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# THE INFLUENCE OF PRINCIPALS' SERVANT LEADERSHIP AND TEACHERS' DIGITAL COMMUNICATION ON TEACHERS' INSTRUCTIONAL INNOVATION IN PUBLIC JUNIOR HIGH SCHOOLS (SMP NEGERI) IN PESISIR SELATAN REGENCY

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**ABSTRACT**

This study aims to analyze the influence of principals' servant leadership and teachers' digital communication on teachers' instructional innovation in public junior high schools (SMP Negeri) in Pesisir Selatan Regency, both partially and simultaneously. The study is motivated by the demands of 21st-century education, which require teachers to develop pedagogical strategies that are adaptive, creative, collaborative, and relevant to technological advancements. A quantitative approach with an explanatory survey design was employed. Data were collected from 327 teachers in public junior high schools across Pesisir Selatan Regency using a closed-ended, five-point Likert-scale questionnaire. The instrument consisted of 22 items measuring principals' servant leadership, 22 items for teachers' digital communication, and 27 items for teachers' instructional innovation. Data were analyzed using descriptive statistics, the Respondent Achievement Level (TCR), regression prerequisite tests, and multiple linear regression. The results indicate that principals' servant leadership achieved a mean score of 4.30 (TCR 86.03%), teachers' digital communication achieved a mean of 4.20 (TCR 84.06%), and teachers' instructional innovation achieved a mean of 4.01 (TCR 80.21%); all three fall into the "good" category. Individually, servant leadership has a positive and significant influence on instructional innovation ($t = 4.307$; $p < 0.001$), as does teachers' digital communication ($t = 3.105$; $p = 0.002$). Simultaneously, both independent variables exert a significant influence ($F = 59.856$; $p < 0.001$). An Adjusted $R^2$ value of 0.265 indicates that the model explains 26.5% of the variation in teachers' instructional innovation. These findings highlight the importance of empowering leadership and professional digital communication in supporting instructional innovation, while also underscoring the need to strengthen the development of new teaching methods

.**Keywords**: *junior high school teachers, school leadership, servant leadership, teachers' digital communication, instructional innovation*

## INTRODUCTION

Education is a process designed to develop the knowledge, skills, attitudes, values, and life competencies of learners. Law Number 20 of 2003 concerning the National Education System asserts that learning is an interaction among learners, educators, and learning resources within a learning environment. Social change, technological advancement, and economic dynamics mean that schools can no longer rely solely on maintaining routine instructional practices. Schools are expected to provide learning


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experiences that are adaptive, relevant, and capable of preparing learners to face increasingly complex life challenges.

These demands are linked to 21st-century competencies, including critical thinking, creativity, collaboration, communication, and digital literacy. Such competencies require an approach to learning that offers students opportunities to engage actively, develop ideas, collaborate, solve problems, and use information responsibly (Bialik et al., 2015; Trilling & Fadel, 2009; World Economic Forum [WEF], 2020). In this context, the quality of learning is determined not merely by the comprehensiveness of the material or the availability of technological tools, but also by a teacher's ability to design meaningful learning experiences.

Teachers occupy a central position in this process, as they are directly involved in the planning, implementation, assessment, and development of instruction. Law Number 14 of 2005 concerning Teachers and Lecturers defines teachers as professional educators tasked with educating, teaching, guiding, directing, training, assessing, and evaluating learners. These responsibilities require both mastery of subject matter and the ability to translate that knowledge into a pedagogical form that is accessible to students. Shulman (1986) highlights the importance of pedagogical content knowledge, while Koehler and Mishra (2009) emphasize that technology-enhanced learning requires the integration of technological, pedagogical, and content knowledge.

Educational innovation serves as a manifestation of a teacher's professionalism in responding to these changes. Innovation does not always mean creating something that has never existed before. Rogers (2003) explains that something is considered an innovation when it is perceived as new by the individual or group adopting it. Thus, the adaptation of methods, development of instructional media, utilization of technology, updating of assessment practices, and organization of learning activities can all constitute innovations, provided they are implemented purposefully to improve the learning process.

Fullan (2016) views educational change as a process involving understanding, acceptance, implementation, and sustainability. New ideas are not sufficient if they are merely known or planned; they must be implemented and evaluated to bring about improvements in educational practice. Thurlings et al. (2015) describe teachers' innovative behavior as a process encompassing the exploration, development, promotion, realization, and reflection upon new ideas. Similarly, research by Liu et al. (2024) defines teacher innovation as a construct that includes the development, testing, implementation, evaluation, and dissemination of new practices.

In a school setting, innovation can be manifested through a variety of teaching methods and strategies, the use of media and technology, the application of formative assessment, differentiated instruction, pedagogical experimentation, and professional collaboration. Strategies such as project-based learning, problem-solving, discovery-based learning, inquiry, the flipped classroom, and blended learning offer alternatives for enhancing student engagement. Concurrently, digital media, videos, simulations, interactive quizzes, and open educational resources can enrich the learning experience, provided they are selected in alignment with specific learning objectives and the nature of the subject matter. Innovations in assessment can also be achieved through portfolios, performance rubrics, formative feedback, self-assessment, and peer assessment (Koehler & Mishra, 2009; Wiliam, 2011).

However, educational innovation cannot be judged solely by the frequency with which a teacher uses an application or creates instructional media. The use of technology that is not integrated with pedagogical goals risks resulting in nothing more than a change in appearance, rather than a transformation of the learning experience. Teachers must also develop methods that cater to the diverse abilities, interests, readiness levels, and


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needs of their students. Therefore, educational innovation should be understood as a comprehensive process encompassing the generation of ideas, implementation, evaluation, and improvement.

A teacher's ability to develop innovations is not solely determined by their individual capacity. The school's organizational environment plays a crucial role in whether teachers are granted the space, support, and trust to develop their ideas. School principals hold a strategic position in shaping the working climate, managing resources, facilitating professional development, and fostering a collaborative culture. Research on educational leadership indicates that school leadership is linked to ...with the quality of the learning process, organizational climate, teacher performance, and student learning (Hallinger, 2011; Leithwood et al., 2004).

