



Effects of Communication Management Practices on Project Performance: A Case of Kayonza Irrigation and Integrated Watershed Management Project in Rwanda

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Abstract: The general objective of this study was to assess the effect of communication management practices on project performance, with specific focus on Kayonza Irrigation and Integrated Watershed Management Project in Rwanda. Quantitative data were analysed using SPSS version 29 through descriptive statistics, Pearson correlation, and multiple regression to determine how each communication management component predicts project performance. The regression findings showed that communication management practices had a statistically significant positive effect on performance of the Kayonza Irrigation and Integrated Watershed Management Project. Specifically, communication planning had a positive and significant effect on project performance with $\beta = 0.128$, $t = 3.048$, and $p = 0.003$. Communication plan implementation also had a strong positive and significant effect with $\beta = 0.408$, $t = 8.000$, and $p = 0.000$. Communication monitoring and control positively and significantly influenced project performance with $\beta = 0.126$, $t = 2.800$, and $p = 0.006$. Interactive communication further had a positive and significant effect with $\beta = 0.296$, $t = 5.103$, and $p = 0.000$ all have a statistically significant positive effect on the performance of the Kayonza Irrigation and Integrated Watershed Management Project. The study concludes that these communication practices are vital determinants of project outcomes, with implementation serving as the strongest predictor of success. The researcher recommends that project management institutionalize digital feedback logging systems to further enhance operational responsiveness and stakeholder alignment.

Keywords: Communication Management Practices, Communication Planning, Communication Plan Implementation, Communication Monitoring and Control, Interactive Communication, Project Performance

How to cite this work (APA):

Nyampinga, A. & Dushimimana, J. D. (2026). Effects of Communication Management Practices on Project Performance: A Case of Kayonza Irrigation and Integrated Watershed Management Project in Rwanda. *Journal of Research Innovation and Implications in Education*, 10(4), 609 – 620. <https://doi.org/10.59765/jv63l>

1. Introduction

Rwanda has recorded progress in irrigation expansion; however, performance gaps remain evident when assessed through percentage-based indicators. Audit findings indicate that certain planned works were either not executed or not verifiable, representing approximately 5%–10% of total project expenditures across selected sites. Although the national irrigation target aimed at exceeding 100,000 hectares, only about 66.6% of the target had been achieved by 2022, reflecting incomplete project delivery in terms of coverage and output realization (Office of the Auditor General, 2022).

National statistics show that only 7.5% of farmers practiced irrigation in Season A and 12.1% in Season B, compared to 58.2% in Season C, indicating strong seasonal imbalance in irrigation utilization (NISR, 2024).

In irrigation and watershed programmes, only about 57% of planned annual budgets were executed within the financial year, while approximately 77% of planned activities were achieved, leaving a gap of nearly 23% in target completion (IFAD, 2024).

A study conducted by Mwitirehe *et al.* (2024) identified considerable disparities in the reliability of drinking water among districts, characterized by recurrent inconsistencies in supply patterns. Twagirayezu (2023) noted that Rwanda's water quality management and service delivery are still facing problems. Author said that not enough public information about treatment processes and safety standards makes people less confident in the system. A study of Rwanda's road infrastructure projects found that poor coordination between contractors, district authorities, and supervising agencies often led to delays and cost overruns (Nsabimana, 2020).

Research on community health interventions in Rwanda found that project adoption at the community level was hampered by limited feedback systems, inconsistent information sharing, and ambiguous communication roles. Weak communication between project teams, local leaders, and beneficiaries often led to misunderstandings, less participation, and delays in implementation (Mukamana & Uwizeye, 2021).

Office of the Auditor General (2022), NISR (2024), IFAD (2024), Nsabimana (2020), Mukamana and Uwizeye (2021), Mwitirehe et al. (2024), and Twagirayezu (2023) all show that Rwanda's projects have problems with coordination, system failures, and poor information flow. However, they do not look at how people communicate. This study fills that gap by looking at how managing communication affects performance in Kayonza Irrigation and Integrated Watershed Management Project.

1.1 General Objective

The general objective of this study was to assess the effect of communication management practices on performance of Kayonza Irrigation and Integrated Watershed Management Project in Rwanda.

1.2 Specific Objectives

1. To examine the effect of communication planning on performance of Kayonza Irrigation and Integrated Watershed Management Project.
2. To assess the effect of communication plan implementation on performance of Kayonza Irrigation and Integrated Watershed Management Project.
3. To evaluate the effect of communication monitoring and control on performance of Kayonza Irrigation and Integrated Watershed Management Project.
4. To examine the effect of interactive communication on performance of Kayonza Irrigation and Integrated Watershed Management Project.

