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Effect of Assessment Methods on Academic Performance of Students in Certification Programmes at Rivers State University

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Abstract
The success of certification programmes is strongly influenced by the evaluation methods used. Different evaluation techniques can vary and affect the overall success of these programmes. The study investigated the effect of the assessment method on the academic performance of students in a certificate programme at Rivers State University. The study was conducted at Rivers State University, Port Harcourt. This study adopted a quasi-experimental research design. The population of the study consists of 1,200 students enrolled in the certificate programmes (Weekend Programmeme) at Rivers State University. The study sample consisted of 300 students, and stratified random sampling was used to ensure representation across different certificate programmes, genders, and academic levels. Students were divided into different groups according to the assessment method used (group A: digital/online assessment, group B: project assessment, and group C: final exam assessment). The data collection instrument used in this study was the "Student Assessment Performance Test (SAPT). The SAPT contains 30 items that were designed based on a 30-item multiple-choice test. A consistency reliability coefficient of 0.73 was tested using Kuder-Richardson reliability. The device was validated by measurement and evaluation experts. Research questions were answered using mean and standard deviation. The results of this study will be beneficial for educators and students. as it will help improve the teaching and learning process and ultimately lead to better academic performance. Gender differences in academic performance are influenced by the type of assessment method used in certificate programmes. Female students generally perform better in online/digital and project-based assessments where organization, engagement, and collaboration are key. In contrast, male students tend to excel in final exams, where performance is often linked to their ability to handle stress and pressure. It was recommended that lecturers try to employ workers. Different assessment methods to ensure a fair and comprehensive assessment of the abilities of all students that takes into account different strengths and learning styles.

Keywords: Assessment method, Academic Performance, Certification Programme, Students, Gender

Introduction

In recent years, student academic performance in certification programmes has become a topic of significant interest among educators, administrators, and policymakers. One of the most important factors influencing academic outcomes is the assessment methods used in these programmes. While traditional tests have been the cornerstone of educational assessment for decades, alternative methods such as continuous assessment, project-based assessment, and formative assessment have gained attention. Despite their increasing popularity, there is still a lack of comprehensive understanding of the specific impact of these different assessment methods on student performance. Rivers State University (RSU), Nigeria's leading educational institution, offers several certificate programmes designed to equip students with specific skills and knowledge needed for careers. Certification programmes are typically short, highly specialized courses that require effective assessment strategies to ensure that students achieve the required competencies. However, the choice of assessment methods can vary greatly depending on the subject, faculty preferences, and institutional policies (Adelman, 2000). Carnevale et al. (2011) and Klein-Collins (2010) define certification programmes as structured educational or training initiatives designed to validate an individual's skills, knowledge, or competencies in a particular field or industry. Certification programmes are designed to ensure that individuals meet established competency or proficiency standards in a particular field. They often serve as benchmarks for professional achievement and preparedness for a particular role or job. Certification is generally recognized within a particular industry or occupation, providing credibility and demonstrating that people have the skills and qualifications required for a particular role. Participants in

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certification programmes are assessed to demonstrate understanding and application of relevant concepts, principles, and practices in the field. Certification programmes often include a structured curriculum or curriculum that addresses key topics, competencies, or learning outcomes relevant to the field (Baker & Reddy, 2001).

Nichol & McFarlane-Dick (2006) suggest that understanding the impact of various assessment methods on student achievement is important for optimizing educational practices within certification programmes. This is especially true in Rivers State, where educational institutions seek to improve student outcomes to meet the demands of the local and global job market. The choice of assessment method can affect not only academic performance, but also student satisfaction, engagement, and long-term retention. As a result, educators and administrators are increasingly interested in empirical evidence that can help them select the most effective assessment strategies. Assessment methods are an integral part of the educational process, serving as a primary means of assessing student learning and understanding. The choice of assessment method can have a significant impact not only on how students interact with the material but also on their overall performance. In recent years, educational institutions, including those offering certificate programmes in Rivers State, Nigeria, have increasingly explored a variety of assessment methods to optimize learning outcomes. This shift reflects a growing awareness that traditional methods, such as standardized tests, may not fully capture the breadth of student learning, prompting a push for more modern, student-centered approaches. Assessment methods play a key role in shaping students' educational experiences and outcomes in certificate programmes. Traditional assessment methods, such as standardized tests, have long been the norm. However, alternative assessment methods such as continuous assessment, project-based assessment, and formative assessment are increasingly being adopted to provide a more comprehensive assessment of student ability.