One leadership approach relevant to supporting teachers' professional development is servant leadership. Greenleaf (2002) posits that service to others is the starting point of leadership. A servant leader does not focus their leadership practice on the dominance of their position; instead, they use their authority to help others grow, develop, and become capable of fulfilling their responsibilities. This approach possesses both ethical and relational dimensions, as leaders must listen, understand the needs of their team members, build trust, and remain attentive to the interests of the organizational community.

Spears (2010) outlines the characteristics of servant leadership, including listening, empathy, relational healing, awareness, persuasion, conceptualization, foresight, stewardship, a commitment to the growth of others, and community building. Barbuto and Wheeler (2006) emphasize an altruistic calling, emotional healing, wisdom, persuasive mapping, and organizational stewardship. Van Dierendonck (2011) synthesizes characteristics such as empowerment, the development of others, humility, authenticity, interpersonal acceptance, stewardship, and the provision of direction. Eva et al. (2019) assert that servant leadership is an approach that prioritizes the interests and development of followers, while striving to provide benefits to individuals, the organization, and the broader community.

In this study, the servant leadership of school principals is operationalized through six indicators. First, empathy—the willingness to listen to teachers, understand their perspectives and needs, and pay attention to both their professional challenges and emotional well-being. Second, empowerment—granting trust, autonomy, opportunities for participation, and support so that teachers can develop their capacities. Third, service—the willingness to assist teachers in overcoming work-related obstacles and to facilitate their professional needs. Fourth, building community—an effort to foster togetherness, trust, and collaboration. Fifth, humility—an openness to receiving input, valuing contributions, and acknowledging one's own limitations. Sixth, vision and moral guidance—the ability to provide organizational direction while ensuring that decisions and changes remain grounded in ethical values.

These six aspects are directly relevant to the needs of innovation. Empathy helps school principals identify the obstacles faced by teachers; empowerment provides space for teachers to test new approaches; service ensures the provision of necessary support; community building expands the exchange of best practices; humility encourages openness to criticism; and vision and moral guidance ensure that innovation remains focused on the best interests of the students. Thus, servant leadership serves as an organizational factor that can foster courage, autonomy, and professional creativity among teachers.

Digital transformation in education does not merely change the medium through which material is delivered; it also transforms how teachers communicate, coordinate,


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share knowledge, and build professional networks. Digital communication among teachers involves the exchange of messages, information, ideas, learning resources, and feedback via digital media or platforms to support professional tasks. Such communication can take place between teachers, between teachers and school principals, between teachers and students, or with the broader educational community.

Platforms—such as messaging apps, email, digital classrooms, learning management systems, online forums, and professional networks—can be utilized to disseminate information, plan instruction, share teaching materials, discuss classroom issues, and provide feedback. Research by Grand-Clement et al. (2017), Lin et al. (2017), and Rivera-Vargas and Cobo (2020) indicates that the evolution of digital learning is linked to shifts in access, experience, and skills within education. Nevertheless, the use of technology must be directed toward educational goals rather than being perceived as an end in itself. The DigCompEdu framework by Redecker and Punie (2017) categorizes educators' digital competencies into several areas, including professional engagement, the management of digital resources, teaching and learning, assessment, the empowerment of learners, and the facilitation of learners' own digital competencies. This framework indicates that a teacher's digital proficiency is an integral part of their professional competence, encompassing the responsible selection, use, management, and evaluation of technology. Hodges et al. (2020) also emphasize the importance of design, interaction, accessibility, and support within systematically structured online learning.

Effective digital communication cannot be measured solely by the frequency of platform usage. The quality of communication also depends on the clarity of the message, the accuracy of the information, the relevance of the channel, responsiveness, openness to collaboration, and professional ethics. Trust et al. (2016) indicate that digital professional learning networks provide opportunities for teachers to share experiences, gain support, access learning resources, and develop teaching practices that transcend school boundaries. Such networks can serve as professional learning spaces that expand knowledge exchange and reflection.

Research by Tang (2021) examines the link between information and communication technology (ICT) and teacher innovativeness. Meanwhile, Wulandari et al. (2025) demonstrate that the use of ICT and knowledge sharing are associated with enhanced innovative work behavior among teachers. These findings suggest that digital communication can broaden access to the ideas, learning resources, and feedback necessary for updating pedagogical practices. However, these benefits depend on how technology is utilized and subsequently integrated into pedagogical practice.

For measurement purposes, teachers' digital communication in this study is broken down into six indicators. The use of digital platforms refers to the ability to select and employ media appropriate for professional communication objectives. Communication effectiveness relates to the delivery of messages that are clear, accurate, relevant, and easily understood. Digital collaboration encompasses joint lesson planning, discussions regarding classroom issues, and the provision of input via digital media. Sharing digital learning resources involves sending, curating, adapting, and discussing instructional materials or resources. Digital responsiveness pertains to the timeliness of responding to messages and acting upon information. Digital ethics and professionalism include courtesy, privacy, data protection, respect for copyright, and the verification of information.

Conceptually, servant leadership and digital communication offer distinct yet complementary pathways of contribution. Servant leadership provides organizational support, trust, empowerment, and a work climate that enables teachers to put forward their ideas. Digital communication provides channels for exchanging information, sharing


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learning resources, obtaining feedback, and building professional collaboration. In other words, leadership can create conditions that support change, while digital communication expands access and interaction, allowing ideas to flourish.

Previous studies have linked servant leadership to follower development, performance, creativity, and positive work behaviors (Eva et al., 2019; Liden et al., 2014). Other research has examined the relationship between the use of ICT, digital professional networks, and knowledge sharing with regard to teachers' innovativeness (Tang, 2021; Trust et al., 2016; Wulandari et al., 2025). Thurlings et al. (2015) also emphasize that teachers' innovative behavior is influenced by the interaction between individual factors and the work environment. Nevertheless, empirical research that integrates school principals' servant leadership and teachers' digital communication into a single model—specifically concerning instructional innovation in public junior high schools (SMP Negeri) in Pesisir Selatan Regency—remains limited.

