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Revolutionizing Education in the Rural Elementary School: Leveraging Instructional Automation and Interactive Assessment

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Abstract

Aim: Transformation in education includes integrating artificial intelligence, enhancing teaching competencies, and administrating administrative tasks that require highly skilled and competent teachers to utilize technological tools in the classroom and save more time from other administrative work. This study aimed to assess the readiness of revolutionizing education, the level of instructional automation, and the extent of assessment measures utilized in rural elementary schools and their significant interconnectedness by looking at the perspectives of teachers and learners.

Methodology: The study employed a descriptive evaluative design and correlational research design; utilizing a researcher-made questionnaire. The study was conducted among 129 teachers and 220 learners in 13 elementary schools of North President Quirino District for the school year 2024-2025. The data were analyzed using mean and standard deviation, Pearson correlation coefficient and One-way Analysis of Variance (ANOVA).

Results: The data reveals that both teachers and learners are highly ready to revolutionize education, with an overall mean of 3.76 for teachers and 4.08 for learners. A strong level of instructional leverage among teachers and learners with overall mean of 4.00 for teachers and 3.97 for learners. For the extent of assessment measures utilized in North President Quirino District findings show an overall mean of 3.93 for teachers and 4.14 for learners, both interpreted as high extent. Furthermore, there is a strong positive correlation (r) of 0.688 for teachers and a very strong positive correlation with a correlation coefficient (r) of 0.874 for the learners between revolutionizing education and leveraging instructional automation. A very strong positive correlation between revolutionizing education and interactive assessment , as indicated on the correlation coefficient of (r) 0.888 for teachers and (r) 0.691 for the learners. Moreover, there is a significant difference on teachers and learners' response on revolutionizing education with an f-value of 1.644 and a p-value of .042; f-value of 1.836 and a p-value of .015 for instructional automation; and an f-value of 2.499 and a p-value of 0.001.

Conclusion: The study findings reveal that rural elementary schools exhibit moderate to high readiness for educational transformation, particularly through AI integration, enhanced teaching competencies, and automated administrative tasks. Strengths lie in strategic planning and professional development, though resource allocation and collaboration with tech firms remain challenges. Instructional automation improves efficiency in teaching and administration but raises concerns about reduced teacher-learner interactions, highlighting the need for a balanced approach. Assessment methods remain diverse, with pen-and-paper tests complemented by computer-aided, game-based, and practical exams, the latter excelling in real-world application. A strong positive relationship exists between education reform, instructional automation, and interactive assessments. However, a gap in perception between teachers and learners highlights the need for better training and collaboration to ensure shared ownership of educational advancements.

Keywords: *revolutionizing education, instructional automation, interactive assessment, artificial intelligence, teaching competencies*

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INTRODUCTION

Modern education is fast evolving; interactive whiteboards and virtual reality experiences are taking the place of traditional classrooms with chalkboards and rows of silent students digesting knowledge. Technology can make information more easily accessible as it can change the face of education, customize instruction to meet the needs of each learner, and offer AI-powered support. Technology's place in education has grown from that of an auxiliary aid to one that is now essential to the teaching and learning process.

Artificial Intelligence (AI) has demonstrated significant contributions across various countries. In Turkey, AI boosts productivity, personalizes learning, enhances outcomes, and increases engagement through instant feedback. (Adiguzel et al., 2023). In Indonesia, AI makes teaching and learning more engaging, efficient, and tailored to individual needs (Harry, 2023). Similarly, in China, AI optimizes learning by integrating technologies, pedagogical approaches, and content effectively (Zheng et al., 2021). Also, in Australia, educational theories closely connect with technology to guide advancement and instructional design (Bower, 2019).

Furthermore, AI revolutionizes education by enhancing teaching, learning, and professional development. It enhances education by fostering positive attitudes, improving teaching skills, and promoting self-reflection (Aldosari, 2020) Also, it supports professional development through evaluation models and suggestions (Gunawan et al., 2021) and enables performance-based assessments using chatbots (Durall & Kapros, 2020). Thus, AI significantly improves educational practices, fostering growth and personalized learning.

In Philippine context, several studies proved the advantages of using AI. AI facilitates professional development among teachers (Gunawan et al., 2021). Its integration to teachers' digital competencies is necessary in revolutionizing education; while AI platforms are helpful to elementary teachers during trainings and seminars (Maloloy-on & Arnado, 2023); and has unlimited learning and research opportunities and a good avenue to create virtual classrooms.

