, differences in digital competence and the need for sustained institutional support. Oyungei (2021) similarly reported that secondary school teachers regarded existing ICT-related professional development as inadequate, fragmented and focused on basic technical skills rather than pedagogical integration, while Morris and Pryor (2024) found that the number of hours of educational technology professional development was negatively related to teachers' perceived ability to design collaborative student use of technology and concluded that the quality of such training matters more than its quantity. Thus, technology-mediated learning may expand professional access while remaining uneven in practice where teachers lack adequate infrastructure, confidence or technical support.

In public senior secondary schools in Rivers State, teacher collaborative learning and technology-mediated learning represent components of continuous professional development with potential relevance to teacher productivity. Collaborative learning can provide school-based opportunities for professional exchange, while technology-mediated learning can broaden access to information and digitally supported learning. However, the extent to which each component is associated with teacher productivity within the State's public senior secondary school system remained unclear. It was against this background that the study examined the relationships of teacher collaborative learning and technology-mediated learning with teacher productivity in public senior secondary schools in Rivers State.

Statement of the Problem

Teachers are expected to remain professionally productive if public senior secondary schools are to achieve their instructional objectives. Continuous professional development provides one means through which teachers can maintain and strengthen the knowledge and competencies required for this responsibility. Teacher collaborative learning and technology-mediated learning are particularly relevant because the former places professional learning within collegial school practice, while the latter extends learning through digital resources and platforms. Existing studies have associated teacher collaboration with professional growth and instructional quality and have also linked information and communication technology with teachers' job performance (Amalu & Oyo-Ita, 2023; Khasawneh et al., 2023). However, these findings do not establish the extent to which the two CPD components relate to teacher productivity in public senior secondary schools in Rivers State. Within the State, collaborative learning opportunities may differ among schools, and teachers do not necessarily have the same access to digital tools, internet facilities or technology-supported professional learning. These variations create uncertainty concerning the relationships of teacher collaborative learning and technology-mediated learning with teacher productivity. Accordingly, the study examined the extent to which each component relates to teacher productivity in public senior secondary schools in Rivers State.

Aim and Objectives

The aim of the study was to investigate the relationships of teacher collaborative learning and technology-mediated learning with teacher productivity in public senior secondary schools in Rivers State. Specifically, the study sought to:

1. determine the extent to which teacher collaborative learning relates to teacher productivity in public senior secondary schools in Rivers State;
2. determine the extent to which technology-mediated learning relates to teacher productivity in public senior secondary schools in Rivers State.

Research Questions

The following research questions were answered in the study:

1. To what extent does teacher collaborative learning relate to teacher productivity in public senior secondary schools in Rivers State?

2. To what extent does technology-mediated learning relate to teacher productivity in public senior secondary schools in Rivers State?

Hypotheses

The following null hypotheses were tested at the .05 alpha level:

1. There is no significant relationship between teacher collaborative learning and teacher productivity in public senior secondary schools in Rivers State.
2. There is no significant relationship between technology-mediated learning and teacher productivity in public senior secondary schools in Rivers State.

METHODOLOGY

A correlational research design was employed because the study sought to determine the strength of the relationships among variables without manipulating them. The study population was made up of 8,526 staff of the 365 public senior secondary schools in Rivers State, namely 365 principals, 730 vice-principals (365 each in charge of academics and administration) and 7,431 teachers (Rivers State Ministry of Education, 2026). Respondents were selected through multistage sampling technique. First, 11 of the 23 Local Government Areas in the State were randomly selected. Second, six public senior secondary schools were drawn from each selected Local Government Area by simple random sampling, which yielded 66 schools. Third, the principal and the two vice-principals of each school were included purposively, while three teachers per school were chosen by simple random sampling. This procedure produced a sample of 396 respondents.

Data were collected using the Continuous Professional Development Programmes Questionnaire (CPDPQ), which comprised 20 items-10 each on collaborative and technology-mediated learning, and the 15-item Teacher Productivity Questionnaire (TPQ). Responses were recorded on a modified four-point scale ranging from Very High Extent (4) through High Extent (3) and Low Extent (2) to Very Low Extent (1). Three experts in the Faculty of Education, University of Port Harcourt, including a specialist in Measurement and Evaluation, reviewed the items for face and content validity. A pilot test with 30 respondents from public senior secondary schools that were not part of the sample provided data for estimating internal consistency with Cronbach's alpha in SPSS version 27. The coefficients were .85 for teacher collaborative learning and .74 for technology-mediated learning and .87 for the TPQ.