The context of Pesisir Selatan Regency is relevant for study because its schools exist within diverse geographical conditions and resource environments. Disparities in access, facilities, and technological readiness across schools may affect professional communication and the implementation of innovations. Preliminary observations described in the thesis indicate that some teachers still tend to rely on conventional teaching methods, the variety of media used is inconsistent, and the application of technology is not yet fully directed toward creative and collaborative learning. Simultaneously, some school leadership practices remain focused more on administrative functions than on the empowerment and professional mentoring of staff.

Based on this, the present study aims to: (1) analyze the state of school principals' servant leadership; (2) analyze teachers' digital communication; (3) analyze teachers' instructional innovation; (4) examine the influence of school principals' servant leadership on teachers' instructional innovation; and (5) examine the influence of teachers' digital communication on teachers' instructional innovation. and (6) to examine the influence of both independent variables simultaneously on teachers' instructional innovation. The research hypotheses state that servant leadership has a positive and significant effect on instructional innovation (H1), digital communication has a positive and significant effect on instructional innovation (H2), and both variables together have a significant effect on instructional innovation (H3).

## METHODS

This study employs a quantitative approach, utilizing an explanatory survey design and a non-experimental associative framework. A quantitative approach was selected because the research variables are measured through empirical indicators converted into numerical scores, which are then statistically analyzed to examine the relationships between the variables (Creswell & Creswell, 2018; Sugiyono, 2022). The explanatory design is used to investigate how a school principal's servant leadership and teachers' digital communication predict variations in teachers' instructional innovation.

The independent variables in this study are the school principal's servant leadership (X1) and the teachers' digital communication (X2), while the dependent variable is the teachers' instructional innovation (Y). The relationships between these variables are tested using multiple linear regression, as the model involves two predictors analyzed both partially and simultaneously in relation to a single criterion variable (Field, 2018; Hair et al., 2019). In this article, the term "influence" refers to a statistical predictive relationship within the model. Given that the study utilizes a non-experimental survey design, the findings cannot be interpreted as definitive evidence of causality.


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The study will be conducted in public junior high schools (SMP Negeri) in Pesisir Selatan Regency, West Sumatra Province, during the 2025/2026 academic year. The research process is scheduled to span one semester, encompassing instrument preparation, pilot testing, data collection, data processing, statistical analysis, and the drawing of conclusions. The unit of analysis consists of public junior high school teachers who are actively engaged in instruction. School principals are not primary respondents; rather, their leadership behavior is assessed based on the perceptions of teachers, who experience these leadership practices firsthand.

The target population for this study comprises all teachers in public junior high schools (SMP Negeri) in Pesisir Selatan Regency for the 2025/2026 academic year—a total of 1,646 individuals distributed across 74 schools, according to data from the Pesisir Selatan Regency Education Office (2026). For the purposes of sampling operations, this study distinguishes between the target population and the accessible population. The accessible population comprises 1,041 teachers across 42 public junior high schools, selected with consideration for regional representation and school accreditation.

Table 1. Population and number of research respondents

| Category | Coverage | Number of teachers |
|---|---|---|
| Target population | 74 Public Middle Schools in Pesisir Selatan Regency | 1,646 |
| Accessible population | 42 public junior high schools that are research schools | 1,041 |
| Minimum size based on Slovin | Error rate 5% | 289 |
| Respondents analyzed | Research data reported in the abstract and analysis results | 327 |

The sample was determined using a multistage sampling technique. In the first stage, schools were selected based on regional representation and accreditation. In the second stage, the number of teachers participating in each school was determined based on proportional allocation. The minimum sample size was calculated using the Slovin formula with a 5% error rate (Sevilla et al., 2007), resulting in a minimum requirement of 289 teachers. The research data reported and analyzed consisted of 327 respondents.

It should be noted that the sample distribution table in the thesis totals 327 school allocations, while Slovin's calculation description lists 289 as the minimum. This article reports both figures as they are based on the source: 289 as the minimum calculation and 327 as the number of respondents analyzed. Before submission, the calculation sheets and the basis for rounding school allocations need to be reconfirmed to ensure consistent replication of the sampling procedure.

Instrument study in the form of A closed-ended questionnaire was developed based on the indicators of each variable. This questionnaire was chosen so that respondents could provide answers using the same alternatives, allowing the data to be coded uniformly and analyzed quantitatively (Cohen et al., 2018; Sugiyono, 2022). The measurement scale used five response options: always (5), often (4), sometimes (3), rarely (2), and never (1). Higher scores indicate a stronger perception or frequency of behavior toward the statement being measured.

**Table 2. Operational definitions and indicators of variables**

| Variables | Operational definition | Indicator | Number of grains |
|---|---|---|---|


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| | | | |
|---|---|---|---|
| Servant leadership of the principal (X1) | The leadership style is service-oriented, empathy, empowerment, moral support, and teacher development. | Empathy; empowerment; service; building community; humility; vision and moral guidance. | 22 |
| Teacher digital communication (X2) | The ability and intensity of using digital media to convey information, collaborate, share learning resources, respond to messages, and maintain professional ethics. | Platform usage; communication effectiveness; digital collaboration; sharing learning resources; responsiveness; digital ethics and professionalism. | 22 |
| Teacher learning innovation (Y) | The ability to create, adapt, develop, implement, evaluate, and disseminate new ideas to improve the quality of learning. | Development of new methods; use of technology; media creativity; differentiation; pedagogical experimentation; innovative evaluation and reflection. | 27 |

The servant leadership variable consists of 22 items covering empathy (3 items), empowerment (3), service (4), building community (3), humility (3), and vision and moral guidance (6). The digital communication variable consists of 22 items, covering the use of digital platforms (4), communication effectiveness (4), digital collaboration (4), sharing digital learning resources (3), digital responsiveness (3), and digital ethics and professionalism (4). The learning innovation variable consists of 27 items, namely the development of new learning methods (5), the use of learning technology (6), creativity in developing learning media (6), the application of learning differentiation (4), pedagogical experiments (2), and innovative evaluation and reflection (4). Thus, the entire instrument contains 71 statement items.