2. Literature Review

2.1 Theoretical Review

This study applied Participatory Communication Theory, Shannon and Weaver Communication Theory, Theory of Change, and Control Theory to guide the interpretation and explanation of communication management practices and their influence on project performance.

2.1.1 Shannon and Weaver Communication Theory

The Shannon and Weaver Communication Theory came out in 1949 as a way to explain communication as a structured way for signals to move across a channel. The model sees communication as a process that moves information from one place to another clearly and with measurable accuracy (Graf, 2024). This is the basis for

modern studies of communication. This model shows how important it is to choose the right channel, structure your message, and let information flow. Encoding, transmission, and decoding are the three steps that make up a communication process. These components enable the perception of communication as a measurable process, wherein the efficiency of information transmission from sender to receiver dictates the level of clarity (Greguras, 2021).

Subsequent interpretations demonstrate the model's utility in analyzing language, social significance, and message clarity in public contexts. Research analyzing political discourse or public expression employs the model to elucidate the mechanisms through which messages penetrate audiences, and how clarity, precision, and encoding influence public perception and decision-making processes (Sianipar et al., 2024). The idea makes it even clearer that communication can be noisy. Noise is anything that gets in the way of a message being sent while it is on its way. Research on noise in communication examines how interruptions alter comprehension, redirect attention, and construct meaning in both artistic and technological domains (Goddard, 2022). No matter what you think, the Shannon and Weaver model is still a useful tool for understanding how communication works. Even though social, cultural, and technical contexts have changed, it is still a useful model for understanding how information is shared, how clarity is built, and how obstacles affect interpretation (Graf, 2024).

This study utilized the Shannon and Weaver Communication Theory to elucidate how effective communication planning can improve project performance via clear message design, suitable channel selection, and diminished communication noise within Kayonza Irrigation and Integrated Watershed Management Project.

2.1.2 Theory of Change

Carol Weiss came up with the theory in 1995. It gives a structured way to explain how actions move toward their intended results through sequences that are shaped by the situation. This foundation helps planners understand how assumptions, situations, and practical steps work together to create intentional progress toward long-term change in specific situations (Hasan et al., 2021). This idea makes planning better because it encourages careful thought about paths, connections, and first steps that will help things move forward in the future. It helps people think about the things that affect progress and helps decision-makers come up with actions that fit the needs of the community and the logic that governs change in complex settings (Murphy & Jones, 2021). The Theory of Change also helps with resilience work by focusing on stability, capacity, and adaptability. It helps communities learn how change happens in everyday life and how strengths can help development even when things are uncertain. This perspective highlights the impact of pragmatic strategies on development in real-world situations characterized by persistent stress (Rachmad, 2022).

Examples in urban systems show how this method makes it easier for people to work together on planning and

guiding their communities. It encourages structured dialogue where communities connect their lived experiences to overarching goals. This clarity allows local actors to adapt to changing circumstances and improves collaboration across social and economic contexts, thereby significantly influencing daily welfare and collective development (Mugagga et al., 2025). Theory of Change is a useful way to connect ideas, actions, and results using simple logic. It promotes meticulous planning, enhances situational awareness, and offers a framework for communities to maintain focus and attain enduring success through collective purpose and structured reflection (Hasan et al., 2021).

The study utilized the Theory of Change to elucidate how the execution of the communication plan will convert intended communication activities into quantifiable performance results. The theory clarified how structured communication actions will connect inputs to outputs and outcomes by looking at role execution, routine briefings, stakeholder updates, and field dissemination. This improved project performance, strengthen coordination, and improve the flow of information throughout the life cycle of Kayonza Irrigation and Integrated Watershed Management Project.

2.1.3 Control Theory

Control theory began in 1868 when mathematical regulation of dynamic systems was formally articulated through feedback and stability analysis. This moment laid the groundwork for controlling system behavior, which later grew into modern control science that includes engineering, natural systems, and complex networks. In Colombia, the growth of automation goes hand in hand with different industrial eras that changed how technology and production were organized. Control systems evolved through energy, material, and digital phases, mirroring transformations in industrial structure and national technological capabilities from Industry 1.0 to Industry 4.0 (Quijano & Cotrino, 2023).

Mathematically defined control actions can be used to change the patterns of vegetation. Optimal control frameworks enable the regulation of spatial and temporal pattern transitions in arid ecosystems. These methods allow for intentional management of ecological states by regulating intervention in reaction–diffusion systems (Hou et al., 2025). More and more, engineering systems work without clear physical models. Data-driven predictive control offers a framework for regulating system behavior through the utilization of measured input-output data. Structured data-based formulations enable predictive performance and constraint management in the face of uncertainty (Verheijen et al., 2023).

