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EFFECTS OF COMMUNICATION, COLLABORATION, AND KNOWLEDGE CONSTRUCTION ON STUDENTS' WORK READINESS WITH WORK MOTIVATION MODERATION

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ABSTRACT

Work readiness has become a crucial aspect of vocational education as students are increasingly required to master 21st-century competencies. This study aims to analyze the effects of communication skills, collaboration skills, and knowledge construction on the work readiness of vocational high school students, as well as to examine the role of work motivation as a moderating variable. This research addresses the limitations of previous studies that tend to examine these skills separately by integrating three 21st-century skills into a single research model with a moderating variable. A quantitative approach employing a survey method was used in this study, involving 207 students from five vocational programs at public vocational high schools in Semarang City. The data were analyzed using descriptive statistics, multiple regression analysis, and moderated regression analysis (MRA) with SPSS version 27. The results indicate that communication skills, collaboration skills, knowledge construction, and work motivation have a significant effect on students' work readiness. Furthermore, work motivation strengthens the relationship between communication skills and work readiness, as well as between collaboration skills and work readiness; however, no moderating effect was found in the relationship between knowledge construction and work readiness. These findings emphasize that students' work readiness is influenced not only by technical competencies but also by non-technical competencies (21st-century skills) and motivational factors. This study contributes theoretically to the development of an integrated model of students' work readiness and provides practical implications for schools in strengthening soft skills–based learning and enhancing students' work motivation.

Keywords: *Communication skills, collaboration skills, knowledge construction, work motivation, work readiness*

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INTRODUCTION

The rapid development of digital technology, automation, and globalization has significantly transformed the competency demands of the 21st-century workforce (World Economic Forum, 2022). The industrial sector now requires not only technical skills but also non-technical skills that support adaptability, collaboration, and continuous learning (Martin, 2018). In the context of vocational education, particularly in Vocational High Schools (VHS), work readiness serves as a key indicator of graduates' success, reflecting competencies, attitudes, and adaptive abilities necessary to perform effectively in the workplace (Wiryasti et al., 2020; Indrawati et al., 2023).

Globally, changes in job structures due to digitalization and automation demand that vocational graduates possess integrated 21st-century skills (Indrawati et al., 2023). Communication skills, collaboration skills, and the ability to apply knowledge contextually are essential for successful transition into the workforce (Martin, 2018). Nevertheless, many graduates face employment challenges due to limited practical experience and weak soft skills (Azizah et al., 2021). National data from 2023 indicate that approximately 2.29 million vocational graduates are classified as Not in Education, Employment, or Training (NEET), reflecting low work readiness (Mashabi & Kasih Ayunda, 2024).

Empirical conditions are also evident in initial observations of 207 twelfth-grade students from five competency programs at public vocational high schools in Semarang City. The observation revealed that 51.69% intended to enter the workforce, 45.89% planned to continue education, and 2.42% were interested in entrepreneurship. This variation in career orientation suggests that work readiness is not yet optimal and remains influenced by non-technical factors such as soft skills and psychological readiness (Ratnasari et al., 2024). This situation underscores the urgency of comprehensive research on factors affecting VHS students' work readiness.

Conceptually, vocational high school students' work readiness is influenced by communication skills, collaboration skills, and knowledge construction. Communication skills involve the ability to convey ideas clearly and establish professional interactions (Hidayatulloh, 2022). Collaboration skills pertain to the capacity to work effectively in teams through coordination and task sharing (Wahyuningsih et al., 2025). Both skills are crucial in supporting individual and group work effectiveness, thereby contributing to work readiness (Indrawati et al., 2023).

Additionally, knowledge construction is a significant cognitive aspect shaping work readiness, emphasizing active understanding through interaction and real-world experience (Hidayati & Wagiran, 2020; Nurjamilah et al., 2025). n vocational education, knowledge construction enhances self-efficacy and career decision-making abilities, particularly when integrated through project-based and problem-solving learning approaches (Azzahra et al., 2025; Kurniawati et al., 2025).

Beyond skills and cognition, work motivation plays a strategic role as a psychological factor strengthening VHS students' work readiness. Students with high motivation tend to be more active in competency development and practical training participation (Fahriati et al., 2024). Conversely, low motivation hampers soft skill development, resulting in suboptimal work readiness (Fidyawati & Rahmawati, 2025). Work motivation fosters persistence and adaptability, aligning interests and abilities with industrial demands (Deci et al., 2017; Ramadeni & Setyorini, 2020; Aulia & Miftahunnajah, 2025).