After obtaining permission from the principals of the sampled schools, the researchers, assisted by two trained research aides, administered the questionnaires in person. The researchers and assistants explained the purpose of the study and assured respondents of anonymity and confidentiality. Completed copies were collected immediately, with 389 of the 396 distributed properly filled and analyzed. Composite scores were computed for each variable, and data analysis was conducted using SPSS version 27. Research questions were addressed through simple linear regression, while the null hypotheses were tested at the .05 alpha level using the regression coefficient t-test. The strength of each relationship was interpreted according to the decision rule provided beneath the result tables.

RESULTS

Research Question One: *To what extent does teacher collaborative learning relate to teacher productivity in public senior secondary schools in Rivers State?*

Table 1: Simple Linear Regression Model Summary for Teacher Collaborative Learning and Teacher Productivity

Model	R	R Square	Adjusted R Square	Variance Explained	Decision
1	.477[a]	.227	.225	22.7%	Moderate

a. Predictors: (Constant), teacher collaborative learning

Decision rule: .00 to .249 = low relationship, .25 to .499 = moderate relationship, .50 to .749 = high relationship, and .75 to 1.00 = very high relationship

The extent to which teacher collaborative learning relates to teacher productivity in public senior secondary schools in Rivers State is presented in Table 1. The R value of .477 indicates a positive

moderate relationship. The coefficient of determination (R^2 = .227) indicated that 22.7% of the variance in teacher productivity was associated with teacher collaborative learning within the fitted regression model.

Research Question Two: *To what extent does technology-mediated learning relate to teacher productivity in public senior secondary schools in Rivers State?*

Table 2: Simple Linear Regression Model Summary for Technology-mediated Learning and Teacher Productivity

Model	R	R Square	Adjusted R Square	Variance Explained	Decision
1	.331[a]	.109	.107	10.9%	Moderate

a. Predictors: (Constant), technology-mediated learning

Decision rule: .00 to .249 = low relationship, .25 to .499 = moderate relationship, .50 to .749 = high relationship, and .75 to 1.00 = very high relationship

The extent to which technology-mediated learning relates to teacher productivity in public senior secondary schools in Rivers State is presented in Table 2. The R value of .331 indicates a positive moderate relationship. The coefficient of determination (R^2 = .109) indicated that 10.9% of the variance in teacher productivity was associated with technology-mediated learning within the fitted regression model.

Test of Hypotheses

Hypothesis One

H_{01}: There is no significant relationship between teacher collaborative learning and teacher productivity in public senior secondary schools in Rivers State.

Table 3: Regression Coefficients for the Relationship Between Teacher Collaborative Learning and Teacher Productivity

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.657	.115		14.355	.000
	Teacher Collaborative Learning	.437	.041	.477	10.671	.000

a. Dependent Variable: Teacher productivity

The regression coefficient test for the relationship between teacher collaborative learning and teacher productivity is presented in Table 3. The analysis yielded a t-value of 10.671 with $p < .001$. Since the probability value was less than the .05 alpha level, the null hypothesis was rejected. There was therefore a statistically significant positive relationship between teacher collaborative learning and teacher productivity in public senior secondary schools in Rivers State.

Hypothesis Two

H_{02}: There is no significant relationship between technology-mediated learning and teacher productivity in public senior secondary schools in Rivers State.

Table 4: Regression Coefficients for the Relationship Between Technology-mediated Learning and Teacher Productivity

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.932	.136		14.153	.000
	Technology-mediated learning	.336	.049	.331	6.891	.000

a. Dependent Variable: Teacher productivity

The regression coefficient test for the relationship between technology-mediated learning and teacher productivity is presented in Table 4. The analysis yielded a t-value of 6.891 with $p < .001$. Since the probability value was less than the .05 alpha level, the null hypothesis was rejected. There was

therefore a statistically significant positive relationship between technology-mediated learning and teacher productivity in public senior secondary schools in Rivers State.