The development of servant leadership indicators refers to the synthesis of the thinking of Greenleaf (2002), Spears (2010), van Dierendonck (2011), Liden et al. (2014), and Eva et al. (2019). Digital communication indicators are compiled by referring to the digital competency framework of educators and studies of digital professional networks (Redecker & Punie, 2017; Trust et al., 2016; Hodges et al., 2020). Learning innovation indicators are compiled based on studies of innovation, educational change, technology-pedagogy-content integration, and teacher innovation (Rogers, 2003; Koehler & Mishra, 2009; Fullan, 2016; Liu et al., 2024).

Before Used in primary data collection , the instrument was tested on 30 respondents outside the research sample. Empirical validity was examined through corrected item-total correlation. In this thesis, the benchmark value used was 0.361. The test results showed that the items in the servant leadership variable had a corrected item-total correlation range of 0.481–0.765; digital communication 0.466–0.814; and learning innovation 0.456–0.773. All items were above the benchmark value used, thus meeting the empirical validity criteria.

Instrument reliability was examined using Cronbach's alpha coefficient. The minimum threshold used was 0.70, as is commonly used in the development of social and educational research instruments (DeVellis & Thorpe, 2021; Hair et al., 2019). The test results showed alphas of 0.946 for servant leadership, 0.940 for digital communication, and 0.949 for learning innovation. These three values indicate high internal consistency based on the criteria used.


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**Table 3. Summary of instrument quality test results**

| Variables | Number of grains | Corrected item-total correlation range | Cronbach's alpha | Decision |
|---|---|---|---|---|
| Servant leadership | 22 | 0.481–0.765 | 0.946 | Valid and reliable |
| Digital communication | 22 | 0.466–0.814 | 0.940 | Valid and reliable |
| Learning innovation | 27 | 0.456–0.773 | 0.949 | Valid and reliable |

Procedure study consists of The stages include preparation, instrument testing, data collection, analysis, and reporting. In the preparation stage, researchers examine theories, develop a framework and hypotheses, determine the population and sample, and develop an instrument grid. In the instrument testing stage, researchers solicit expert assessments and conduct pilot tests on respondents outside the main sample. In the data collection stage, questionnaires are distributed to respondents according to the sample allocation. In the analysis stage, data are coded, checked, tabulated, tested for prerequisites, and analyzed to answer the hypotheses.

Data collection was conducted online using Google Forms. The questionnaire link was distributed through WhatsApp groups and official letters to schools. Responses were collected using Google Spreadsheets, then reviewed and tabulated for analysis using SPSS. The use of the online questionnaire was intended to facilitate the reach of respondents spread across several schools in Pesisir Selatan Regency.

Descriptive analysis was used to describe the tendency of each variable through the mean value, standard deviation, minimum and maximum values, score distribution, and Respondent Achievement Level (TCR). Regression prerequisite tests included residual normality, linearity, multicollinearity, and heteroscedasticity. Residual normality was examined using Kolmogorov–Smirnov and Shapiro–Wilk; linearity was examined using the Deviation from Linearity value; multicollinearity was examined using tolerance and VIF; while heteroscedasticity was examined using the regression significance of the absolute value of the residual.

Hypothesis testing was conducted using multiple linear regression. The t-test was used to examine the predictive relationship of each independent variable to learning innovation after accounting for other predictors. The F-test was used to assess the significance of the model simultaneously. The coefficient of determination ($R^2$) and adjusted $R^2$ were used to describe the proportion of variation in learning innovation that could be explained by the model (Field, 2018; Hair et al., 2019). testing use level significance 0.05.

## RESULTS AND DISCUSSION

### Results

### Overview of Research Data

The research data analyzed came from 327 public junior high school teachers in Pesisir Selatan Regency. The analysis was conducted on three variables: principal servant leadership, teacher digital communication, and teacher learning innovation. Overall, descriptive results show that all three variables achieved average scores and a good TCR. However, performance at the indicator level shows variation that warrants attention, as some aspects are relatively stronger and others require further development.


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In the servant leadership variable, respondents' scores tended to be concentrated in the range of 82–110. A total of 283 respondents or 86.5% were in that range, while 44 respondents or 13.5% were in the range of 22–81. The descriptive statistics reported in the thesis showed a mean of 95.44, a median of 101, a mode of 110, and a standard deviation of 19.36, with a minimum score of 22 and a maximum of 110. This distribution shows a tendency for relatively high perceptions of the principal's leadership practices.

For the digital communication variable, 275 respondents, or 84.1%, were in the 82–110 range, while 52 respondents, or 15.9%, were in the 22–81 range. The highest score range most frequently occupied by respondents was 102–110, with 112 respondents, or 34.3%. For the learning innovation variable, 292 respondents, or 89.3%, were in the 101–123 range, while 35 respondents, or 10.7%, were in the 85–100 range. This distribution indicates that respondents' assessment of learning innovation tends to be in the relatively high range, although the achievement of certain indicators is still low.

**Level of Achievement of Servant Leadership of School Principals**

The principal's servant leadership achieved an average score of 4.30 and a TCR of 86.03%, making it categorized as good. These results indicate that the principal generally demonstrated leadership behaviors oriented toward service, empowerment, caring, community development, and providing direction and moral guidance. These achievements illustrate that the principal's role is perceived not only through administrative and supervisory functions, but also through supporting teachers' professional needs.

**Table 4. Respondents' achievement level on the servant leadership variable**

| Indicator | Number of grains | Average | TCR | Category |
|---|---|---|---|---|
| Empathy | 3 | 4.18 | 83.69% | Good |
| Empowerment | 3 | 4.42 | 88.44% | Good |
| Service | 4 | 4.24 | 84.88% | Good |
| Building a community | 3 | 4.26 | 85.26% | Good |
| Modesty | 3 | 4.27 | 85.46% | Good |
| Vision and moral guidance | 6 | 4.42 | 88.42% | Good |
| Overall | 22 | 4.30 | 86.03% | Good |

The empowerment indicator achieved the highest score, with an average score of 4.42, with a TCR of 88.44%. This finding indicates that teachers assess the principal as providing trust, opportunities to develop skills, flexibility in choosing learning strategies, and space to participate in decisions related to improving learning quality. Empowerment is crucial because innovation requires professional initiative. Trusted teachers have greater room to design learning alternatives, adapt strategies to student characteristics, and develop ideas that emerge from teaching experience.

