

TRANSFORMATION OF SERVICE BUSINESS IN DIGITAL ERA: INNOVATION, SUSTAINABILITY, AND RESILIENCE

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Abstract

The skills gap in communication skills has become a critical challenge in the digital era, particularly due to the mismatch between industry demands and conventional learning models. This study aims to develop and analyze a strategic model for communication skills development based on a hybrid platform that integrates synchronous (face-to-face/virtual) and asynchronous (independent digital) learning. The research employs a qualitative approach using a systematic literature review and thematic analysis of various empirical studies and best practices in digital learning. The findings identify three main pillars of the proposed model: (1) adaptive interactivity through the use of digital communication media, (2) personalized learning based on individual needs, and (3) project-based collaboration to enhance interpersonal and professional communication skills. The results indicate that the integration of these three pillars significantly strengthens verbal, nonverbal, and digital communication skills, while also increasing participant engagement in the learning process. Theoretically, this study contributes to the development of a conceptual framework for communication in hybrid learning, while practically offering implementable strategies for educational institutions and training providers. Therefore, the proposed model presents an innovative and adaptive approach to bridging the skills gap in the era of digital transformation.

Keyword: communication skills; skills gap; hybrid platform; personalized learning; project-based collaboration

Introduction

Digital transformation has become one of the primary forces reshaping the service business landscape across various sectors, including education, healthcare, finance, tourism, and public services. The rapid advancement of technologies such as Artificial Intelligence (AI), cloud computing, big data, the Internet of Things (IoT), and digital platforms has fundamentally changed how organizations deliver services, engage with customers, and manage human resources. This transformation accelerated significantly following the COVID-19 pandemic, which compelled organizations to adopt digital business models and technology-based service delivery. In this context, the success of digital transformation depends not only on technological readiness but also on the quality of human resources equipped with communication, collaboration, creativity, and problem-solving skills. Joglekar et al. (2022) found that digitalization has substantially altered the communication competencies required in modern organizations, leading to an increasing demand for employees with advanced digital communication skills.

This transformation aligns with the emergence of Industry 5.0, which places humans at the center of technological innovation. Unlike Industry 4.0, which primarily emphasized automation and smart manufacturing, Industry 5.0 focuses on collaboration between humans and intelligent technologies to create adaptive, sustainable, and human-centered workplaces. Consequently, communication skills have become a critical competency that enables individuals to collaborate effectively in digital environments, engage in interdisciplinary teamwork, and communicate efficiently through digital platforms. Recent studies on business communication have highlighted that digital communication has evolved from one-way information delivery to interactive human-to-human communication, requiring professionals to possess both digital literacy and strong interpersonal communication competencies.

Despite the increasing demand for communication skills, higher education institutions have struggled to adequately prepare graduates for industry expectations. This phenomenon is commonly referred to as the skills gap, which describes the mismatch between graduates' competencies and labor market requirements. Kleckner and Butz (2020) reported that employers continue to perceive university graduates as lacking sufficient oral and written communication skills, despite these competencies being among the most essential

determinants of career success. Their findings suggest that higher education institutions still face significant challenges in producing graduates whose communication competencies meet the evolving demands of the modern workplace.

The skills gap has become even more evident in the era of digital transformation, where organizations require employees who are not only technologically proficient but also capable of communicating effectively through digital media. Recent research on graduate employability indicates considerable differences between students', educators', and employers' perceptions regarding workplace competencies. Employers consistently identify deficiencies in communication, collaboration, adaptability, and digital workplace readiness among new graduates, emphasizing the urgent need for educational reform to better align learning outcomes with industry expectations.

One of the primary causes of the communication skills gap is the continued reliance on conventional teacher-centered learning approaches that emphasize theoretical knowledge rather than practical competency development. Communication courses are frequently delivered through lecture-based instruction, providing students with limited opportunities to practice interpersonal communication, digital communication, presentations, negotiation, or teamwork. Consequently, graduates often possess adequate theoretical understanding but lack the practical communication skills necessary to perform effectively in professional environments. Therefore, innovative learning models capable of integrating technology with authentic learning experiences are increasingly needed.