Traditionally, assessment in these programmes has relied heavily on written tests, exams, and essays. While these methods are structured and simplistic, they often emphasize rote memorization and may not fully address students' ability to apply knowledge to real-world situations. Newer assessment methods such as project-based assessment, portfolios, peer assessment, and digital assessment provide a more holistic view of student outcomes. They emphasize skills that are increasingly important in today's dynamic job market, such as critical thinking, problem-solving, and practical application. Research has shown mixed results regarding the effectiveness of traditional and modern assessment methods. Some studies suggest that traditional methods, due to their standardized nature, provide reliable measures of student knowledge (Black & Wiliam, 1998). However, other studies argue that modern methods, which often require students to demonstrate their understanding through application, better prepare students for real-world problems (Brown, 2016; Zanarini, 2018). For example, Brown (2016) emphasizes the benefits of peer support systems and continuous assessment, which have been shown to enhance both learning and performance. Similarly, Zanarini (2018) emphasizes the importance of formative assessment in facilitating deep learning. Modern assessment refers to modern approaches and tools used to assess students' skills and competencies. These methods leverage advances in technology and pedagogical strategies to provide more dynamic, personalized, and comprehensive assessments than traditional assessment methods. Modern assessments aim to increase student engagement, provide timely feedback, and better reflect the real-world application of knowledge and skills.

Examples of modern assessment methods

1. Digital and online assessments: conducted through online platforms that provide flexibility and accessibility.
2. Adaptive grading: provides personalized grading by adjusting question difficulty based on student responses.
3. Game-based assessment: Using game elements to increase student motivation and engagement.
4. Digital/online assessment refers to the use of digital tools and platforms to conduct assessments, evaluate student performance, and provide feedback. These assessments range from simple tests and exams to more complex tasks such as interactive simulations or collaborative projects. The increasing use of digital/online assessment is driven by technological advances and the need for more flexible, scalable, and accessible assessment methods (Gikandi et al., 2011).
5. Project-based assessment (PBA) is an assessment method in which students work on a project over a while while exploring a real-world problem or problem. This type of assessment emphasizes the application of knowledge and skills in a practical context, allowing students to demonstrate their understanding through creating, presenting, or performing a product (Thomas, 2000). Shepard (2005) states that traditional assessments are designed to provide insight into student performance and are often used to compare the performance of different groups of students or institutions. Although they provide a systematic and quantitative way to measure learning, critics argue that they cannot fully capture students' critical thinking,

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problem-solving skills, or practical application of knowledge. It is also a traditional method of assessing student performance and progress, typically involving standardized tests, quizzes, midterms, finals, and other formal testing approaches.

According to Lynn and Miller (2005), these assessments often have the following characteristics:

1. Standardized: Uses uniform procedures and criteria for administering and assessing tests.
2. Summative assessment: Focuses on measuring what students have learned at the end of a learning period.
3. Objective Assessment: Relies on easily gradable multiple choice, true/false, and short answer questions.
4. Content Knowledge: Focuses on assessing students' retention and understanding of factual information and concepts.
5. High Stakes: This has serious implications for students' grades, academic achievement, and sometimes future opportunities.

Research Questions

1. What are the mean performance scores of students assessed through digital/online assessments and those assessed through final examinations in certification programmes?
2. What are the mean performance scores of students assessed through project-based assessment and those assessed through final examinations in certification programmes?
3. What are the mean performance scores of male and female students in certification programmes assessed in three groups?

Hypotheses

There is no significant difference in the mean performance scores of students assessed through digital/online assessments and those assessed through final examinations in certification programmes.

2. There is no significant difference in the mean performance scores of students assessed through project-based assessment and those assessed through final examinations in certification programmes.
3. There is no significant difference in the mean performance scores of male and female students in certification programmes assessed in three groups.