Various studies have shown that communication and collaboration skills significantly affect VHS students' work readiness (Putra et al., 2020; Mulyono et al., 2023), while knowledge construction strengthens critical thinking and problem-solving skills (Kapareliotis et al., 2019; Kurniawati et al., 2025). Work motivation has also been proven to enhance the development of interpersonal skills (Fahriati et al., 2024; Deci et al., 2017). However, previous studies tend to examine these skills separately and position work motivation as either an independent or mediating variable, rather than a moderating variable within an integrated model (Putra et al., 2020; Soni & Armida, 2023). This study fills this gap by integrating the three skills with work motivation as a moderating variable among students from five competency programs to provide a more comprehensive overview of VHS students' work readiness.

Based on this background, this study aims to analyze the influence of communication skills, collaboration skills, and knowledge construction on students' work readiness and to examine the role of work motivation as a moderating variable. These three skills represent interconnected 21st-century competencies, with work motivation serving to strengthen the relationship between skills and work readiness. The study is crucial in light of industrial demands that integrate interpersonal, cognitive, and motivational competencies, as well as the competency gap between vocational graduates and workplace requirements.

The novelty of this research lies in integrating three key skill domains into a single analytical model with work motivation as a moderating variable, extending the scope to various vocational competency programs. Practically, this study is expected to contribute to the development of more comprehensive vocational curricula and learning strategies that enhance work readiness in accordance with industry demands. The conceptual model depicts communication skills, collaboration skills, and knowledge construction as independent variables, work readiness as the dependent variable, and work motivation as the moderating variable (see Figure 1).

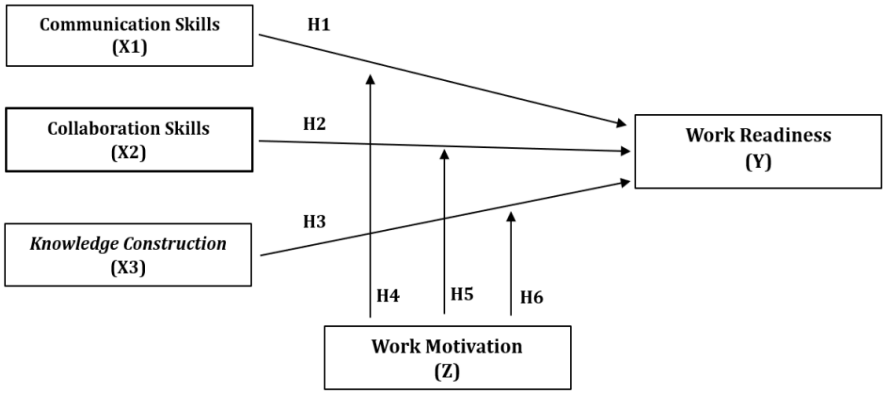

Figure 1.
Research Framework

Based on the research framework above, it can be concluded that this research has six hypotheses, namely:

H_1 : Communication skills have a significant positive effect on work readiness.
H_2 : Collaboration skills have a significant positive effect on work readiness.
H_3 : *Knowledge construction has a significant positive effect on work readiness.*
H_4 : Work motivation enhancing the effect of communication skills on work readiness.
H_5 : Work motivation enhancing the effect of collaboration skills on work readiness.
H_6 : Work motivation enhancing the effect of knowledge construction on work readiness.

RESEARCH METHOD

This study employed a quantitative approach with a survey design. The quantitative approach was selected because it allows for the objective description of relationships among variables through numerical measurement that can be statistically analyzed (Sugiyono, 2016). This approach focuses on measuring the effects of communication skills, collaboration skills, and knowledge construction on work readiness, as well as examining the role of work motivation as a moderating variable. The survey design was considered appropriate for efficiently collecting empirical data from a large number of respondents, thereby enabling a more structured examination of causal relationships and variable effects (Fraenkel et al., 2012).