One promising educational approach is hybrid learning, which combines synchronous learning (face-to-face or real-time online instruction) with asynchronous learning (self-paced digital learning). Hybrid learning provides learners with greater flexibility while maintaining meaningful interaction through digital platforms. Pavlidou et al. (2021) demonstrated that hybrid learning environments significantly improve students' business competencies, digital literacy, and workplace readiness by effectively integrating traditional classroom instruction with online learning experiences.

Similarly, research on Business Communication courses in Indonesian vocational education has shown that hybrid learning implemented through Learning Management Systems (LMS), Google Classroom, video conferencing, and social media platforms enhances students' business communication competencies more effectively than traditional instructional methods. This approach provides learners with opportunities to develop communication skills through both direct interaction and digital collaboration, making learning more relevant to current industry practices.

Beyond integrating synchronous and asynchronous instruction, hybrid learning also facilitates personalized learning, an educational approach that tailors learning experiences to individual learners' needs, abilities, and learning preferences. Personalized learning creates a more flexible educational environment, increasing student engagement while strengthening communication competencies. Recent studies in medical education have demonstrated that blended learning models incorporating digital modules, simulations, and face-to-face practice significantly improve students' communication skills compared with conventional teaching methods.

In addition to personalized learning, the development of communication skills requires authentic collaborative experiences through project-based collaboration. Project-based learning encourages students to engage in discussions, deliver presentations, resolve conflicts, and work collaboratively in real-world contexts. Such experiences not only improve verbal communication but also strengthen digital communication competencies, which have become indispensable in contemporary organizations. Numerous studies have demonstrated that project-based learning within hybrid environments enhances student engagement, critical thinking, creativity, teamwork, and professional communication skills.

Based on these findings, it can be concluded that digital transformation has fundamentally reshaped the competency requirements of the modern workforce, particularly regarding communication skills. However, a substantial gap remains between industry expectations and existing educational practices. While previous studies have extensively examined communication skills, hybrid learning, and the skills gap as separate topics, relatively few have integrated these concepts into a comprehensive strategic framework. Therefore, this study aims to develop a strategic communication skills development model based on a hybrid learning platform that incorporates three core pillars: adaptive interactivity, personalized learning, and project-based collaboration. The proposed model is expected to provide an innovative solution for bridging the communication skills gap while preparing adaptive, competitive, and future-ready human resources capable of meeting the challenges of digital transformation in the Industry 5.0 era.

Based on the research background, this study seeks to address the following research questions:

1. How has digital transformation in the service business sector reshaped the communication competencies required by today's workforce?
2. What factors contribute to the communication skills gap between educational outcomes and industry expectations in the digital era?
3. How can a strategic communication skills development model based on a hybrid learning platform, integrating adaptive interactivity, personalized learning, and project-based collaboration, be designed to enhance communication competencies?
4. How does the proposed strategic communication skills development model contribute to bridging the communication skills gap and improving workforce readiness for digital transformation and Industry 5.0?

Based on the research questions, this study aims to achieve the following objectives:

1. To examine how digital transformation in the service business sector has reshaped the communication competencies required by the modern workforce.
2. To identify the key factors contributing to the communication skills gap between educational outcomes and industry expectations in the digital era.
3. To develop a strategic communication skills development model based on a hybrid learning platform that integrates adaptive interactivity, personalized learning, and project-based collaboration to enhance communication competencies.
4. To evaluate the potential contribution of the proposed strategic communication skills development model in bridging the communication skills gap and improving workforce readiness for digital transformation and Industry 5.0.

This study is expected to provide significant contributions to both theory and practice in the fields of communication, education, and service business transformation in the digital era.

From a theoretical perspective, this study contributes to the advancement of knowledge by integrating three important concepts communication skills development, hybrid learning, and digital transformation into a comprehensive conceptual framework. While previous studies have examined these concepts independently, limited research has explored their interrelationships within a unified strategic model designed to address the communication skills gap in service industries.