Methodology

The study was conducted at Rivers State University, Port Harcourt. This study adopted a quasi-experimental research design. The population of the study consists of 1,200 students enrolled in the certificate programmes (Weekend Programmeme) at Rivers State University. The study sample consisted of 300 students, and stratified random sampling was used to ensure representation across different certificate programmes, genders, and academic levels. Students were divided into different groups according to the assessment method used (group A: digital/online assessment, group B: project assessment, and group C: final exam assessment). The data collection instrument used in this study was the "Student Assessment Performance Test (SAPT). The SAPT contains 30 items that were designed based on a 30-item multiple-choice test. A consistency reliability coefficient of 0.73 was tested using Kuder-Richardson reliability. The device was validated by measurement and evaluation experts. Research questions were answered using mean and standard deviation.

Results

Research Question One: What are the mean performance scores of students assessed through digital/online assessments and those assessed through final examinations in certification programmes?

Table 1: Mean scores of students assessed with digital/online and final examinations

	Pretest		Post test	
Group	**N**	**Mean**	**S.D**	**Mean**	**S.D**
Digital/Online	100	65.24	13.0	87.05	8.56
Final examination	100	54.12	10.52	73.05	13.76

From Table 1, the mean performance scores of the students assessed digitally/online and those assessed with the final examination in the pre-treatment test were 65.24 and 54.12 respectively. Their respective standard deviations are 13.0 and 10.52. On the other hand, in the post-treatment test, the mean performance scores of students assessed digitally/online and those with the final examination were 87.05 and 73.05. Their respective standard deviations are 8.56 and 13.76. The mean performance scores of students assessed with digital/online certification programmes are greater than the mean performance scores of students assessed with the final examination. This implies that digital/online improved the performance of students in certification programmes.

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Research Question Two: What are the mean performance scores of students assessed through project-based assessment and those assessed through final examinations in certification programmes?

Table 2:Mean scores of students assessed with project-based and final examinations

	Pretest		Posttest	
Group	N	Mean	S.D	Mean	S.D
Project-based	100	57.84	13.27	90.13	8.17
Final examination	100	54.12	10.52	73.05	13.76

From Table 2, the mean performance scores of the students assessed with project-based and those assessed with the final examination in the pre-treatment test were 57.84 and 54.12 respectively. Their respective standard deviations are 13.27 and 10.52. On the other hand, in the post-treatment test, the mean performance scores of students assessed with the project-based and those with the final examination were 90.13 and 73.05. Their respective standard deviations are 8.17 and 13.76. The mean performance scores of students assessed with a project-based certification programme are greater than the mean performance scores of students assessed with a final examination. This implies that project-based improved the performance of students in certification programmes.

Research Question Three: What are the mean performance scores of male and female students in certification programmes assessed in three groups?

Table 3:Mean performance scores in the post-treatment test of students assessed within the treatment by gender.

Group	N	Mean	S.D	Mean	S.D	Mean	SD
Male	50	89.60	8.77	91.80	7.62	80.48	14.47
Female	50	84.50	7.60	88.46	8.43	65.62	7.79

The mean performance scores of Female and male students assessed with Digital/online,project-based, and final examinations as presented in Table 3 are 89.60 and 84.50, 91.80 and 88.46, and finally 80.48 and 65.62 respectively. Their respective standard deviations are 8.77 and 7.60,7.62 and 8.43 and 14.47 and 7.79. The mean performance score of female students in certification programmes assessed with project-based is higher than that of their male counterparts. For digital/online, the female performed higher than the male while in the final examination, the female performed higher than the male. This implies that in all three groups, the female performed higher than their male counterparts.

Hypothesis One: There is no significant difference in the mean performance scores of students assessed through digital/online assessments and those assessed through final examinations in certification programmes.

Table 4: ANCOVA results on the mean performance scores of students in the certification programme assessed with digital/online and final examination.