Vision and moral guidance achieved an average score of 4.42 and a TCR of 88.42%, nearly the same as empowerment. This achievement demonstrates that principals are considered capable of providing direction toward improving learning quality and emphasizing the values of responsibility, honesty, and work ethic. Clarity of organizational direction is crucial to prevent innovation from occurring sporadically or simply following technological trends. Innovation needs to be directed toward educational goals and student needs.

The service indicator averaged 4.24 and the TCR was 84.88%. These results demonstrate that the principal has fulfilled his role in assisting school members, providing support for teachers' assignments, and addressing professional needs. Meanwhile, the community building indicator averaged 4.26 and the TCR was 85.26%, indicating efforts to foster cooperation and a sense of togetherness. In a school context, a supportive


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community can provide a space to discuss learning challenges, share best practices, and develop collaborative solutions.

Humility scored an average of 4.27 with a TCR of 85.46%. This indicator relates to the principal's openness to opinions and criticism, appreciation of teachers' contributions, and willingness to accept constructive feedback. This attitude can strengthen two-way communication and reduce hierarchical barriers when teachers want to convey ideas. Conversely, empathy scored the lowest, with an average of 4.18 and a TCR of 83.69%, although it remained in the good category. These findings suggest that attention to teachers' individual needs, emotional states, and professional challenges can still be strengthened.

**Level of Teachers' Digital Communication Achievement**

Teachers' digital communication averaged 4.20 and their TCR was 84.06%, categorized as good. These results indicate that teachers have generally utilized digital media for communication, coordination, collaboration, sharing learning resources, responding to information, and maintaining ethics and professionalism. Thus, digital communication has become part of teachers' professional activities, not only as a means of delivering announcements but also as a medium for interaction and information exchange.

**Table 5. Respondents' achievement level on digital communication variables**

| Indicator | Average | TCR | Category |
|---|---|---|---|
| Use of digital platforms | 4.02 | 80.44% | Good |
| Communication effectiveness | 4.24 | 84.89% | Good |
| Digital collaboration | 4.10 | 82.09% | Good |
| Sharing digital learning resources | 4.17 | 83.34% | Good |
| Digital responsiveness | 4.25 | 85.06% | Good |
| Digital ethics and professionalism | 4.43 | 88.52% | Good |
| Overall | 4.20 | 84.06% | Good |

Digital ethics and professionalism scored the highest, with an average score of 4.43 and a TCR of 88.52%. These findings indicate that teachers have a good awareness of maintaining politeness, responsibility, and professionalism when communicating through digital media. This aspect is crucial because school communications can involve learning information, student data, and internal documents. Technology use requires attention to privacy, information security, message accuracy, and professional communication norms.

Digital responsiveness averaged 4.25 and a TCR of 85.06%. This achievement indicates that teachers are relatively capable of responding to professional information or messages and following up on the feedback received. Responsiveness plays a role in maintaining smooth coordination, but it needs to be understood proportionally based on the urgency of the message and the school's communication agreement. A quick response does not necessarily mean teachers must be available 24/7.

Communication effectiveness averaged 4.24 and TCR 84.89%. This indicates that teachers have good skills in conveying and receiving information through digital media clearly and precisely. Sharing digital learning resources averaged 4.17 and TCR 83.34%, while digital collaboration averaged 4.10 and TCR 82.09%. Both achievements demonstrate the existence of resource exchange and professional cooperation, but the intensity and depth of collaboration can still be improved so that it does not stop at sending documents or administrative coordination.

Digital platform use scored the lowest on this variable, with an average score of 4.02 and a TCR of 80.44%, although this is still considered good. These findings indicate that digital platform proficiency has developed, but its use for more complex professional activities still needs to be strengthened. Teachers can be guided to use digital spaces to


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design collaborative learning tools, discuss classroom challenges, provide feedback, develop a learning resource bank, and evaluate the implementation of learning strategies.

**Level of Achievement of Teacher Learning Innovation**

Teachers' learning innovation achieved an average score of 4.01 and a TCR of 80.21%, placing them in the good category overall. These results indicate that teachers have demonstrated efforts in using technology, developing media, implementing differentiation, conducting pedagogical experiments, and evaluating and reflecting on learning. However, achievement across indicators showed wider variation than the other two variables. The most striking difference was between creativity in developing learning media and developing new learning methods.

**Table 6. Respondents' achievement level on learning innovation variables**

| Indicator | Number of grains | Average | TCR | Category |
|---|---|---|---|---|
| Development of new learning methods | 5 | 3.00 | 59.99% | Not good |
| Use of learning technology | 6 | 4.12 | 82.47% | Good |
| Creativity in compiling learning media | 6 | 4.39 | 87.71% | Good |
| Implementation of learning differentiation | 4 | 4.26 | 85.15% | Good |
| Pedagogical experiments | 2 | 4.12 | 82.39% | Good |
| Innovative evaluation and reflection | 4 | 4.18 | 83.55% | Good |
| Overall | 27 | 4.01 | 80.21% | Good |

Creativity in developing learning media achieved the highest achievement, with an average score of 4.39 and a TCR of 87.71%. These findings indicate that teachers are relatively capable of producing, modifying, or combining learning media to make the material more understandable and engaging for students. Media can help visualize concepts, clarify information, and increase student engagement. However, media creativity needs to be linked to pedagogical objectives, materials, and strategies so that media does not merely function as a complement to the learning presentation.

The implementation of learning differentiation achieved an average score of 4.26 with a TCR of 85.15%. These results indicate that teachers have made efforts to adapt learning processes, activities, support, or products to the needs and characteristics of students. Differentiation is important because students have diverse readiness levels, interests, and needs. Developing learning that is responsive to this diversity requires teachers to understand classroom conditions and be flexible in managing learning strategies.