Despite the benefits of integrating AI in education, its implementation presents challenges, primarily due to the high costs for installation and maintenance (Estrellado & Miranda, 2023); and limited connectivity in schools (Aborot et al., 2022). Consequently, these barriers negatively impacted the quality of education in public high schools. Moreover, the Philippines ranked 56th out of 100 countries as to readiness in digital skills (Taeihagh, 2021), highlighting the curriculum's failure to accommodate the rapidly evolving technology, further exacerbating the AI skills gap among educators and students (Guey, 2021).

While existing studies focus on AI's benefits and its role in improving teaching, learning, and professional development, there is a lack of research addressing the contextual barriers, such as implementation challenges, inadequate curriculum integration, connectivity issues, and the AI skills gap among educators and students in developing countries. This gap underscores the need for localized studies that explore strategies for effective AI adoption in resource-limited educational settings, particularly in regions with limited technological infrastructure and digital readiness, such as the Philippines. Thus, the researcher is determined to explore more on the revolutionizing education in the rural elementary schools.

The elementary schools in North President Quirino District, Division of Sultan Kudarat encountered various challenges in integrating ICT in the classroom as noted during the regular SLAC sessions of teachers. As an insider in the study, one of the researchers personally observed the problem as a teacher in Pedro P. Santos Memorial Elementary School, President Quirino, Sultan Kudarat.

This paper examined the various facets of transforming education in President Quirino, Sultan Kudarat's rural elementary schools. Further, this study's findings would like to improve the educational curricula by thoroughly examining its various aspects; in particular, it aimed to address the issues that teachers and students face in the modern era, as well as the use of automation and assessment in technology.

Objectives

This study determined the state of readiness in revolutionizing education in rural elementary schools under North President Quirino District for school year 2024-2025. Specifically, the study sought answers to the following questions:

1. What is the state of readiness of the Education in revolutionizing the following:
    1.1 Integrating Artificial Intelligence
    1.2 Enhancing Teaching Competencies
    1.3 Automating Administrative Tasks
2. What level is the instructional automation leverage in terms of:
    2.1 Teacher to Computer Interaction
    2.2 Automated instructional Development

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2.3 Learner's Database Support

3. What is the extent of assessment measure utilized in the rural elementary school on:
   3.1 Pen and Paper Test
   3.2 Offline-Computer Aided Exam
   3.3 Game-Based Exam
   3.4 Practical Exam
4. Is there a significant relationship between revolutionizing education and leveraging instructional automation?
5. Is there a significant relationship between revolutionizing education and interactive assessment?
6. Is there a significant difference with response of teacher and learner?

Hypothesis

Given the stated research problem, the following hypotheses were tested on 0.05 level of significance:

1. Revolutionizing education is significantly associated with leveraging instructional automation.
2. Revolutionizing education is significantly related with interactive assessment.
3. Teachers' response is significantly different from the learner's response.

METHODS

Research Design

This study used descriptive evaluative design and correlational research design. Descriptive evaluative research design is a methodological approach that tries to collect data regarding current circumstances or scenarios for interpretation and description. Whereas, correlational research design, according to Bhandari (2021), examines correlations between variables without the researcher's control or manipulation.

In determining the readiness to revolutionize education and other factors, descriptive evaluative method was employed; while determining the relevance among the variables, correlational research was utilized. This study used questionnaires, assessments, or standardized measures to gather quantitative data in the setting of rural elementary schools. The quantification of factors like "revolutionize education", "leverage instructional automation" and "interactive assessment" was made possible by these data sources. The primary objective in studying the revolutionizing education of rural elementary schools in North President Quirino District was to provide a comprehensive explanation of the variables and their relationships without altering them or making the assumption that one thing causes another.

Population and Sampling

The respondents of the study were the 129 public school teachers in 13 elementary schools and 220 Grade VI learners of North President Quirino District, Division of Sultan Kudarat, for the school year 2024-2025. This study utilized total enumeration for selecting teachers and simple random sampling for selecting learners to ensure appropriate representation. Total enumeration, as noted by Creswell (2014), involves including all members of the target population, in this case, all the teachers to achieve a comprehensive understanding of their perspectives.