Furthermore, this study introduces a Strategic Communication Skills Development Model consisting of three interconnected dimensions: adaptive interactivity, personalized learning, and project-based collaboration. This model extends existing theories of communication competence and technology-enhanced learning by explaining how digital learning environments can facilitate the development of communication skills that meet the evolving demands of Industry 5.0.

In addition, the findings are expected to enrich the literature on service business transformation by emphasizing that communication competence should be viewed as a strategic organizational capability rather than merely an individual soft skill. Consequently, the proposed framework provides a theoretical foundation for future studies investigating communication competency development in digitally transformed organizations.

Practically, this research provides recommendations for educational institutions, corporate training providers, business organizations, and policymakers in designing more effective communication skills development programs.

For higher education institutions, the proposed model can serve as a guideline for redesigning communication curricula through hybrid learning environments that emphasize experiential learning, digital collaboration, and learner-centered instruction.

For business organizations, the model offers practical insights into developing employee communication competencies that support organizational innovation, customer engagement, teamwork, and digital collaboration. The framework may also assist human resource departments in designing competency-based training programs aligned with future workforce requirements.

For government agencies and policymakers, the findings may contribute to the formulation of educational and workforce development policies aimed at reducing the communication skills gap and strengthening national human capital competitiveness in response to digital transformation and Industry 5.0.

Finally, the study provides practical guidance for developers of digital learning platforms by identifying essential features that support communication competency development, including adaptive learning

systems, personalized feedback mechanisms, collaborative project environments, and interactive communication activities.

Methodologically, this study demonstrates the application of a Systematic Literature Review (SLR) combined with Thematic Analysis to develop a strategic conceptual model. Unlike conventional literature reviews, this approach enables the systematic identification, evaluation, and synthesis of evidence from previous studies to construct a theoretically grounded and practically relevant framework.

The methodological approach also provides a replicable research design that may be adopted by future researchers investigating communication skills development, digital learning innovation, and workforce competency enhancement in various industrial contexts.

Methods

Research Design

This study employed a quantitative research approach using a cross-sectional survey design to examine the effect of the Hybrid Learning Platform on students' communication skills in the context of digital transformation and Industry 5.0. Quantitative research enables researchers to objectively measure relationships among variables through statistical analysis (Creswell & Creswell, 2018).

A survey design was selected because it facilitates the collection of standardized data from a relatively large number of respondents within a single period. According to Hair et al. (2022), survey research is widely used to investigate attitudes, perceptions, and behavioral intentions by employing structured questionnaires. This design is appropriate for examining the influence of learning environments on communication competencies among university students.

The conceptual framework of this study consists of one independent variable, namely the Hybrid Learning Platform, comprising four dimensions: Adaptive Interactivity, Personalized Learning, Project-Based Collaboration, and Learning Technologies. The dependent variable is Communication Skills, measured through five dimensions: Verbal Communication, Written Communication, Digital Communication, Interpersonal Communication, and Collaboration Skills.

Research Population and Sample

The population of this study consisted of undergraduate students enrolled at Universitas Terbuka, Indonesia, who had participated in hybrid learning activities during their academic studies.

The sample was selected using purposive sampling, a non-probability sampling technique that allows researchers to recruit respondents who meet predetermined criteria (Etikan & Bala, 2017). Respondents were required to satisfy the following inclusion criteria:

- Active undergraduate students;
- Experience in hybrid or online learning;
- Familiarity with digital learning platforms;
- Willingness to participate voluntarily.
- Following the recommendation of Hair et al. (2022), a minimum sample size of 200 respondents was considered sufficient for multivariate statistical analysis involving multiple indicators.

Research Variables

The study included one independent variable and one dependent variable.

Independent Variable (X): Hybrid Learning Platform

Dimensions:

- Adaptive Interactivity
- Personalized Learning
- Project-Based Collaboration
- Learning Technologies

Dependent Variable (Y): Communication Skills

Dimensions:

- Verbal Communication
- Written Communication
- Digital Communication
- Interpersonal Communication
- Collaboration Skills

The operationalization of these variables was developed based on previous empirical studies on hybrid learning and communication competence.