Innovative evaluation and reflection achieved an average score of 4.18 with a TCR of 83.55%. This achievement indicates that teachers have assessed the learning process and used the results to identify the strengths and weaknesses of the strategies implemented. Reflection is a crucial part of innovation because new ideas need to be evaluated based on student responses and the achievement of learning objectives. Pedagogical experiments achieved an average score of 4.12 and a TCR of 82.39%, while the use of learning technology achieved an average score of 4.12 and a TCR of 82.47%. Both indicators are in the good category, indicating teachers' openness to experimenting with strategies and technology in learning.

The new learning method development indicator averaged 3.00 and the TCR was 59.99%, categorizing it as poor. This finding is important because it indicates that teachers' ability to develop media has not been fully matched by their ability to create or adapt new learning methods. Teachers are relatively stronger at developing learning aids than at changing the organizational patterns of learning activities. Thus, learning


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innovation is generally considered good, but it has not developed evenly across all pedagogical aspects.

**Prerequisite Analysis Test**

Prior to multiple linear regression testing, prerequisite tests were performed to assess model feasibility. Normality tests were performed on residuals, not solely on raw scores. The Shapiro–Wilk test showed a statistical significance of 0.995 with a significance of 0.449. The Kolmogorov–Smirnov test with Lilliefors correction showed a significance of 0.200. Both values were greater than 0.05, indicating insufficient statistical evidence to indicate that the residuals deviated from a normal distribution.

**Table 7. Summary of regression prerequisite test results**

| Prerequisite test | Indicator | Results | Criteria/interpretation |
|---|---|---|---|
| Normality of residuals | Shapiro–Wilk | W = 0.995; p = 0.449 | Meets the normality criteria |
| Normality of residuals | Kolmogorov–Smirnov | D = 0.038; p = 0.200 | Meets the normality criteria |
| Linearity X1–Y | Deviation from Linearity | p = 0.222 | There is no significant deviation from linearity |
| Linearity of X2–Y | Deviation from Linearity | p = 0.639 | There is no significant deviation from linearity |
| Multicollinearity X1 | Tolerance; VIF | 0.407; 2.454 | Does not show multicollinearity |
| Multicollinearity X2 | Tolerance; VIF | 0.407; 2.454 | Does not show multicollinearity |
| Heteroscedasticity X1 | ABS_RES Test | p = 0.225 | No indication of heteroscedasticity |
| Heteroscedasticity X2 | ABS_RES Test | p = 0.528 | No indication of heteroscedasticity |

The linearity test showed a Deviation from Linearity value of 0.222 for the relationship between servant leadership and learning innovation and 0.639 for the relationship between digital communication and learning innovation. Both values were greater than 0.05, indicating no significant deviation from linearity. These results support the use of a linear regression model to test predictive relationships between variables.

The multicollinearity test showed that both independent variables had a tolerance value of 0.407 and a VIF of 2.454. The tolerance value was above 0.10 and the VIF was below 10.00, indicating no multicollinearity that would interfere with the model estimation based on the threshold used. Furthermore, the heteroscedasticity test yielded a significance value of 0.225 for servant leadership and 0.528 for digital communication. Since both values were greater than 0.05, no indication of heteroscedasticity was found through the reported tests.

**Multiple Linear Regression Results and Hypothesis Testing**

Multiple linear regression analysis was used to test the ability of principals' servant leadership and teachers' digital communication in predicting variations in teacher learning innovation. The model summary shows a multiple correlation value of R of 0.519, R Square of 0.270, Adjusted R Square of 0.265, and a standard error of the estimate of 5.266. The R Square value indicates the proportion of variation in learning innovation scores that can be explained by the two predictors in the sample, while Adjusted R Square takes into account the number of predictors in the model.


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**Table 8. Summary of regression models**

| Model size | Mark |
|---|---|
| R | 0.519 |
| R Square | 0.270 |
| Adjusted R Square | 0.265 |
| Standard Error of the Estimate | 5,266 |

The Adjusted R Square value of 0.265 means that 26.5% of the variation in teacher learning innovation can be statistically explained by the principal's servant leadership and teacher digital communication in the model. Meanwhile, the remaining 73.5% of the variation is not explained by these two predictors. Other potentially relevant factors, as discussed in the thesis, include work motivation, professional and pedagogical competence, school organizational culture, the availability of technological facilities, professional development opportunities, and educational policies. These factors have not been tested as variables in this research model, so their respective contributions cannot be determined.

**Table 9. Results of the F test of the regression model**

| Source of variation | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 3,320,318 | 2 | 1,660,159 | 59,856 | <0.001 |
| Residual | 8,986,434 | 324 | 27,736 | — | — |
| Total | 12,306,752 | 326 | — | — | — |

The F-test results yielded an F-value of 59.856 with a significance level of 0.000 displayed in SPSS output. In scientific reporting, this value is stated as $p < 0.001$, not $p = 0.000$. Because the significance value is less than 0.05, the regression model is simultaneously significant. Thus, the third hypothesis is supported: principal servant leadership and teacher digital communication jointly have a significant predictive relationship with teacher learning innovation.

**Table 10. Results of the regression coefficient t-test (referring to the thesis hypothesis test table)**

| Predictor | B | Std. Error | Beta | t | Sig. |
|---|---|---|---|---|---|
| Constant | 90,474 | 1,654 | — | 54,705 | <0.001 |
| Principal servant leadership | 0.104 | 0.024 | 0.320 | 4,307 | <0.001 |
| Teacher digital communication | 0.083 | 0.027 | 0.231 | 3,105 | 0.002 |

Partial testing shows that the principal's servant leadership has an unstandardized coefficient of 0.104, a standardized beta coefficient of 0.320, a t-value of 4.307, and a significance level of $p < 0.001$. The positive coefficient indicates that higher servant leadership scores are associated with higher predicted learning innovation scores when digital communication is factored into the model. Thus, the first hypothesis is supported.