Meanwhile, simple random sampling was used for learners, as defined by Thomas (2020), which is a randomly selected subset of a population where each member has an exactly equal chance of being chosen. This method is the most straightforward of all probability sampling techniques, involving a single random selection and requiring minimal prior knowledge about the population. In combining these approaches, the study aims to maximize the accuracy and representativeness of the data collected from both groups.

Data Gathering Instrument

In this research, a complete data gathering technique was implemented, utilizing standardized survey questionnaires that the researcher has rigorously constructed. These were arranged into four parts to ensure a systematic and thorough investigation of the instructional automation and interactive assessment in the revolutionizing education in North President Quirino District.

The first section of the survey was intended to capturing essential information about teachers' and students' profiles. It encompassed various aspects of the teachers' and students' profiles, including their age, sex, school in

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which the students are presently enrolled, and the school where the teachers are currently teaching, together with their teaching positions.

The second section focused on the state of readiness of the revolutionizing education in rural elementary schools. This section explored aspects such as artificial intelligence, teaching competencies and administrative tasks, shedding light on the readiness of the school for the revolutionized education.

The third part of the questionnaire delved into the level of instructional automation leverage in rural elementary schools. It examined the teacher to computer interaction, automated instructional development and learner's database support. This section aimed to measure the utilization of automation by the teachers in their instruction.

The fourth section was dedicated to exploring various areas of interactive assessment in rural elementary schools. It involved pen and paper test, offline computer aided, game-based and practical exams. This section aimed to highlight and measure the utilization of interactive assessment in the classroom.

By structuring the survey in this manner, the research aimed to comprehensively assess the revolutionizing education in rural elementary schools. The integration of artificial intelligence, enhancement of teaching strategies, administration of administrative tasks, development of automated instruction, computer interaction, learner database support and utilization of various interactive assessment will provide a holistic view of the development of the education system in the rural elementary schools of North President Quirino District.

George (2024) claims that Likert scales, which typically have many response points, ranging from 4 to 9, along with verbal anchors, are the most commonly used psychrometric scales. Since respondents are presented with a variety of possible replies, Likert scales are ideal for capturing their level of agreement or opinions about the topic in a more nuanced manner (Bhandari & Nikolopoulou, 2023). The research instrument was a closed-ended or structured questionnaire with a five-point ordinal Likert scale through a survey questionnaire.

Likert scale normally offers five alternative responses to a statement or question, allowing respondents to express their positive-to-negative level of agreement or sentiment about the question or statement.

Since the instrument is original, five (5) panels and experts like two (2) school head in the elementary with at least five (5) years of leadership experience, two (2) language teacher, and one (1) ICT teacher who validated the research instrument. Pilot testing was done in non-respondent school with similar qualities to the target population. The respondents were thirty (30) teachers and thirty (30) pupils in the South President Quirino. The degree of consistency was assessed using Cronbach's Alpha, the following interpretations were used: Unacceptable (below 0.50), Questionable (0.60-0.69), Acceptable (0.70-0.79) Good (0.80-0.89), and Excellent (0.90 above). Thus, the survey questionnaire received a 0.864 Cronbach's alpha rating consistent with the good interpretation. These suggest that Cronbach's alpha reliability test was successful for the survey.

Data Gathering Procedure

Data collection is the systematic process of obtaining observations or measurements involving planning, methods and gathering, sorting, and processing data (Bhandari, 2021). Despite potential variations in methods and objectives, the general data collection process remained consistent in the study. In this study, the researcher followed the following phases of data gathering:

Preparatory Phase: The researchers sought permission from the Schools Division Superintendent through a consent letter to conduct the study in the identified school. The letter included an explanation of the study's parameter and title. Upon approval, the researcher and respondents agreed on the schedules for conducting the study, target sections, and the scope and constraints of the investigation. This phase covered the respondents' roles and restrictions and guidelines for conducting the survey.

Administration Phase: The researchers clearly explained the survey guidelines to the respondents, providing instruction or directions on completing the questionnaire and emphasizing the importance of honesty in responding to the survey. The survey questionnaires were then be administered to the respondents.

Collection/Retrieval Phase: After completing the questionnaire, the respondents' survey questionnaires were be collected or retrieved for statistical analysis.

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Statistical Treatment

The study utilized descriptive and correlation statistics to analyze the data. The state of readiness of the revolutionizing education, level of instructional automation leverage and extent of assessment measure of public-school teachers and Grade VI learners in the North President Quirino were determined using mean and standard deviation. The mean was employed as a representative measure of data, considering every value in the dataset.