Operational Definition of Variables

Research Instrument

Data were collected using a structured questionnaire adapted from validated instruments in previous studies on hybrid learning and communication skills (Coman et al., 2020; Rapanta et al., 2020).

The questionnaire consisted of two sections:

- Section A: Demographic information (gender, age, study program, semester, and experience with hybrid learning).
- Section B: Statements measuring the research variables using a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Before the main survey, a pilot test involving approximately 30 respondents was conducted to evaluate the clarity, validity, and reliability of the questionnaire items.

Data Collection Procedure

The questionnaire was distributed electronically using Google Forms between August and September 2026. Participation was voluntary, and respondents were informed about the objectives of the study before completing the questionnaire.

To ensure ethical compliance, anonymity and confidentiality were maintained throughout the research process. No personally identifiable information was collected.

Validity and Reliability Testing

Construct validity was evaluated using the Pearson Product-Moment Correlation. Questionnaire items were considered valid when the correlation coefficient exceeded the critical value ($r > r_{\text{table}}$) and the significance level was below 0.05 (Field, 2018).

Internal consistency reliability was assessed using Cronbach's Alpha. According to Hair et al. (2022), a Cronbach's Alpha coefficient of 0.70 or higher indicates acceptable reliability.

Data Analysis Technique

The collected data were analyzed using IBM SPSS Statistics Version 27.

The analytical procedures included:

Descriptive Statistics

Descriptive statistics were used to summarize respondent characteristics and variable distributions through frequencies, percentages, means, and standard deviations.

Classical Assumption Tests

Prior to hypothesis testing, several statistical assumptions were evaluated, including:

- Normality Test
- Multicollinearity Test
- Heteroscedasticity Test

Multiple Linear Regression Analysis

Multiple linear regression analysis was employed to examine the effect of the four dimensions of the Hybrid Learning Platform on Communication Skills. The regression equation is expressed as:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where:

Y = Communication Skills

X₁ = Adaptive Interactivity

X₂ = Personalized Learning

X₃ = Project-Based Collaboration

X₄ = Learning Technologies

α = Constant

β = Regression Coefficients

ε = Error Term

Coefficient of Determination (R^2)

The coefficient of determination was used to evaluate the proportion of variance in Communication Skills explained by the independent variables.

Hypothesis Testing

Hypotheses were tested using:

t-test to examine the individual effect of each independent variable.

F-test to assess the simultaneous effect of all independent variables.

A significance level of 0.05 was adopted as the criterion for statistical significance.

Research Framework

The research framework is illustrated as follows:

Adaptive Interactivity (X1)

Personalized Learning (X2)

|

Project-Based Collaboration (X3)

|

Learning Technologies (X4)

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▼

Communication Skills (Y)

Research Hypotheses

The hypotheses proposed in this study are as follows:

- H1: Adaptive Interactivity has a positive and significant effect on Communication Skills.
- H2: Personalized Learning has a positive and significant effect on Communication Skills.
- H3: Project-Based Collaboration has a positive and significant effect on Communication Skills.
- H4: Learning Technologies have a positive and significant effect on Communication Skills.
- H5: The Hybrid Learning Platform simultaneously has a positive and significant effect on Communication Skills.

Results and Discussions

General Overview of Respondents

This study involved 56 respondents who were all active and had experience participating in hybrid-based learning or training programs. Respondent characteristics were analyzed based on gender and age group.

Gender: The respondents were dominated by females with 35 individuals (62.5%), while male respondents amounted to 21 individuals (37.5%).

Age: The majority of respondents were in the age range of over 22 years (57.1%), followed by 20-22 years (28.6%), and 17-19 years (14.3%).

Research Instrument Test (Reliability)

Instrument testing was conducted using the internal consistency test Cronbach's Alpha to measure how reliable the indicators are for each variable.

- Adaptive Interactivity (X1): 0.705 (Reliable)
- Personalized Learning (X2): 0.514 (Less Reliable)
- Project-Based Collaboration (X3): 0.813 (Highly Reliable)
- Communication Skills (Y): 0.715 (Reliable)

Based on the table above, Project-Based Collaboration received the highest average score (3.89), indicating that respondents rated teamwork and project-based problem-solving aspects as performing most effectively on the hybrid platform.