Teacher digital communication has an unstandardized coefficient of 0.083, a standardized beta of 0.231, a t-value of 3.105, and a significance level of 0.002. The positive coefficient indicates that an increase in digital communication scores is associated with an increase in predicted learning innovation scores after servant leadership is taken into account. Since the significance value is less than 0.05, the second hypothesis is supported.

Comparing the standardized beta coefficients in the hypothesis test table, the beta value for servant leadership (0.320) is greater than the beta value for digital communication (0.231). Descriptively and statistically, this indicates that the relative predictive contribution of servant leadership in the model is greater than that of digital communication. This comparison should be interpreted within the confines of this study's


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model and measurements, not as a statement that digital communication is unimportant or that the magnitude of the effect applies equally across all schools.

## Discussion

### Discussion of the Influence of Servant Leadership on Learning Innovation

The test results indicate that principals' servant leadership is positively and significantly related to teacher learning innovation. This finding supports the hypothesis that leadership qualities oriented toward service, empowerment, and organizational member growth are related to teachers' tendency to develop learning practices. Principals hold positions that allow for the creation of working conditions that either support or limit teacher initiative. When teachers receive trust, space for participation, resource support, and opportunities to develop competencies, the process of trying new methods or media can proceed more openly.

These findings align with Greenleaf's (2002) notion that servant leaders prioritize the development of others. In a school context, the principle of service can be realized through the principal's willingness to listen to teachers' needs, help overcome obstacles, and provide professional support. Liden et al. (2014) explain that servant leadership is related to empowerment, individual development, concern for members, and a culture of service. Eva et al. (2019) through a systematic review also emphasized servant leadership's orientation toward follower growth and its positive consequences for both individuals and the organization.

The highest achievement of empowerment indicators in the servant leadership variable provides important context for the regression results. Empowerment can create space for professional autonomy, allowing teachers to make pedagogical decisions based on student needs. Innovation requires space to test alternatives, receive feedback, and make adjustments. If every change requires detailed instructions or lacks leadership support, teachers may tend to maintain familiar patterns. Conversely, empowerment allows teachers to assume responsibility for improving learning.

Vision and moral guidance, which also achieved high TCR, indicate that organizational direction and professional values are a crucial part of teachers' perceived leadership practices. Innovation shouldn't be simply about demonstrating technology or following trends. Principals need to help teachers connect innovations in methods and media to learning objectives, student needs, and educational values. This clarity of direction can ensure innovation has a pedagogical and ethical orientation.

On the other hand, empathy was the lowest indicator, although it remained in the good category. This finding can be interpreted as an opportunity to strengthen individual leadership. Principals need to understand that teachers have different experiences, workloads, development needs, and classroom challenges. Equal support for all teachers may not necessarily address their individual needs. Mentoring based on dialogue, observation, and needs identification can help teachers develop innovations tailored to real-world classroom conditions.

This explanation can be linked to the concept of school climate. Hadiyanto (2016) views school climate as the quality of school life formed through relationships and interactions among school members. Syahril and Hadiyanto (2018) outline that school climate encompasses relationships, personal growth and development, system maintenance and change, and the physical environment. Servant leadership practices can foster open relationships and a work environment that allows teachers to feel valued and have room to grow. Fiqri et al. (2024) also demonstrated that principal leadership and school climate contribute to the performance of public junior high school teachers in Padang City. Although the research variables differ, the findings are relevant in


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emphasizing the importance of leadership quality and the organizational environment in supporting teachers' professional performance.

Thus, the implications of the findings extend beyond simply asking principals to be more friendly or serving, but also to strengthening concrete leadership practices: opening spaces for professional dialogue, involving teachers in instructional decisions, providing mentoring, supporting pedagogical experimentation, and recognizing teacher contributions. These practices can help foster a climate conducive to the emergence and sustainable implementation of innovative ideas.

**Discussion of the Influence of Digital Communication on Learning Innovation**

Regression results indicate a positive and significant relationship between teachers' digital communication and learning innovation. This finding demonstrates that teachers' ability to use digital media to convey information, coordinate, collaborate, share learning resources, respond to messages, and maintain professional ethics is associated with a tendency to update learning practices. Digital communication can expand access to knowledge and experience not always available in individual school environments.

Through digital communication, teachers can obtain teaching materials, discuss learning strategies, seek the opinions of colleagues, share experiences using media, and discuss challenges encountered in the classroom. These exchanges can expand pedagogical alternatives and accelerate the spread of good practices. Trust et al. (2016) demonstrated that digital professional learning networks provide opportunities for teachers to learn, share experiences, and develop learning practices across spatial and temporal boundaries. This is especially important when teachers work in schools with diverse geographic conditions and resources.

The highest achievement in the digital ethics and professionalism indicator indicates that teachers are relatively strong in maintaining politeness and responsible communication. Ethics is a crucial foundation because digital activities in educational environments can involve sensitive information, student data, school documents, and learning resources owned by others. Good digital competence must be accompanied by the ability to protect privacy, verify information accuracy, respect copyright, and use professional language. This aligns with the DigCompEdu framework, which places professional engagement and responsible use of technology as part of educator competencies (Redecker & Punie, 2017).

However, digital platform use was the indicator with the lowest achievement in the digital communication variable. This means that teachers have used digital media, but the use of platforms for professional activities that support innovation can still be optimized. Digital platforms need to be utilized for more than just announcements and administrative coordination. Teachers can use digital spaces to develop collaborative teaching tools, manage learning resources, discuss assessment designs, conduct reflections, and document good practices.

These findings align with Tang (2021), who examined the relationship between ICT utilization and teacher innovation. Wulandari et al. (2025) also demonstrated the relationship between ICT utilization, knowledge sharing, and innovative work behavior. Utami et al. (2023) emphasized that educational management strategies in the digital era need to be accompanied by the development of technological competencies for principals and teachers. Thus, digital communication is not simply understood as technical skills in using applications, but as professional capabilities to transform digital interactions into learning, collaboration, and knowledge development.