Additionally, the standard deviation provided a comprehensive understanding of the dataset's characteristics allowing for a quick overview of the data spread. Also, the Pearson Correlation coefficient was used to determine the significant relationship between the revolutionizing education and leveraging instructional automation and interactive assessment.

Norman (2010) emphasized that parametric tests, such as the Pearson correlation, are reliable for assessing Likert scale responses and can generate unbiased conclusions that are acceptably close the truth. Correlation coefficients describe the strength and direction of the association between variables, with the Pearson correlation specifically measuring the linear association between two normally distributed random variables (Schoeber et al., 2018).

To assess whether there is a statistically significant difference between teachers' responses and learners' responses, the study employed a One-way Analysis of Variance (ANOVA). This statistical method is particularly useful for comparing the means of two or more independent groups to determine if the observed differences are due to chance or reflect true variation in the population.

Through analyzing the variance within each group (teachers and learners) and between the groups, ANOVA provided insights into whether the responses differ significantly in terms of their central tendencies. This technique assumed that the data is normally distributed and the variances across groups are equal, ensuring reliable and valid conclusions about group differences.

Ethical Considerations

The researchers ensured that all research protocols involving ethics in research were complied with for the protection of all people and institutions involved in the conduct of the study.

RESULTS and DISCUSSION

This section systematically presents, analyzes, and interprets the collected data. The results as summarized in tables, are critically examined to report the objectives of the study and provide meaningful insights into the research problem.

Tables 1 present the summary of both teachers and learners of North President Quirino in revolutionizing the education

Table 1. Summary of Teachers and Learners' State of Readiness in Revolutionizing Education in terms of Enhancing Teaching Competencies, Automating Administrative Task and Integrating Artificial Intelligence

Indicators	Teachers Section Mean	SD	Interpretation	Learners Section Mean	SD	Interpretation
Enhancing Teaching Competencies	3.96	.65	Highly Ready	4.13	.75	Highly Ready
Automating Administrative Task	3.93	.65	Highly Ready	4.08	.75	Highly Ready
Integrating Artificial Intelligence	3.39	.95	Moderately Ready	4.05	.80	Highly Ready
Overall Mean	3.76	.75	Highly Ready	4.08	.76	Highly Ready

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The study presented summarizes the state of readiness of teachers and learners in revolutionizing education, focusing on three key indicators: enhancing teaching competencies, automating administrative tasks, and integrating artificial intelligence (AI). The results reveal that both teachers and learners in North President Quirino District demonstrate a generally high level of readiness, with an overall mean of 3.76 for teachers and 4.08 for learners. These findings reflect the growing acknowledgment of the need for technological integration in educational settings.

The first indicator, enhancing teaching competencies, received a mean score of 3.96 from teachers and 4.13 from learners, both interpreted as "Highly Ready." This suggests that both groups recognize the importance of professional development in improving instructional practices. According to Darling-Hammond et al. (2020), effective teacher training directly impacts teaching quality and student learning outcomes, highlighting the need for continuous skills development in an era of educational innovation.

For automating administrative tasks, teachers scored a mean of 3.93 while learners scored 4.08, both categorized as "Highly Ready." This result underscores the increasing reliance on digital tools for streamlining administrative work, aligning with the findings of Selwyn (2019), who noted that automation can reduce teachers' workload and allow more time for instructional activities. The positive perception of learners may reflect their familiarity with digital platforms that facilitate communication and information management.

The third indicator, integrating artificial intelligence, showed a disparity between teachers and learners. Teachers reported a "Moderately Ready" mean of 3.39, while learners showed a "Highly Ready" mean of 4.05. This gap may be attributed to the generational divide in digital literacy. Studies like that of Luckin et al. (2016) have highlighted how AI tools can enhance personalized learning and assessment, suggesting a need for targeted training to boost teachers' confidence and competence in utilizing AI.

The study indicates a generally high level of readiness among both teachers and learners to embrace educational innovations, with learners exhibiting slightly higher readiness across all indicators. The gap in AI integration readiness highlights the importance of continuous professional development to equip teachers with the necessary skills to adapt to technological advancements. As the educational landscape evolves, these findings align with global trends emphasizing the integration of digital tools to enhance teaching, learning, and administrative efficiency.