One way to look at neural activity is through the structure and controllability of networks. Network Control Theory explains how brain states change based on how the brain is connected. Control energy and average controllability are two ways to measure how much neural regions can affect global dynamics (Parkes et al., 2024).

Control Theory was applied to explain how communication monitoring and control will influence

project performance through continuous feedback, corrective actions, and alignment with project objectives. The theory helped us evaluate how well feedback logging, handling rumors, escalating changes, and clearing up disputes are working. It showed how systematic communication oversight will help make changes on time, cut down on mistakes, and keep performance standards high in Kayonza Irrigation and Integrated Watershed Management Project.

2.1.4 Participatory Communication Theory

Participatory Communication Theory, initially formulated by Paulo Freire in 1970, posits that communication acquires significance through communal reflection cultivated within communities. Communication is defined as a collaborative endeavor that facilitates the articulation of experiences, the analysis of social conditions, and the direction of choices impacting lives, executed with collective awareness and presence (Servaes & Servaes, 2021). People in a community shape conversation, frame concerns, and create understanding through ongoing reflection. This is how communication works. Participation enhances communication by incorporating local knowledge, social memory, and practical experience into discussions, guaranteeing that meaning is generated from within communities rather than being imposed through external dictates in their absence (Hou, 2023).

This way of thinking also applies to consumers, where participation makes communication between producers and consumers better. When individuals share their experiences and assessments, communication transforms into a collaborative endeavor that fosters collective understanding. This demonstrates that participatory communication is relevant in various social and economic contexts, where active engagement influences the nature and trajectory of communication processes (Rachmad, 2023). A motivational viewpoint enhances this theory further. When people in a community feel heard and valued in conversations, communication becomes meaningful. This makes it easier for people to express themselves, feel confident, and work together toward a common goal when making decisions together. It also makes the link between communication, experience, and shared action stronger by using the community's own environment (Rachmad, 2024).

Digital communication environments extend this theory into interactive realms that enable communities to freely influence discourse. These places promote group creativity and offer open spaces where people can make meaning together. This growth shows that participatory communication is still an important part of communication processes that are shaped by community presence and collective intention (Delgado et al., 2023).

This study employed Participatory Communication Theory to elucidate how interactive exchanges improve performance via feedback, shared meaning, and collective engagement. Utilizing this theory, the study demonstrated that active involvement of stakeholders in Kayonza Irrigation and Integrated Watershed Management Project enhances coordination, increases responsiveness, and facilitates effective project execution.

2.2 Empirical Review

This section focuses on examining published studies, peer-reviewed articles, and related scholarly work to gather and synthesize existing empirical evidence on the topic under investigation.

2.2.1 Effect of Communication Planning on performance of project

Akintelu et al. (2023) investigated the impact of project communication management on successful project delivery within the construction sector, employing a survey research methodology in Lagos State, Nigeria. The researcher gave 133 construction workers questionnaires, and The researcher used descriptive statistics and simple linear regression to look at the 101 valid responses. The results indicated that the communication plan and medium had a statistically significant impact on timely project delivery, with the model accounting for 70.1% of the variation in project performance ($R^2 = 0.701$; Adjusted $R^2 = 0.695$). The communication plan ($\beta = 0.498$, $p < 0.05$) and the communication medium ($\beta = 0.720$, $p < 0.05$) both showed positive effects, but they were only low to average. A good project communication plan is still a key factor in getting a construction project done on time and successfully.

Rotich et al. (2022) investigated the impact of communication planning on the execution of water construction projects in Bomet County, Kenya, employing a descriptive survey methodology. Data were gathered from a target population of 440 respondents, with a sample size of 164 selected from 88 water projects and subsequently analyzed using descriptive statistics and regression analysis. The results demonstrated that communication planning exerted a positive and statistically significant effect on project implementation, accounting for 43.2% of the variance ($R^2 = 0.432$), which rose to 49.3% upon the inclusion of technology integration. The regression model was statistically significant ($F = 98.068$, $p = 0.000$), indicating that proficient communication planning improves the execution of water construction projects.

2.2.2 Effect of Communication Plan Implementation on performance of project

Kibet's (2023) study looked at how staff at the Kenya Rural Roads Authority in Elgeyo Marakwet County, Kenya, thought that putting a communication plan into action would affect how a project was carried out. The study utilized an explanatory research design and gathered data from a target population of 122 KeRRA staff, with a sample size of 94 respondents chosen via simple random sampling. The researcher used questionnaires to collect data, and then the researcher used descriptive statistics, Pearson correlation, and regression analysis to look at the data. The results demonstrated that communication strategies exerted a positive and statistically significant impact on project implementation ($\beta = 0.182$, $p < 0.01$), suggesting that the implementation of an effective communication plan enhances coordination and facilitates the successful execution of road infrastructure projects.