The relationship between relatively low levels of digital platform use and low levels of new method development on the innovation variable provides practical guidance that warrants further testing. These two findings do not demonstrate a direct relationship at the indicator level because the regression analysis was conducted on composite scores of


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the variables. However, they suggest that platform utilization could be more strongly directed toward supporting method innovation. For example, groups of teachers could discuss a learning problem, design alternative methods, pilot them, and then share their reflections through a digital forum.

Therefore, the development of digital communication needs to be oriented towards the quality of interactions. Schools can agree on professional communication channels, develop learning resource repositories, schedule online pedagogical discussions, and direct teacher working groups to use the platform as a space for sharing and evaluating practices. These efforts are expected to make technology a tool for developing learning, not just a routine communication tool.

**Simultaneous Influence and Meaning of Model Contribution**

The F-test showed that principal servant leadership and teacher digital communication simultaneously significantly correlated with learning innovation. These results suggest that learning innovation can be understood through a combination of organizational support and professional communication skills. Both variables serve complementary functions. Servant leadership provides a climate of trust, support, empowerment, and direction. Digital communication provides a means to expand access to information, share learning resources, obtain input, and build collaboration.

This synergy is crucial because leadership support without effective professional communication can make it difficult to disseminate and develop ideas collaboratively. Conversely, digital communication without a supportive organizational climate may not necessarily lead to the implementation of new ideas. Teachers may have access to numerous digital resources, but they still need time, support, trust, and opportunities to test new practices. Thus, leadership and digital communication can be seen as complementary conditions in the school innovation ecosystem.

The Adjusted $R^2$ value of 0.265 indicates that the two variables explain 26.5% of the variation in learning innovation in the model. This value also demonstrates that learning innovation is a phenomenon influenced by many factors. Pedagogical and professional competence, motivation, self-efficacy, organizational culture, availability of technological resources, workload, policy support, and professional development opportunities are factors that could be considered in future research. However, because these factors were not tested in this study, their contributions cannot be quantified or compared.

These simultaneous findings align with Thurlings et al.'s (2015) view that teachers' innovative behavior is shaped through the interaction of individual factors and the work context. Hadiyanto (2016) and Syahril and Hadiyanto (2018) also provide a framework for understanding the importance of school climate and relationship quality in supporting growth and change. This study adds evidence to the context of public junior high schools in Pesisir Selatan Regency by examining servant leadership and digital communication together in a single empirical model.

The managerial implication is that innovation development cannot be achieved solely through technology training. Schools need to integrate principal capacity building, strengthening teachers' digital competencies, and developing professional learning communities. Principals can provide support and collaborative spaces, while teachers foster digital communication oriented toward the exchange of ideas and practices. These programs need to be followed by evaluations of innovation implementation in the classroom to ensure that change doesn't stop with training activities.

**Practical Implications and Limitations of the Research**

For principals, the research findings suggest the need to maintain empowerment practices and organizational vision while strengthening empathy and individual


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mentoring. Possible practices include reflective meetings with teachers, consultations on competency development needs, teacher involvement in instructional decisions, and providing space to experiment with new approaches. Principals can also facilitate forums for sharing good practices and ensure adequate support for resources aligned with learning priorities.

For teachers, digital communication needs to be directed toward professional activities that generate collaborative learning. Teachers can optimize platforms to share learning resources, develop teaching tools, discuss methods, and reflect on learning outcomes. Descriptive results also indicate the need for special attention to the development of new learning methods. Lesson study activities, peer observation, MGMP discussions, and pedagogical experiments accompanied by reflection can provide opportunities to develop these skills.

For the Department of Education and school administrators, the research findings can be used as a basis for developing competency development programs for principals and teachers. Programs can incorporate servant leadership training, digital communication mentoring, professional learning community development, and innovative learning design training. Program implementation should consider the varying school conditions, technology access, and teacher needs in each region.

This study has several limitations. First, the data were obtained through a perception questionnaire, which may have influenced respondents' answers, possibly influenced by subjectivity or a tendency to give positive assessments. Second, the study was conducted only with public junior high school teachers in Pesisir Selatan Regency, so generalizations to other educational levels or regions require caution. Third, the model only includes two independent variables, whereas learning innovation can be related to individual, organizational, and other resource factors. Fourth, the survey design does not fully describe the process by which digital leadership and communication translate into changes in classroom practices.

Future research could expand the model by incorporating pedagogical competencies, work motivation, digital self-efficacy, innovation culture, or infrastructure availability. A mixed-method approach could be used to complement survey results through principal and teacher interviews, classroom observations, and review of learning documents. A longitudinal design could also help determine whether changes in leadership and digital communication are accompanied by changes in learning practices over time

## CONCLUSION

This study shows that the principal's servant leadership, teacher digital communication, and teacher learning innovation in junior high schools in Pesisir Selatan Regency are generally in the good category. Servant leadership obtained an average of 4.30 and a TCR of 86.03%, with empowerment as the highest indicator and empathy as the lowest indicator. Digital communication obtained an average of 4.20 and a TCR of 84.06%, with digital ethics and professionalism as the highest indicator and the use of digital platforms as the lowest indicator. Learning innovation obtained an average of 4.01 and a TCR of 80.21%, with creativity in composing media as the highest indicator and the development of new learning methods as the lowest indicator which is categorized as less good.

Partially, the principal's servant leadership has a positive and significant predictive relationship with learning innovation ($t = 4.307$; $p < 0.001$). Teacher digital


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communication also has a positive and significant predictive relationship (t = 3.105; p = 0.002). Simultaneously, the two independent variables form a significant regression model (F = 59.856; p < 0.001), with an Adjusted $R^2$ of 0.265. These results indicate that the two variables explain 26.5% of the variation in learning innovation in the model, while the remaining variation is related to factors outside the study.

Strengthening learning innovation needs to be directed at servant and empowering principal leadership, digital communication for professional collaboration, and the development of new learning methods. This development needs to be implemented in an integrated manner through mentoring, professional learning communities, pedagogical experiments, and learning reflection. Because the study used a non-experimental survey design, the results are interpreted as statistical predictive relationships and not absolute proof of causality..

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