Tables 2 present the summary of both teachers and learners of North President Quirino District's Level of Instructional Leverage

Table 2. Teachers and Learners' Level of Instructional Leverage in terms of Learners' Database Support, Automated Instructional Development and Teacher to Computer Interaction

Indicators	Teachers Section Mean	SD	Interpretation	Learners Section Mean	SD	Interpretation
Learners' Database Support	4.05	.60	Highly Leverage	3.99	.76	Highly Leverage
Automated Instructional Development	4.03	.53	Highly Leverage	3.92	.76	Highly Leverage
Teacher to Computer Interaction	3.92	.66	Highly Leverage	4.00	.78	Highly Leverage
Overall Mean	4.00	.60	Highly Leverage	3.97	.77	Highly Leverage

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This summary table presents the level of instructional leverage among teachers and learners in North President Quirino, focusing on three key indicators: learners' database support, automated instructional development, and teacher-to-computer interaction. The findings reveal a consistently high level of instructional leverage, with an overall mean of 4.00 for teachers and 3.97 for learners. These results underscore the growing integration of technology in education, aligning with the findings of Schrum and Levin (2015), who emphasized that technology enhances instructional practices and learner engagement when effectively utilized.

The first indicator, learners' database support, shows a mean of 4.05 for teachers and 3.99 for learners, both interpreted as "Highly Leverage." This suggests that both groups recognize the importance of digital databases in organizing and accessing learning materials. Database systems facilitate personalized learning by storing and analyzing learning patterns, which helps teachers tailor instructional strategies to meet diverse learning needs.

In terms of automated instructional development, teachers reported a mean of 4.03 while learners scored 3.92, both indicating "Highly Leverage." This result aligns with the study of Chen et al., 2021 shows that automation aids educators in managing repetitive tasks, such as grading and content adaptation, allowing more time for student engagement and pedagogical strategies.

The third indicator, teacher-to-computer interaction, received a mean of 3.92 from teachers and 4.00 from learners, maintaining the "Highly Leverage" interpretation. This finding highlights the critical role of digital literacy in instructional practices. A study by Aliah et al. (2024) emphasizes that teachers' digital literacy significantly impacts their ability to design and implement effective online instruction. The research highlights the necessity for continuous professional development to enhance educators' digital competencies, thereby improving learners engagement and achievement in digital learning environments.

Overall, this indicates a strong instructional leverage among teachers and learners in North President Quirino District, with minor differences in their perceptions. The high mean scores across all indicators suggest a shared acknowledgment of the role of technology in modern education. This aligns with the broader literature on educational technology, which emphasizes the importance of integrating technological tools to optimize instructional processes, foster engagement, and ultimately improve learning outcomes.

Table 3 present the summary of both teachers and learners in North President Quirino District's extent of Assessment Measure Utilized

Table 3. Summary of Teachers and Learners' Extent of Assessment Measure Utilized in the Rural Elementary School

Indicators	Teachers Section Mean	SD	Interpretation	Learners Section Mean	SD	Interpretation
Pen and Paper Test	4.28	.57	Very High Extent	4.23	.79	Very High Extent
Practical Exam	4.14	.60	High Extent	4.18	.76	High Extent
Game- based exam	3.75	.94	High Extent	4.08	.78	High Extent
Offline Computer Aided Exam	3.56	.87	High Extent	4.08	.78	High Extent
Overall Mean	3.93	.75	High Extent	4.14	.78	High Extent

This summary presents an analysis of the extent of assessment measures utilized in North President Quirino District, focusing on four key indicators: pen-and-paper tests, practical exams, game-based exams, and offline computer-aided exams. The findings show an overall mean of 3.93 for teachers and 4.14 for learners, both interpreted as having a "High Extent" of utilization.

These results reflect the continuous evolution of assessment practices in response to the demands of modern education, as supported by the work of Black and Wiliam (1998), who emphasized the critical role of diverse assessment methods in enhancing learning outcomes.

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The first indicator, pen-and-paper tests, received the highest scores with a mean of 4.28 for teachers and 4.23 for learners, interpreted as "Very High Extent." This finding aligns with the traditional nature of these tests in educational settings, as noted by Popham (2009) emphasizes that pen and paper test assessments remain essential in educational systems worldwide due to the ability to efficiently measure academic skills such as recall, comprehension, and application of knowledge.