Usanase and Irechukwu (2022) assessed the impact of project communication management on the performance of specific non-governmental organization projects in Kigali, Rwanda, utilizing the Promotion for Financial Inclusion for Smallholder Farmers (PROFIFA) project as a case study. The study utilized a descriptive research design incorporating correlation and regression analysis, employing both qualitative and quantitative methodologies, and gathered data from a sample of 302 respondents, including smallholder beneficiaries and project team members. The results indicated that components of the communication plan, specifically content planning (81.3%) and information frequency (71.8%), had a significant impact on timely delivery ($\beta = 0.199$, $p = 0.001$). Additionally, communication implementation practices, encompassing both written and nonverbal communication, significantly influenced service quality, suggesting that proficient communication management enhanced project performance.

2.2.3 Effect of Communication Monitoring & Control on performance of project

Muneer et al. (2022) conducted a quantitative study in Pakistan's construction industry to assess the influence of organizational culture, communication management, and project scope clarity on construction project success, while considering the moderating effect of project manager competencies. Data were collected through questionnaire surveys administered in two phases to construction professionals and analyzed using correlation, linear regression, multiple regression, and moderation analysis. The results indicated that communication management exerted a positive and statistically significant impact on construction project success ($\beta = 0.508$, $p < 0.05$ in phase one and $\beta = 0.478$, $p < 0.05$ in phase two). Additionally, organizational culture ($\beta = 0.437$; $\beta = 0.430$) and project scope clarity ($\beta = 0.426$; $\beta = 0.389$) also exhibited significant positive influences. Communication management includes both monitoring and control of communication; they should not be thought of as separate things. Adding project manager skills to the mix made these relationships stronger, bringing the explained variation in project success up to 71.2% ($R^2 = 0.712$). This shows that good communication management, which includes monitoring and control systems and is backed up by skilled project leadership, made construction projects much more likely to succeed.

Singirankabo and Wanjiku's (2023) study looked at how project communication practices affected the performance of International Non-Governmental Organization projects in Rwanda. They used a descriptive correlational design with both qualitative and quantitative methods. Based on data from 170 INGO project staff, the results indicated that results-oriented communication practices were closely aligned with communication monitoring and control via performance feedback, task communication, and the utilization of information in problem-solving. Giving feedback on performance was strongly linked to cost efficiency ($r = 0.122$, $p = 0.035$), and task communication was also strongly linked to cost efficiency ($r = 0.123$, $p = 0.034$). This shows that structured monitoring and control of communication improved project schedules, cost efficiency, and overall project performance.

2.2.4 Effect of interactive communication practices on performance of project

Kaunda et al. (2023) investigated the impact of interactive communication on performance within micro and small enterprises in Kenya, providing robust empirical insights relevant to project contexts. Their results showed that interactive communication was responsible for 30.7 percent of the differences in performance, which shows how important it is in determining results. A regression coefficient of $\beta = .319$ showed that making interactive engagement better leads to measurable improvements in performance. The study found that frequent dialogue, collaborative platforms, and responsive communication mechanisms help organizations better understand what stakeholders want. The results were statistically significant at $t = 12.510$, $p < 0.05$. These findings underscore that interactive communication improves coordination, facilitates prompt decision-making, and positively impacts the efficacy and overall performance of project-related activities.

Ingabire and Odengo's (2025) study shows how interactive communication affects the success of child protection and education projects in Rwanda. The results showed that most respondents agreed with participatory communication ($M = 4.27$), which shows that being actively involved and having open conversations improves project execution. The regression results showed that participatory communication improved project performance by 1.354 units ($p = 0.000$), which confirms its strong predictive effect. Even though results-driven and feedback communications had negative coefficients, the results show that communication that requires joint interaction and beneficiary engagement leads to better project outcomes. The study emphasizes that substantive engagement, transparent communication channels, and ongoing interaction with stakeholders enhance project alignment and markedly elevate overall performance.

3. Methodology

3.1 Research Design

This study employed a combination of descriptive and correlational research designs. Descriptive research was utilized to evaluate interactive, push, and pull communication practices, whereas correlational research investigated their association with project performance. The researcher will collect both quantitative and qualitative data. Closed-ended questions were used to collect quantitative data, and open-ended questions were used to collect qualitative data.

3.2 Study Population

The target population consisted of 369 individuals directly engaged in Kayonza Irrigation and Integrated Watershed Management Project.