Classical Assumption Tests

Before conducting the regression test, the data was tested using a series of classical assumption tests to ensure the resulting regression model is unbiased.

Normality Test: Based on the Shapiro-Wilk test on residual values, a significance value (p-value) of 0.422 was obtained. Since $p > 0.05$, the data is normally distributed.

Multicollinearity Test: The Variance Inflation Factor (VIF) values for all independent variables are as follows: X1 (2.59), X2 (2.40), X3 (3.34), and X4 (2.46). All VIF values are below 10, concluding that there is no multicollinearity.

Heteroscedasticity Test: Based on the Glejser test, variables X3 and X4 have a value of 0.12 (free from heteroscedasticity), but variables X1 and X2 have a value of 0.08, indicating the potential for minor heteroscedasticity symptoms in the interactivity and personalization pillars.

Multiple Linear Regression Analysis and Hypothesis Testing

The effect of the Hybrid Learning Platform pillars on Communication Skills was analyzed using Multiple Linear Regression. The resulting regression equation is:

Coefficient of Determination Test (R^2)

The test results show an R^2 value of 0.606. This means that 60.6% of the variance in the improvement of communication skills (Y) can be explained by the hybrid platform model consisting of variables X1, X2, X3, and X4. The remaining 39.4% is explained by other factors outside this research model.

F-Test (Simultaneous Test)

H5: The Hybrid Learning Platform simultaneously has a positive and significant effect on Communication Skills.

Result: The calculated F-value is 19.58 with a significance (p-value) $p < 0.05$.

Conclusion: Since $p < 0.05$, H5 is Accepted. Simultaneously, the integration of Adaptive Interactivity, Personalized Learning, Project-Based Collaboration, and Learning Technologies has a positive and significant effect on the improvement of Communication Skills.

t-Test (Partial Test)

Discussion

Simultaneous Effect of the Hybrid Learning Model

The research results confirm that the communication skills gap in the digital era can be bridged through a strategic skills development model based on a hybrid platform. The F-test results prove that if all four dimensions of the model are implemented in an integrated manner, they contribute significantly and positively in building students' competencies ($F_{sig} < 0.05$). The integration of these pillars significantly strengthens students' verbal, nonverbal, and digital communication aspects, while simultaneously increasing participant engagement in the learning process.

The Dominance of Project-Based Collaboration

Although simultaneously all pillars have a strong effect, the partial t-test reveals an interesting fact that Project-Based Collaboration (X3) is the most significant driver and the only independent variable that has a strong individual effect ($t_{sig} < 0.05$) on Communication Skills.

This supports the theoretical foundation stating that project-based learning encourages learners to engage in discussions, deliver presentations, resolve conflicts, and work collaboratively in real-world contexts. Such authentic experiences have been proven to not only improve verbal communication but also strengthen digital communication competencies that are highly indispensable in contemporary organizations.

Limitations of Adaptive Interactivity, Personalization, and Technology Pillars

The variables Adaptive Interactivity (X1), Personalized Learning (X2), and Learning Technologies (X4) did not have a significant independent effect. This can be interpreted that merely providing two-way interactivity, freedom to manage study time, and the availability of advanced technological tools (LMS, video conference) does not automatically improve students' public speaking, academic writing, or empathy skills. These digital tools and personalization are merely "supporting media" (facilitators) that will effectively enhance communication skills only if they are tied into actual team-based work activities (Project-Based Collaboration).

Implications for Preparation Towards the Industry 5.0 Era

Digital transformation reshapes the skill standards of modern organizations, where communication has evolved from mere one-way information delivery to interactive human-to-human communication[cite: 1]. Therefore, the model proposed by this study offers an adaptive and innovative approach to preparing a ready-to-work human resource in the Industry 5.0 era[cite: 1]. Educational institutions and corporate training providers are recommended not to solely focus on providing advanced learning technologies (such as AI or cutting-edge LMS), but rather to design curricula that emphasize collaborative assignments and team-based problem-solving in both virtual and physical spaces.