Practical exams also received high ratings, with means of 4.14 for teachers and 4.18 for learners, indicating a "High Extent" of use. This suggests an acknowledgment of the importance of hands-on activities in reinforcing learning, especially in subjects that require applied skills. According to Kolb (2015), both teachers and students acknowledged the effectiveness of practical exams in assessing applied skills. This aligns with previous studies that emphasize the importance of experiential learning in enhancing comprehension and retention.

The third indicator, game-based exams, received means of 3.75 for teachers and 4.08 for learners, both interpreted as "High Extent." The positive perception, particularly among learners, reflects the growing acceptance of gamification in education, which research by Deterding et al. (2011) has shown to increase motivation and engagement by incorporating game elements into learning activities.

Lastly, offline computer-aided exams were rated 3.56 by teachers and 4.08 by learners, again with a "High Extent" interpretation. This suggests that while teachers may still be adjusting to the use of digital tools in assessment, learners have become more receptive to these methods. Oliver and Herrington (2020) emphasize that successful implementation of computer-aided assessments requires thorough teacher training and adequate infrastructure.

Overall, the findings demonstrate a strong and diverse use of assessment measures in North President Quirino District. The data indicates that while traditional methods like pen-and-paper tests remain dominant, there is a growing shift toward more interactive and technology-based assessment tools. This transition reflects the broader trends in educational assessment practices, where diversity and innovation are increasingly recognized as essential to meeting the varied needs of 21st-century learners.

Table 4 present the overall analysis on the relationship between revolutionizing education and leveraging instructional automatiin among teachers

Table 4. Overall Analysis on the Relationship between Revolutionizing Education and Leveraging Instructional Automation Among Teachers

Indicators			R	Sig	Interpretation
Revolutionizing Education	vs	Leveraging Instructional Automation	.688**	p<.000	Strong Positive Relationship

at the .05 level (two-tailed)

The data indicates a strong positive relationship (r=.688,p<.000) between revolutionizing education and leveraging instructional automation among teaching personnel. This suggests that as instructional automation is increasingly integrated into educational practices, the process of revolutionizing education is significantly enhanced. The strong correlation implies that technological advancements, particularly automation, play a pivotal role in transforming traditional educational methods into more efficient, innovative, and adaptive systems, empowering educators to better meet evolving pedagogical demands.

Table 5 present the overall analysis on the relationship between revolutionizing education and leveraging instructional automation among learners

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Table 5. Overall Analysis on the Relationship between Revolutionizing Education and Leveraging Instructional Automation among Learners

Indicators			r	Sig	Interpretation
Revolutionizing Education	Vs	Leveraging Instructional Automation	.874**	p<.000	Very Strong Positive Relationship

*** is significant at the .05 level (two-tailed).*

The data reveals a very strong positive relationship (r=.874, p<.000) between revolutionizing education and leveraging instructional automation among learners. This indicates that as efforts to revolutionize education increase, the adoption and effective use of instructional automation among learners also significantly improve. The high correlation suggests that integrating innovative educational approaches and technologies fosters environments where learners can fully utilize automation tools to enhance their learning experiences, promoting efficiency, engagement, and adaptability in modern educational contexts.

Table 6 present the overall analysis on the relationship between revolutionizing education and interactive assessment among teachers

Table 6. Overall Analysis on the Relationship between Revolutionizing Education and Interactive Assessment among Teachers

Indicators			R	Sig	Interpretation
Revolutionizing Education	vs	Interactive Assessment	.888**	p<.000	Very Strong Positive Relationship

*** is significant at the .05 level (two-tailed).*

Table 6 reveals a **very strong positive relationship** (r = .888, p < .000) between revolutionizing education and interactive among teachers. This indicates that as educational practices are modernized—through integrating technologies, enhancing teaching competencies, and automating tasks—teachers are more inclined to use automation to optimize instructional delivery and assessment processes.

Table 7 present the overall analysis on the relationship between revolutionizing education and interactive assessment among learners

Table 7. Overall Analysis on the Relationship between Revolutionizing Education and Interactive Assessment among Learners

Indicators			r	Sig	Interpretation
Revolutionizing Education	Vs	Interactive Assessment	.691**	p<.000	Strong Positive Relationship

*** is significant at the .05 level (two-tailed).*

Table 7 reveals a strong positive relationship (r=.691, p< .000) between revolutionizing education and interactive assessment among learners. This indicates that as educational practices evolve—through integrating

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technology, enhancing teaching competencies, and automating administrative tasks—there is a strong tendency for learners to benefit from, or engage with, interactive assessment.