The population of this study comprised all twelfth-grade students from the Software and Game Development, Accounting and Financial Institutions, Office Management and Business Services, Tourism Business, and Marketing programs at public vocational high schools in Semarang City, totaling 429 students. The sample was determined using the Stratified Proportional Random Sampling technique to ensure proportional representation from each vocational program, which possesses distinct characteristics. Based on proportional calculations, a sample of 207 students was obtained, all of whom served as respondents in this study. This sample

size is statistically adequate for multiple regression and moderated regression analyses, as it exceeds the minimum sample size recommended in quantitative research based on population proportion and the number of predictor variables (Green, 1991). With three independent variables and one moderating variable, this sample size provides sufficient statistical power to detect significant effects at a 5% significance level.

Work readiness is defined as students' capacity to enter the workforce, encompassing knowledge, skills, and work-related attitudes that enable individuals to adapt effectively to job demands and industrial environments (Hidayatulloh, 2022). This variable was measured using the Work Readiness Scale (WRS), which assesses individual readiness through four main factors: personal characteristics, organizational acumen, work competence, and social intelligence (Caballero et al., 2011).

Communication skills refer to students' ability to convey ideas and receive information clearly, effectively, and contextually, both orally and in written form (Hidayatulloh, 2022). Operationally, this variable was measured using the Self-Perceived Communication Competence (SPCC) Scale developed by McCroskey & McCroskey (2013), which has been validated across multiple countries. The instrument evaluates students' comfort, confidence, and effectiveness in communication across various contexts, encompassing seven key aspects: public speaking, communication in meetings, group communication, dyadic or face-to-face communication, communication with strangers, communication with acquaintances, and communication with close friends.

Collaboration skills are defined as students' ability to work effectively with others to achieve shared goals through coordination, task distribution, mutual respect, and group problem-solving (Wahyuningsih et al., 2025). Operationally, this variable was measured using the Teamwork Scale for Youth developed by Lower et al. (2017), which assesses students' collaborative abilities across several dimensions, including confidence in teamwork, cooperation in achieving goals, the ability to give and receive feedback, participation and engagement, appreciation of members' contributions, equity in teamwork, as well as leadership and task delegation.

In this study, knowledge construction is defined as students' ability to develop new understanding through processing information, analyzing concepts, connecting prior learning experiences, and generating deeper interpretations or solutions (Indrawati et al., 2023). Operationally, this variable was measured using indicators adapted from Kapareliotis et al. (2019), comprising three main dimensions: curiosity, subject-specific knowledge, and teacher intervention.

Work motivation in this study is operationalized as an internal drive that influences students' willingness to work, strive toward goals, and demonstrate optimal performance in tasks related to work preparation (Indrawati et al., 2023). Operationally, this variable was measured using indicators adapted from Popoola & Fagbola (2023), covering five main aspects: intention to enter the industry, task

value, self-esteem, achievement goals, and domain-specific motivation. These indicators were used to capture the intensity of students' motivational drive in preparing for entry into the workforce.

The research instrument consisted of a closed-ended questionnaire developed based on the operational definitions and theoretical indicators of each variable and adapted from relevant instruments used in previous studies. The instrument adaptation process involved modifying item wording and contextual framing to align with the characteristics of vocational high school students, vocational learning environments, learning experiences, and respondents' socio-cultural backgrounds, without altering the substantive constructs being measured. Language adjustments were made to ensure clarity and comprehensibility of the questionnaire items. The questionnaire was administered via Google Forms to facilitate distribution, expand respondent reach, and enhance data collection accuracy. Each item was measured using a five-point Likert scale ranging from "strongly disagree" to "strongly agree" (Sugiyono, 2016).

The research instrument was confirmed to be valid and reliable through expert judgment and empirical testing with respondents. Reliability testing results indicated that all variables achieved Cronbach's Alpha values exceeding 0.70, indicating that the instruments were reliable and suitable for use in this study. After establishing validity and reliability, data were collected from 207 twelfth-grade student respondents and subsequently analyzed using inferential statistical techniques.

Data collection was conducted directly in classroom settings, where the researcher provided explanations regarding the questionnaire completion procedures. Subsequently, the Google Form questionnaire link was distributed to students, who completed the questionnaire using their own devices under the direct supervision of the researcher. To minimize potential common method bias, data collection was conducted using neutral instructions, assurances of respondent anonymity, and supervision during the questionnaire completion process. Prior to data analysis, all items were tested for validity using Corrected Item–Total Correlation and for reliability using Cronbach's Alpha in accordance with established guidelines (Ghozali, 2018). Items that met validity and reliability criteria were then coded and processed using SPSS version 27.