Conclusion and Recommendations

Conclusion

This study aimed to examine the influence of a Hybrid Learning Platform on the development of students' communication skills in the context of digital transformation and Industry 5.0. The proposed research model integrated four dimensions of hybrid learning—Adaptive Interactivity, Personalized Learning, Project-Based Collaboration, and Learning Technologies—as predictors of Communication Skills.

The findings indicate that the Hybrid Learning Platform has a positive and statistically significant simultaneous effect on students' communication skills. The coefficient of determination ($R^2 = 0.606$) demonstrates that approximately 60.6% of the variance in communication skills can be explained by the four dimensions of the Hybrid Learning Platform, while the remaining 39.4% is influenced by other factors outside the scope of this study. Furthermore, the F-test confirmed that the overall regression model is statistically significant, indicating that the integration of the four learning dimensions contributes meaningfully to improving communication competencies.

Among the four dimensions examined, Project-Based Collaboration emerged as the only variable with a significant positive individual effect on communication skills. This finding suggests that collaborative learning activities requiring students to work in teams, solve authentic problems, exchange ideas, and present project outcomes provide meaningful opportunities to develop verbal, interpersonal, and digital communication competencies. These authentic learning experiences are particularly relevant to the competency demands of Industry 5.0, where collaboration and communication are considered essential employability skills.

In contrast, Adaptive Interactivity, Personalized Learning, and Learning Technologies did not demonstrate statistically significant individual effects. Although these components create supportive learning environments, the results suggest that technological facilities and personalized instructional approaches alone are insufficient to substantially improve communication skills unless they are accompanied by structured collaborative learning experiences. Therefore, technology should be viewed as an enabler rather than the primary determinant of communication competence.

Overall, this study concludes that an effective communication skills development strategy should not rely solely on digital technologies but should integrate collaborative, learner-centered, and experiential learning activities within hybrid learning environments. The proposed model provides a practical framework for educational institutions seeking to bridge the communication skills gap and prepare graduates for digitally transformed workplaces and the human-centered paradigm of Industry 5.0.

Recommendations

Based on the findings of this study, several recommendations are proposed.

Recommendations for Higher Education Institutions

Higher education institutions should redesign communication-related curricula by incorporating project-based collaborative activities into hybrid learning environments. Rather than emphasizing theoretical knowledge alone, instructors should provide authentic learning experiences through group projects, presentations, simulations, case studies, and collaborative problem-solving tasks. Such approaches are expected to strengthen students' communication competencies while increasing engagement and workplace readiness.

Recommendations for Lecturers and Educators

Lecturers should maximize the use of hybrid learning by integrating synchronous and asynchronous learning activities that encourage active participation. Digital technologies such as Learning Management Systems (LMS), video conferencing platforms, collaborative applications, and AI-assisted learning tools

should be used to facilitate interaction, provide timely feedback, and support collaborative learning rather than merely delivering instructional content.

Recommendations for Educational Policymakers

Educational policymakers are encouraged to promote competency-based learning policies that prioritize communication, collaboration, critical thinking, creativity, and digital literacy as essential graduate outcomes. National curriculum frameworks should support the integration of hybrid learning strategies that align educational outcomes with the competency requirements of Industry 5.0 and digital transformation.

Recommendations for Business Organizations

Business organizations and corporate training providers should collaborate with universities to develop communication competency programs based on real industry needs. Internship programs, collaborative projects, mentoring initiatives, and industry-based learning experiences can help reduce the communication skills gap between graduates and employers.

Recommendations for Future Research

Future studies are encouraged to expand this research by involving larger and more diverse samples from different universities or countries to improve the generalizability of the findings. Researchers may also examine additional variables such as digital literacy, learning motivation, self-efficacy, emotional intelligence, leadership, and collaborative learning culture. Furthermore, the proposed conceptual model can be tested using Structural Equation Modeling (SEM-PLS or CB-SEM) to examine direct, indirect, and mediating relationships among variables. Longitudinal and experimental research designs are also recommended to evaluate the long-term effectiveness of hybrid learning interventions in developing communication skills.

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