Differences between Teachers and Learners' State of Readiness of Education

Table 8 present the analysis on significant difference among teachers and learners' state of readiness of education

Table 8. Analysis on Significant Difference among Teachers and Learners' State of Readiness of Education

	Sum of Squares	Df	Mean Square	F-value	p-value
Between groups	15.554	26	.598	1.644	.042
Within groups	36.017	99	.364		
	51.571	125			

The data indicates a significant difference among teachers and learners' state of readiness for education. With a p-value of 0.042, which is below the 0.05 threshold, it suggests that the variance between the groups is statistically significant. This means that there is a notable discrepancy in how teachers and learners perceive their readiness for education, implying that factors influencing their preparedness might differ across the two groups.

The findings suggest that there is a significant difference in the state of readiness for education between teachers and learners. This difference, as indicated by the p-value (0.042), shows that the way teachers and learners assess their preparedness for educational tasks diverges. The study implies that educators and learners may have varying perceptions and expectations of what constitutes readiness, possibly due to differences in experience, perspective, and role in the educational process.

The result of the significant difference between teachers and learners' readiness aligns with cognitive load theory, which suggests that individuals' ability to process and absorb information is influenced by the amount of mental effort required. Teachers, due to their more extensive experience and training, may be better equipped to manage cognitive load, thus perceiving themselves as more ready for educational challenges. On the other hand, learners, who are still developing their cognitive frameworks, may experience a higher cognitive load and thus feel less prepared. Cognitive load affects learners; readiness, with complex tasks overwhelming learners who lack metacognitive skills or foundational knowledge.

Differences between Teachers and Learners on Instructional Leverage

Table 9 present the analysis on significant difference among teachers and learners on instructional leverage

Table 9. Analysis on Significant Difference among Teachers and Learner on Instructional Leverage

	Sum of Squares	Df	Mean Square	F-value	p-value
Between groups	11.885	29	.410	1.836	.015
Within groups	21.428	96	.223		
	33.313	125			

The data from Table 9 indicates a statistically significant difference in instructional leverage between teachers and learners, as evidenced by the p-value of 0.015, which is below the standard significance level of 0.05.

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The F-value of 1.836 suggests that the variability between the groups (teachers and learners) is greater than within groups, supporting the notion that instructional leverage plays a differing role in the educational experience of teachers and learners.

The significant difference observed between teachers and learners in terms of instructional leverage suggests that there are varied perceptions or impacts of instructional practices based on the group being assessed. The F-statistic of 1.836 and the significance level of 0.015 indicate that teachers and learners experience or perceive instructional leverage differently, which may reflect varying levels of understanding, engagement, or the way instructional strategies are implemented in practice. These results could prompt a deeper investigation into the factors contributing to the differential impact of instructional leverage on both groups.

Instructional leverage refers to the extent to which teaching strategies influence the learning process and overall academic outcomes. The significant difference between teachers and learners in instructional leverage might reflect the varying ways feedback is processed by both groups. Teachers might use feedback to modify their instructional strategies to optimize learning, while learners might perceive feedback as either empowering or confusing, depending on the quality and timing of the assessments. Effective feedback is crucial for improving student performance, but the effectiveness can vary based on how it is delivered and interpreted. This could explain the differences observed between teachers and learners regarding instructional leverage.

Differences between Teachers and Learner's response on Interactive Assessment

Table 10 present the analysis on significant difference among teachers and learners' on interactive assessment

Table 10. Analysis on Significant Difference among Teachers and Learners' response on the Interactive Assessment

	Sum of Squares	Df	Mean Square	F-value	p-value
Between groups	15.769	28	.563	2.499	.001
Within groups	21.863	97	.225		
	37.632	125			

The data presented in Table 10 indicates a significant difference between teachers and learners regarding interactive assessment, as evidenced by the F-value of 2.499 and a p-value of 0.001, which is less than the significance level of 0.05. The F-test suggests that variations in interactive assessment exist between groups, with the between-groups variance being larger than the within-groups variance. This means that the difference in interactive assessment between teachers and learners is statistically significant, highlighting a possible gap in perceptions or practices related to instructional effectiveness.