Source	**Type 111 sum of Squares**	**d.f**	**Mean Square**	**F**	**Sig**
Corrected Model	14590.744	2	7295.372	56.697	.000
Intercept	52298.900	1	52298.900	406.431	.000
Pretest	4.424	1	4.424	.034	.853
Groups	25349.636	1	14183.887	110.227	.000
Error	1371326.000	197	128.678		
Total	197164.000	200			
Corrected Total	7428.800	199			

Table 4 shows the ANCOVA test for significant differences in the mean performance scores of students assessed with digital/online assessments and those assessed through final examinations in certification programmes. At df =1,197,F=110.227, p-value =0.00 ($p<0.05$).This indicated that the significance level is less than the Alpha level ($p<0.05$). This suggested a statistically significant difference in the mean performance scores of those assessed with digital/online assessments and those assessed with final examinations. Thus, the null hypothesis was not retained. Hence, there was a difference in the mean performance scores of students assessed with digital/online assessments and those assessed through final examinations in certification programmes.

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Hypothesis Two: There is no significant difference in the mean performance scores of students assessed through project-based assessment and those assessed through final examinations in certification programmes.

Table 5: ANCOVA results on the mean performance scores of students in the certification programme assessed with project-based and final examinations.

Source of Variation	Type 111 sum of Squares	d.f	Mean Square	F	Sig
Corrected Model	10112.917	2	5056.459	38.783	.000
Intercept	40643.148	1	40643.148	311.732	.000
Pretest	312.917	1	312.917	2.400	.123
Groups	6714.983	1	6714.983	51.504	.000
Error	25684.583	197	130.379		
Total	1317398.000	200			
Corrected Total	35797.500	199			

Table 5 shows the ANCOVA test for significant differences in the mean performance scores of students assessed with project-based assessment and those assessed through final examinations in certification programmes. At df =1,197,F=51.504,P-value =0.00 ($p<0.05$).This indicated that the significance level is less than the Alpha level ($p<0.05$). This suggested a statistically significant difference in the mean performance scores of those assessed with project-based assessments and those assessed with final examinations. Thus, the null hypothesis was not retained. Hence, there was a difference in the mean performance scores of students assessed with project-based assessments and those assessed through final examinations in certification programmes.

Hypothesis Three: There is no significant difference in the mean performance scores of male and female students in certification programmes assessed in three groups.

Table 6: Summary of 2-WAY ANOVA for male and female students in certification programme assessed in digital/online, project-based, and final examination.

Source of Variation	Type 111 sum of Squares	d.f	Mean Square	F	Sig
Corrected Model	10112.917	2	5056.459	38.783	.000
Intercept	40643.148	1	40643.148	311.732	.000
Pretest	312.917	1	312.917	2.400	.123
Groups	6714.983	1	6714.983	51.504	.000
Error	25684.583	197	130.379		
Total	1317398.000	200			
Corrected Total	35797.500	199			

Table 6 shows that p-value of 0.00 which is less than Alpha level. of 0.05. Based on the results, the null hypothesis was not retained which implies that no significant difference exists between the mean performance scores of male and female students in certification programmes assessed with project-based, digital/online, and final examinations.

Discussion

The finding of the study revealed that students in certification programmes assessed with digital/online had a better mean score than their counterparts assessed with the final examination. An analysis of average performance scores by gender in online/digital assessments, project-based assessments, and final exams showed that female students typically achieve consistent success in all assessment types, often excelling in collaborative formats such as project-based learning. On the other hand, while male students may perform better in high-stakes final exams, their performance tends to be more variable in other assessment formats. This consistency among females may stem from a more organized approach to studying and effective time management skills. These results align with Voyer and Voyer's (2014) conclusions that females generally attain higher grades across a wide range of subjects and assessment types, suggesting a broader academic advantage. In contrast, the performance of male students differs notably depending on the assessment type, with strengths in competitive environments like final exams but less reliable results in project-based or continuous assessments. This inconsistency is supported by Seligman

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(2006), who noted that although males may excel in examinations, they often fall short in continuous assessments and coursework.

The study explored the effect of assessment methods on the academic performance of students pursuing a certification programme at Rivers State University. The outcomes of this research hold significant value for both educators and students, as they can enhance the teaching and learning experience, ultimately resulting in improved academic performance. Gender-based differences in academic achievement are influenced by the assessment methods utilized in certification programmes. Female students usually outperform their male counterparts in online/digital and project-based assessments, where skills such as organization, engagement, and teamwork are crucial. Conversely, male students often excel in final examinations, which are closely related to their ability to handle stress and perform effectively under pressure.