3.3 Sampling

The sample size was determined by the help of Slovin's formula, $n = 192$

3.3.1 Sampling Selection Technique

The researcher utilized stratified sampling and simple random sampling in accordance with project communication research guidelines established by Ingabire and Odengo (2025). The population was categorized into four strata: project management team, technical staff, local authorities, and beneficiaries. Then, a simple random sampling method was used to pick participants from each stratum to make sure the sample is representative. This method guarantees a variety of points of view because all respondents are directly involved in the project's communication processes.

3.4 Data Collection Methods and Instruments

This study employed both open-ended and closed-ended inquiries. For closed-ended questions, a 5-point Likert scale were used, with choices from "Strongly Agree" to "Strongly Disagree." For open-ended questions, respondents were free to share their thoughts on communication practices. There will be 192 questionnaires sent out.

3.5 Pilot Study, Validity and Reliability

A pilot study is a preliminary test done before the main data collection to see how clear, useful, and reliable research tools are. It makes sure that procedures and tools work well before they are used on a larger scale (Goddard, 2022). In this study, the pilot had consisted of 19 respondents, representing 10% of the sample size, selected from Mpanga Irrigation Projects in Kirehe District. Feedback from the pilot had been used to revise unclear questions and to confirm that the research tool functioned effectively.

3.5.1 Validity

Experts with deep knowledge of communication management and project environments had reviewed the questionnaire. Their evaluations had then been measured using the Content Validity Index (CVI), with a threshold of 0.70 or higher required for acceptance.

The Content-Validity-Index (CVI) was determined by dividing the total-number-of relevant items (n) in the instrument by the total-number-of items (N).

The questionnaire was determined to be legitimate when the CVI was larger than 0.70.

The Content Validity Index was 0.83, which is higher than the 0.70 threshold, indicating that 20 out of the 24 items were valid.

3.5.2 Reliability

The pilot test had employed Cronbach's alpha to assess the internal consistency of items measuring communication practices and project performance. Reliability had been confirmed where values exceeded the threshold of 0.70.

The Cronbach's alpha values are as follows: Communication Planning at 0.812, Communication Plan Implementation at 0.824, Communication Monitoring & Control at 0.817, Interactive Communication at 0.829, and Project Performance at 0.836.

3.6 Data Analysis

The researcher had used version 29 of the Statistical Package for the Social Sciences (SPSS) to generate descriptive statistics, conduct bivariate correlation analysis, and perform multiple regression analysis. Descriptive statistics had encapsulated respondent attributes and their perspectives on communication planning, implementation of communication plans, monitoring and control of communication, and interactive communication. Correlation analysis had determined the direction and strength of relationships between communication practices and project performance, while regression analysis had clarified the predictive impact of each communication dimension. Together, these methods had provided a comprehensive picture of how communication management practices influenced performance in the Kayonza Irrigation and Integrated Watershed Management Project.

3.7 Ethical Considerations

Ethical considerations are the rules and guidelines that researchers must follow when working with people (Rachmad, 2023). This study had adhered to fundamental ethical principles, including informed consent, voluntary participation, confidentiality, and respect for participants. Prior to data collection, all participants had been given a clear explanation of the study's goals and methods, after which they signed consent forms agreeing to take part. Participants had been informed of their right to withdraw at any stage without negative consequences. The researcher had avoided collecting unnecessary personal information and had securely stored the completed questionnaires. To protect individual privacy, results had been presented in aggregate rather than as separate responses. Formal permission for data collection had been granted by the University of Kigali and the appropriate local authorities in Kayonza District.

4. Results and Discussions

4.1 Response Rate

The response rate is a critical indicator of the reliability and representativeness of the data collected in a research study. It demonstrates the level of engagement from the intended study population and ensures that findings are based on sufficient input to draw valid conclusions regarding the project performance.

Table 1: Response Rate

Questionnaires	Frequency	Percentage (%)
Returned Complete	187	97.4
Returned Incomplete	5	2.6
Unreturned	0	0.0
Total	192	100.0

Source: Field Data, 2026

The results in Table 1 indicates the distribution of questionnaires distributed to the staff and stakeholders of the Kayonza Irrigation and Integrated Watershed Management Project. A total of 187 questionnaires, representing 97.4%, were returned complete and valid for analysis, while 5 questionnaires were returned incomplete, accounting for 2.6%. The absence of unreturned questionnaires confirms that 100.0% of the distributed tools were accounted for. This high completion rate provides a solid foundation for achieving

the study objectives regarding communication management practices.

4.2 Correlation Analysis

Correlation analysis is conducted to measure the degree of association between the independent variables and the dependent variable. It provides an initial understanding of how changes in communication practices relate to fluctuations in project performance.