The data analysis techniques employed in this study included descriptive analysis and Moderated Regression Analysis (MRA). MRA was conducted to evaluate the role of work motivation as a moderating variable, following the analytical procedures outlined by (Ghozali, 2018). All analysis results are presented systematically to address the research objectives and test the proposed hypotheses.

RESULTS AND DISCUSSION

Results

Following the validity and reliability testing of the questionnaire, the subsequent stage involved conducting the necessary analytical tests.

Normality Test

The normality test results are presented in Table 1.

Table 1.
Results of Normality Test

Unstandardized Residual	
Kolmogorv-Sminov Z	0,067
Asymp. Sig. (2-tailed)	0,063

Based on the results of the normality test Table 1, the obtained significance value is 0.063. This value exceeds the threshold of 0.05, indicating that all research variables are normally distributed. The decision criterion for assessing residual normality refers to the non-parametric Kolmogorov–Smirnov (K–S) test, in which the data are considered to be normally distributed when the significance value is greater than 0.05 (Ghozali, 2018).

Linearity Test

The results of the linearity test are presented in Table 2.

Table 2.
Results of Linearity Test

No	**Variable Relationship**	**Sig.**	**Description**
1.	Work Readiness* Communication Skills	0,285	Linear
2.	Work Readiness* Collaboration Skills	0,486	Linear
3.	Work Readiness* Knowledge Construction	0,071	Linear
4.	Work Readiness* Work Motivation	0,505	Linear

Based on the linearity test results shown in Table 2, the relationships between work readiness and communication skills, collaboration skills, knowledge construction, and work motivation each exhibit significance values greater than 0.05. Therefore, it can be concluded that all independent variables and the moderating variable have a linear relationship with the dependent variable, thereby satisfying the assumptions required for regression analysis.

Multicollinearity Test

The results of the multicollinearity test are presented in Table 3.

Table 3.
Results of Multicollinearity Test

Variable	**Tolerance**	**VIF**	**Description**
Communication Skills	0,415	2,412	No multicollinearity
Collaboration Skills	0,337	2,968	No multicollinearity
Knowledge Construction	0,691	1,448	No multicollinearity
Work Motivation	0,562	1,778	No multicollinearity

Based on the multicollinearity test results shown in Table 3, all variables exhibit tolerance values ≥ 0.10 and Variance Inflation Factor (VIF) values ≤ 10. Specifically, communication skills have a tolerance value of 0.415 and a VIF value of 2.412; collaboration skills show a tolerance value of 0.337 and a VIF value of 2.968; knowledge construction has a tolerance value of 0.691 and a VIF value of 1.448; and work motivation shows a tolerance value of 0.562 and a VIF value of 1.778. Therefore, it can be concluded that no multicollinearity issues are present in the regression model of this study.

Heteroscedasticity Test

The results of the heteroscedasticity test are presented in Table 4.

Table 4.
Results of Heteroscedasticity Test

Variable	Sig.	Description
Communication Skills	0,205	No heteroscedasticity
Collaboration Skills	0,301	No heteroscedasticity
Knowledge Construction	0,149	No heteroscedasticity
Work Motivation	0,313	No heteroscedasticity

Based on the heteroscedasticity test results shown in Table 4, the communication skills variable has a significance value of 0.205, collaboration skills 0.301, knowledge construction 0.149, and work motivation 0.313. All variables exhibit significance values greater than 0.05; therefore, it can be concluded that no heteroscedasticity is present in this study's regression model.

Coefficient of Determination (R^2)

The results of the Coefficient of Determination (R^2) are presented in Table 5.

Table 5.
Results of Coefficient of Determination (R^2)

Model	R Square
1	.502

Based on Table 5, the coefficient of determination (R^2) obtained is 0.502. This result indicates that communication skills (X_1), collaboration skills (X_2), and knowledge construction (X_3) simultaneously account for 50.2% of the variance in work readiness (Y). These findings suggest that more than half of the variation in the dependent variable can be explained by the three independent variables included in this research model, while the remaining 49.8% is attributable to other factors outside the scope of the model.

F-Test

The results of the F test are presented in Table 6.