The research findings indicated that the academic performance of male and female students was analyzed across three different assessment groups. When examining the average performance scores by gender in online/digital assessments, project-based assessments, and final evaluations, it was found that female students typically achieve consistently strong results across all assessment formats, with a notable strength in collaborative and continuous assessment methods like project-based learning. While male students may excel in high-stakes final exams, their performance tends to be more variable in other assessment types. This consistency among female students may largely result from a more structured approach to their studies and superior time management skills. This aligns with the findings of Voyer & Voyer (2014), who noted that females generally attain higher grades across a range of subjects and assessments, suggesting a broader academic advantage. In contrast, male students' performance often fluctuates depending on the assessment method; they may thrive in competitive environments such as final exams but are less consistent in project-based or continuous assessments. This variability is further supported by Seligman (2006), who observed that while males can perform well in exams, they frequently underperform in continuous assessments and coursework.

Conclusion

The study explored the effect of assessment methods on the academic performance of students in the certification programme at Rivers State University. The findings are anticipated to be beneficial for both educators and students, aiding in the enhancement of the teaching and learning process, and ultimately leading to improved academic outcomes. The research highlights that gender differences in academic performance are affected by the type of assessment utilized in certification programmes. Female students usually outperform their male counterparts in online/digital and project-based assessments, where skills such as organization, engagement, and collaboration play critical roles. In contrast, male students are more inclined to excel in final examinations, where success is often contingent upon their ability to manage stress and perform effectively under pressure.

Recommendations

1. Certification programmes should integrate both digital/online assessments and final examinations to create a blended assessment strategy.
2. University should regularly review and assess the effectiveness of both project-based assessment and final examinations.
3. Lecturers should strive to employ a variety of assessment methods to ensure a fair and comprehensive evaluation of all students' abilities, catering to different strengths and learning styles.

References

Adelman, C. (2000). A Parallel Post secondary Universe: The Certification System in Information Technology." U.S. Department of Education, Office of Educational Research and Improvement.

Baker, D. F., & Reddy, K. (2001). Certification and Professional Development: Challenges and Opportunities. *Journal of Continuing Education in the Health Professions, 21(1), 20-28.*

Black, P., & Wiliam, D. (1998). Assessment and classroom learning. Assessment in Education Principles, Policy & Practice, 5(1), 7-74.

Brown, S. (2016). Peer Support Systems and Continuous Assessment in Higher Education. Routledge.

Carnevale, A. P., Rose, S. J., & Cheah, B. (2011). The College Payoff: Education, Occupations,Lifetime Earnings. Georgetown University Center on Education and the Workforce.

Gikandi, J. W., Morrow, D., & Davis, N. E. (2011). "Online Formative Assessment in Higher Education: A Review of the Literature." Computers & Education, 57(4), 2333-2351.

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Klein-Collins, R. (2010). Measuring Up: What Educational Testing Tells Us. Council for Adult and Experiential Learning.

Linn, R. L., & Miller, M. D. (2005). Measurement and Assessment in Teaching (10th ed.). Pearson.

Nicol, D. J., & Macfarlane-Dick, D. (2006). "Formative Assessment and Self-Regulated Learning: A Model and Seven Principles of Good Feedback Practice." Studies in Higher Education, 31(2), 199-218.Key Points:

Shepard, L. A. (2005). "Linking Formative Assessment to Scaffolding." Educational Leadership62(5), 26-31.

Seligman, M.E.P. (2006) Learned optimism: How to change your mind and your life. VintageBooks.

Thomas, J. W. (2000). "A Review of Research on Project-Based Learning." Autodesk Foundation.

Voyer,D., & Voyer,S.D.(2014).Gender differences in scholastic achievement: A meta-analysis.Psychological Bulletin.140(4),1174-1204

Zanarini, M. C. (2018). Formative assessment and its impact on student learning. *Journal of Educational Research, 110(3), 245-260.*