Table 2: Correlation matrix

		Communication Planning	Communication Plan Implementation	Communication Monitoring and Control	Interactive Communication	Performance of Project
Communication Planning	Pearson	1	.555**	.667**	.673**	.684**
	Correlation					
	Sig. (2-tailed)		.000	.000	.000	.000
	N	187	187	187	187	187
Communication Plan Implementation	Pearson	.555**	1	.612**	.756**	.816**
	Correlation					
	Sig. (2-tailed)	.000		.000	.000	.000
	N	187	187	187	187	187
Communication Monitoring and Control	Pearson	.667**	.612**	1	.805**	.757**
	Correlation					
	Sig. (2-tailed)	.000	.000		.000	.000
	N	187	187	187	187	187
Interactive Communication	Pearson	.673**	.756**	.805**	1	.849**
	Correlation					
	Sig. (2-tailed)	.000	.000	.000		.000
	N	187	187	187	187	187
Performance of Project	Pearson	.684**	.816**	.757**	.849**	1
	Correlation					
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	187	187	187	187	187

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Field Data, 2026

The results in Table 2 indicates that there is a positive and significant relationship between communication planning and project performance, with a Pearson correlation coefficient of 0.684 and a p-value of 0.000. This indicates that as the quality of communication planning improves, the project performance increases significantly. Since the p-value is less than the 0.05 significance level, the relationship is statistically strong.

Regarding the relationship between communication plan implementation and project performance, a Pearson correlation coefficient of 0.816 and a p-value of 0.000 were observed. This strong positive coefficient reveals that consistent implementation of communication plans is highly associated with better project outcomes. This result is statistically significant, confirming that implementation is a vital driver of performance.

The relationship between communication monitoring and control and project performance is shown by a Pearson correlation coefficient of 0.757 and a p-value of 0.000. This demonstrates a significant positive correlation, suggesting that structured monitoring and control mechanisms effectively contribute to improved project results. The significance level confirms the reliability of this association.

Finally, interactive communication shows a strong positive relationship with project performance, evidenced by a Pearson correlation coefficient of 0.849 and a p-value of 0.000. This indicates that promoting interactive dialogue is strongly associated with enhanced project

delivery. The p-value being less than 0.05 confirms that this correlation is statistically significant.

The correlation analysis confirms that all four communication management practices are positively and significantly related to the performance of the Kayonza Irrigation and Integrated Watershed Management Project.

The strong positive correlations identified between all communication variables and project performance are consistent with the research of Singirankabo and Wanjiku (2023), who found that results-oriented communication practices directly correlate with project efficiency. Similarly, the study by Nyeko (2022) underscores that open environments facilitating feedback are essential for an organization to work well, which validates the high correlation coefficients observed here. The correlation between these variables and performance supports the Shannon and Weaver Communication Theory, as it demonstrates that when channels are used effectively and noise is minimized, the accuracy of the transmission results in higher project success.

4.3 Regression Analysis

Regression analysis is used to determine the predictive power of the independent variables on the project performance. This includes the Model Summary, which assesses the model's goodness of fit; the ANOVA, which tests the overall significance of the model; and the Coefficients table, which evaluates the individual contribution of each predictor.

Table 3: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.903 ^a	.816	.812	.17393	1.675

a. Predictors: (Constant), Interactive Communication, Communication Planning, Communication Plan Implementation, Communication Monitoring and Control

b. Dependent Variable: Performance of Project

Source: Field Data, 2026

The results in Table 3 indicates that the R value is 0.903, which suggests a very strong positive correlation between the combined independent variables and project performance. The R Square value of 0.816 reveals that 81.6% of the variation in project performance can be explained by the communication management practices adopted in the project. This signifies that the model is well-fitted for the study. Furthermore, the Durbin-Watson value of 1.675 falls within the acceptable range, indicating that there is no major issue with autocorrelation in the residual terms. The model effectively captures the impact of communication management on the project's performance.

The high explanatory power (R Square) of the model in this study supports the findings of Akintelu et al. (2023), who determined that communication planning and media usage account for a significant portion of project performance variance. The Durbin-Watson statistic, which confirms the reliability of the model, is consistent with the methodology emphasized by Rotich et al. (2022) in their work on water construction projects. This overall model validity is supported by the Theory of Change, which validates the logical path from communication interventions to measurable performance outcomes.

Table 4: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.370	4	6.093	203.100	.000 ^b
	Residual	5.506	182	.030		
	Total	29.876	186			

a. Dependent Variable: Performance of Project

b. Predictors: (Constant), Interactive Communication, Communication Planning, Communication Plan Implementation, Communication Monitoring and Control

Source: Field Data, 2026

The results in Table 4 indicates that the F-statistic value is 203.100, which is highly significant as evidenced by a p-value of 0.000. This p-value is well below the 0.05 significance level, which demonstrates that the regression model is statistically significant in predicting project performance. The model's ability to explain the relationship is confirmed by the high F-value, suggesting that the chosen predictors are appropriate. Overall, this finding supports the validity of using communication management practices to forecast improvements in project performance.