The significant F-test result indicates that interactive assessment differs significantly between teachers and learners. This finding suggests that both groups may have distinct views or experiences when it comes to the methods, strategies, or tools that influence teaching and learning outcomes. The result could point to the need for more aligned professional development or communication between teachers and learners to bridge any discrepancies in their understanding or use of interactive assessment.

Interactive assessment is an approach that actively involves learners in the evaluation process, promoting engagement, reflection, and deeper learning. Teacher may perceive interactive assessment as a structured tool designed to enhance learner engagement and provide valuable feedback for instructional improvement. In contrast, learners may interpret it based on their personal experiences, level of engagement, and understanding of its purpose. Previous research has highlighted that students often view assessment methods differently from educators, particularly regarding their effectiveness and fairness (Brown & Harris, 2018).This divergence in perceptions can lead to a gap in the reported significance between teachers and learners in interactive assessment.

Another aspect contributing to these differences is the level of familiarity and experience with interactive assessment. Teachers who have received training on innovative assessment techniques are more likely to appreciate their pedagogical benefits. On the other hand, learners who are accustomed to passive learning methods may

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struggle to adapt to interactive assessment practices, viewing them as less structured or even unfair compared to conventional testing methods (Gikandi, et al., 2011). This discrepancy highlights the importance of clear communication and proper orientation for both educators and learners regarding the purpose and value of interactive assessment.

Conclusions

Based on the findings of the study, the researcher concluded that rural elementary schools demonstrate moderate to high readiness in revolutionizing education, particularly through integrating artificial intelligence, enhancing teaching competencies, and automating administrative tasks. While strategic planning and professional development programs are evident strengths, gaps in resource allocation and collaboration with technology firms hinder optimal readiness.

More so, instructional automation is effectively leveraged in improving teacher-computer interactions, automating instructional development, and supporting learner databases. While automation enhances efficiency and productivity, it also raises concerns about reduced teacher-learner interactions, emphasizing the need for a balanced approach to technology integration that preserves human connections in learning environments.

Pen-and-paper tests remain a cornerstone of assessment practices, complemented by offline computer-aided exams, game-based exams, and practical exams. These diverse methods cater to different learning needs, with practical exams particularly excelling in promoting active participation and real-world application of knowledge.

There is also a significant positive relationship between revolutionizing education and leveraging instructional automation, particularly in areas like enhancing teaching competencies and automating administrative tasks. These findings confirm that professional development and technological integration are crucial for advancing education in rural contexts. A similar positive relationship exists between education revolution and interactive assessment methods, which foster creativity and technological fluency.

Lastly, differences between teachers and learners' perceptions suggest a gap in the adoption and acceptance of educational innovations. Learners consistently rate schools as highly ready for technology integration, while teachers express moderate readiness, pointing to the need for enhanced training and collaborative strategies to bridge this divide and create shared ownership of educational advancements.

Recommendations

Based on the conclusions of the study, the researcher recommends the following:

1. It would be beneficial for rural schools to focus on comprehensive training programs designed to help teachers effectively integrate artificial intelligence, automation tools, and innovative assessment methods. Tailoring these programs to address specific technical skill gaps could foster greater confidence and competence among educators.
2. Schools may consider increasing investments in resources, including modern hardware, software, and infrastructure, to support the seamless integration of automation technologies and interactive assessment tools.
3. Establishing stronger collaborations with technology companies could provide schools with access to advanced tools, ongoing technical support, and customized solutions. These partnerships might also offer opportunities for knowledge sharing and innovation tailored to the unique needs of rural education.
4. Schools might explore ways to balance the use of automation with maintaining meaningful teacher-learner interactions. Using technology strategically to streamline administrative tasks while preserving personal connections in teaching could enrich the overall learning experience.
5. It could be valuable for schools to continue diversifying assessment methods by incorporating game-based and offline computer-aided exams alongside traditional pen-and-paper tests. Placing greater emphasis on practical exams might also support real-world skill application and experiential learning.
6. Schools might consider implementing collaborative activities such as workshops and focus groups to align teachers' and learners' perceptions of educational innovations.
7. Future researchers may conduct research across multiple rural regions to compare the effectiveness of instructional automation and interactive assessment in diverse educational settings includes both public and private rural elementary schools to identify variations in implementation.

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