DISCUSSION

As the results in Tables 1 and 3 indicate, teacher collaborative learning was positively and moderately related to teacher productivity in the sampled schools (R = .477). The coefficient of determination showed that 22.7% of the variance in teacher productivity was associated with teacher collaborative learning within the fitted model, while the hypothesis test confirmed that the relationship was statistically significant ($t = 10.671$; $p < .001$). This finding indicates that collaborative professional learning was meaningfully associated with teacher productivity. The result is broadly consistent with Khasawneh et al. (2023), who reported that teacher collaboration within professional learning communities was associated with professional growth, instructional quality and perceived student outcomes. Hart and Nwuke (2025) also found significant moderate positive relationships between structured professional development activities and instructional delivery in public senior secondary schools in Rivers State, and Kiptoo et al. (2025) identified teamwork, expressed through collaborative planning and shared decision-making, among the drivers of teacher productivity in public secondary schools in Kenya.

The observed relationship may be understood in terms of the proximity of collaborative learning to teachers' everyday professional work. Joint lesson planning, peer discussion, professional learning communities and shared examination of instructional problems provide opportunities for teachers to exchange practical knowledge within the school environment. These processes may help teachers develop more consistent approaches to lesson preparation, classroom practice and assessment without depending entirely on externally organised professional development. However, the moderate rather than very high relationship also indicates that collaborative learning is only one of several factors associated with productivity. Its professional value may depend on whether collaboration is structured around teaching and learning rather than routine administrative interaction. The implication for school practice is that regular, purposeful opportunities for teachers to examine instructional problems collectively and share professionally relevant knowledge are relevant to teacher productivity.

The results in Tables 2 and 4 indicate that technology-mediated learning was also positively and moderately related to teacher productivity in the sampled schools (R = .331). The coefficient of determination showed that 10.9% of the variance in teacher productivity was associated with technology-mediated learning within the fitted model, while the hypothesis test confirmed that the relationship was statistically significant ($t = 6.891$; $p < .001$). This finding indicates that technology-mediated professional learning was significantly associated with teacher productivity, although a substantial proportion of the variance in productivity was associated with other factors. The finding is consistent with Amalu and Oyo-Ita (2023), who found that information and communication technology was significantly associated with teachers' job performance in public secondary schools, and with Iwuoha et al. (2024), who reported a significant relationship between information technology skills and teacher productivity in public senior secondary schools in Rivers State.

The finding is also consistent with Jena and Pandey (2024), who reported that technology-supported professional development could strengthen digital literacy, instructional efficiency, online collaboration and access to continuing learning. Morris and Pryor (2024) and Oyungei (2021) point in the same direction, since both studies linked the value of technology-focused professional development to its quality and pedagogical relevance rather than to the amount of training provided.

The observed moderate relationship does not mean that technology-mediated learning alone explains teacher productivity but rather that it is one professionally relevant correlate among others. Digital professional learning may be more useful when teachers have access to appropriate tools, adequate connectivity, relevant learning resources and sufficient competence to relate technology to actual instructional tasks. The implication for public senior secondary schools is that technology-mediated learning is likely to be more useful when it is embedded within teachers' professional practice than when it is treated merely as exposure to digital devices. School and system-level support can accordingly focus on access, practical training and the use of digital resources for lesson preparation, instructional delivery, assessment and professional collaboration.

CONCLUSION

The study examined the relationships of teacher collaborative learning and technology-mediated learning with teacher productivity in public senior secondary schools in Rivers State. Teacher collaborative learning had a positive moderate and statistically significant relationship with teacher productivity, while technology-mediated learning also had a positive moderate and statistically significant relationship with teacher productivity. The findings establish that both dimensions of continuous professional development were related with teacher productivity within the study population.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations were made:

1. School principals should establish regular teacher collaborative learning activities such as subject-based meetings, peer lesson planning and peer mentoring to provide structured opportunities for teachers to exchange instructional ideas and address shared professional challenges.
2. The Rivers State Ministry of Education should improve access to basic digital tools, internet facilities and relevant training support to strengthen teachers' participation in technology-mediated professional learning and their use of digital resources for professional and instructional tasks.

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