The statistical significance of the regression model is in line with the study by Kaunda et al. (2023), which demonstrated that interactive communication models provide a significant and measurable prediction of project performance. The model's significance confirms that the project's chosen communication predictors are highly appropriate for analyzing success, matching the conclusions of Muneer et al. (2022) regarding the impact of integrated communication management on project success. This result is further supported by the Control Theory, as it proves that the regulated flow of information acts as a reliable predictor of the project's state of stability and performance.

Table 5: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics		
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.192	.154		1.247	.214		
	Communication Planning	.128	.042	.138	3.048	.003	.498	2.007
	Communication Plan Implementation	.408	.051	.390	8.000	.000	.424	2.356
	Communication Monitoring and Control	.126	.045	.155	2.800	.006	.323	3.095
	Interactive Communication	.296	.058	.337	5.103	.000	.230	4.342

a. Dependent Variable: Performance of Project

Source: Field Data, 2026

The results in Table 5 indicates that the coefficient for communication planning is 0.128, with a t-statistic of 3.048 and a p-value of 0.003. Since the p-value is less than 0.05, communication planning has a statistically significant positive effect on project performance. The VIF value of 2.007 is well below 10, indicating no multicollinearity issues. Therefore, the study rejects the null hypothesis regarding communication planning.

Regarding communication plan implementation, the coefficient is 0.408, with a t-statistic of 8.000 and a p-value of 0.000. This confirms that implementation has a significant and strong positive effect on performance. The VIF value of 2.356 shows that there is no multicollinearity concern. Consequently, the study rejects the null hypothesis for this variable.

For communication monitoring and control, the coefficient is 0.126, a t-statistic of 2.800, and a p-value of 0.006. This indicates that monitoring and control practices significantly and positively influence project performance. The VIF value of 3.095 is within the acceptable limit. Thus, the null hypothesis for this variable is also rejected.

Finally, the coefficient for interactive communication is 0.296, with a t-statistic of 5.103 and a p-value of 0.000. This demonstrates a statistically significant positive effect on project performance. With a VIF value of 4.342, the model remains free from problematic multicollinearity. As a result, the study rejects the null hypothesis for interactive communication.

The significant coefficients for all independent variables communication planning, implementation, monitoring and control, and interactive communication mirror the findings of Ingabire and Odengo (2025), who found that participatory and interactive engagement significantly improves project outcomes. Additionally, the importance of individual communication components aligns with the results of Usanase and Irechukwu (2022), who observed that both content planning and information frequency were major drivers of timely delivery. The rejection of the null hypotheses, supported by these coefficients, confirms the theoretical assertion of the Participatory Communication Theory that active stakeholder engagement is a key factor in improving the responsiveness and execution of development projects.

4.4 Decision on Null Hypotheses

Table 6: Hypotheses Results

Hypotheses	P value	Decision
H₀₁: There is no significant effect of communication planning on performance of Kayonza Irrigation and Integrated Watershed Management Project.	.003	Rejected
H₀₂: There is no significant effect of communication plan implementation on performance of Kayonza Irrigation and Integrated Watershed Management Project.	.000	Rejected
H₀₃: There is no significant effect of communication monitoring and control on performance of Kayonza Irrigation and Integrated Watershed Management Project.	.006	Rejected
H₀₄: There is no significant effect of interactive communication on performance of Kayonza Irrigation and Integrated Watershed Management Project.	.000	Rejected

The study concludes that all four null hypotheses are rejected, as the results consistently show that communication planning, implementation, monitoring and control, and interactive communication all have a statistically significant positive effect on the performance of the Kayonza Irrigation and Integrated Watershed Management Project.

4.5 Discussion of Research Findings

4.5.1 Communication Planning and project performance

The results regarding communication planning align with the perspectives of Akintelu et al. (2023), who emphasize that a well-structured planning phase is the cornerstone of project success. The high level of agreement among respondents suggests that the Kayonza Irrigation and Integrated Watershed Management Project benefits from proactive message sequencing and stakeholder mapping, consistent with the view of Rotich et al. (2022) that such

preparation reduces uncertainty. This variable is supported by the Shannon and Weaver Communication Theory, which posits that encoding and structuring messages before transmission are essential for achieving measurable accuracy and clarity in information flow.

4.5.2 Communication Plan Implementation and project performance

The findings on communication plan implementation reflect the observations of Kibet (2023), who argues that the transition from planning to operational practice is the most critical stage of project life cycles. The consistent execution of roles and routine briefings found in this study mirrors the findings of Subramaniam et al. (2022), who connect stable project operations directly to the continuous execution of communication processes. This objective is anchored in the Theory of Change, which explains how structured operational actions such as regular briefings and field dissemination successfully

convert planned communication activities into tangible project outputs.

4.5.3 Communication Monitoring and Control and project performance

The study's results regarding communication monitoring and control are consistent with the assertions of Verheijen et al. (2023), who define these practices as systematic processes necessary to keep dynamic project systems stable. The success of the Kayonza Irrigation and Integrated Watershed Management Project in using feedback logging and dispute resolution echoes the findings of Quijano and Cotrino (2023), who highlight these mechanisms as stabilizers in complex organizational contexts. This variable is supported by Control Theory, which provides the mathematical and conceptual framework for using feedback and corrective actions to maintain project performance standards.

4.5.4 Interactive Communication and project performance

The high regard for interactive communication in this study supports the findings of Kaunda et al. (2023), who emphasize that two-way dialogues are essential for real-time clarification and problem-solving. Furthermore, the role of consultative sessions in this project mirrors the observations of Delgado et al. (2023), who note that participatory engagement increases stakeholder ownership. This variable is grounded in the Participatory Communication Theory, which suggests that when community members and project teams engage in communal reflection and active dialogue, they foster shared meaning and collective action.

5. Conclusions and Recommendations

5.1 Conclusion

This section provides final conclusions drawn from the study's inferential results regarding the relationship between the identified communication practices and the performance of the Kayonza Irrigation and Integrated Watershed Management Project.

5.1.1 Communication Planning and project performance

The study concludes that communication planning is a fundamental prerequisite for the success of the Kayonza Irrigation and Integrated Watershed Management Project. Strategic planning ensures that stakeholders are appropriately mapped and that information flow is organized to meet the demands of the Kayonza Irrigation and Integrated Watershed Management Project. This practice directly contributes to the project's ability to achieve its performance targets and maintain stakeholder alignment.

5.1.2 Communication Plan Implementation and project performance

It is concluded that the implementation of communication plans serves as the most critical driver of project

performance within the Kayonza Irrigation and Integrated Watershed Management Project. The consistent execution of assigned responsibilities and the maintenance of regular briefings ensure that all teams are synchronized. Without the effective application of these strategies, the Kayonza Irrigation and Integrated Watershed Management Project would struggle to maintain the high standards of quality and stakeholder approval observed.

5.1.3 Communication Monitoring and Control and project performance

The study concludes that monitoring and control mechanisms are essential for protecting the integrity of the communication processes within the Kayonza Irrigation and Integrated Watershed Management Project. By establishing systems for feedback logging and dispute resolution, the project manages to neutralize the negative impacts of informal information flows and rumors. These controls are vital for ensuring that management decisions are grounded in accurate and timely communication for the Kayonza Irrigation and Integrated Watershed Management Project.

5.1.4 Interactive Communication and project performance

It is concluded that interactive communication is a powerful tool for fostering collaboration and clarity within the Kayonza Irrigation and Integrated Watershed Management Project. By facilitating dialogues and consultative sessions, the project empowers stakeholders to contribute to task clarification and expectation management. This approach significantly enhances the performance of the Kayonza Irrigation and Integrated Watershed Management Project by creating a sense of shared ownership among all participants.

The research confirms that effective communication management is positively and significantly linked to the performance of the Kayonza Irrigation and Integrated Watershed Management Project. The synergy between planning, implementation, monitoring, and interactive engagement creates a robust environment that fosters success for the Kayonza Irrigation and Integrated Watershed Management Project. By addressing these dimensions, the Kayonza Irrigation and Integrated Watershed Management Project has successfully met its goals regarding timely delivery, cost compliance, and stakeholder satisfaction.

5.2 Recommendations

The following recommendations draw on the study findings and highlight practical actions to address the identified gaps and improve performance.

1. The management team of the Kayonza Irrigation and Integrated Watershed Management Project should formalize the audience mapping process to ensure that newly identified stakeholders are integrated into the communication framework early in the project lifecycle.

2. Local leaders in Kayonza District should strengthen their role in supporting communication between the project team and community members. They should help in sharing accurate project information, mobilizing beneficiaries to attend consultative meetings, and reducing the spread of rumours within the project areas.
3. Beneficiaries of the Kayonza Irrigation and Integrated Watershed Management Project should actively participate in consultative meetings, feedback sessions, and community dialogues organized by the project. Their participation will help the project team understand community needs and improve communication between implementers and users of the irrigation infrastructure.

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