Table 6.
Results of F-Test

Description	F_{Count}	Sig.
Regression	53,939	0.000

Based on the F-test results presented in Table 6, the calculated F value is 53.939 with a significance level of 0.000 ($p < 0.05$), indicating that the regression model used in this study is statistically significant and suitable for explaining the influence of the independent variables on students' work readiness. These results suggest that communication skills, collaboration skills, knowledge construction, and work motivation simultaneously have a significant effect on work readiness, implying that improvements in students' work readiness are influenced by the integration of interpersonal skills, cognitive abilities, and motivational factors that mutually reinforce one another.

The Effect of Communication Skills on Students' Work Readiness

Table 7.
Hypothesis 1 Test Results

Regression Model	Description	Regression Coefficient	t_{count}	Sig.
1	Constant	-7,486	-0.909	0.365
	X_1	0,176	3,320	0,001
	$R^2 = 0,502$			

Based on the results presented in Table 7, the t-test shows that communication skills have a calculated t-value of 3.320, which is greater than the critical t-value of 1.97, with a significance level of 0.001 (< 0.05). Based on these results, the regression equation is formulated as follows:

$$Y = -7.486 + 0.176X_1$$

This indicates that for every one-unit increase in communication skills, work readiness increases by 0.176 units, assuming other variables remain constant. Therefore, the first hypothesis (H_1), which states that communication skills have a positive and significant effect on vocational high school students' work readiness, is accepted.

The Effect of Collaboration Skills on Students' Work Readiness

Table 8.
Hypothesis 2 Test Results

Regression Model	Description	Regression Coefficient	t_{count}	Sig.
	Constant	-7,486	-0.909	0.365
2	X_2	0,200	3,284	0,001
	R^2 = 0,502			

Based on the results presented in Table 8 above, the t-test shows that collaboration skills have a calculated t-value of 3.284, which is greater than the critical t-value of 1.97, with a significance level of 0.001 (<0.05). Based on these results, the regression equation is formulated as follows:

$$Y = -7.486 + 0.200X_2$$

This indicates that for every one-unit increase in collaboration skills, work readiness increases by 0.200 units, assuming other variables remain constant. Therefore, the second hypothesis (H_2), which states that collaboration skills have a positive and significant effect on vocational high school students' work readiness, is accepted.

The Effect of Knowledge Construction on Students' Work Readiness

Table 9.
Hypothesis 3 Test Results

Regression Model	Description	Regression Coefficient	t_{count}	Sig.
	Constant	-7,486	-0.909	0.365
3	X_3	0,433	2,911	0,004
	R^2 = 0,502			

Based on Table 9, the t-test results show that knowledge construction has a calculated t-value of 2.911, which is greater than the critical t-value of 1.97, with a significance level of 0.004 (< 0.05). Based on these results, the regression equation is formulated as follows:

$$Y = -7.486 + 0.433X_3$$

This indicates that for every one-unit increase in knowledge construction, work readiness increases by 0.433 units, assuming other variables remain constant. Therefore, the third hypothesis (H_3), which states that knowledge construction has a positive and significant effect on vocational high school students' work readiness, is accepted.

The Role of Work Motivation in Moderating the Effect of Communication Skills on Students' Work Readiness

Table 10.
Hypothesis 4 Test Results

Regression Model	Description	Regression Coefficient	t_{count}	Sig.
4	Constant	58,014	0,865	0,388
	X_1	1,226	2,365	0,019
	Z	-1,169	-0,882	0,379
	$X_1 \times Z$	-0,019	-2,046	0,042
	$R^2 = 0,502$			

Based on the results of the Moderated Regression Analysis (MRA) presented in Table 10, the interaction between communication skills and work motivation ($X_1 \times Z$) has a calculated t-value of -2.046, which is greater in absolute value than the critical t-value of 1.97, with a significance level of 0.042 (< 0.05). The resulting moderation regression equation is as follows:

$$Y = 58.014 + 1.226X_1 – 1.169Z – 0.019(X_1 \times Z)$$

These findings indicate that work motivation plays a significant role in moderating the effect of communication skills on students' work readiness, suggesting that the effectiveness of communication skills in enhancing work readiness is influenced by the level of work motivation possessed by the students. Therefore, the fourth hypothesis (H_4) is accepted.

The Role of Work Motivation in Moderating the Effect of Collaboration Skills on Students' Work Readiness

Table 11.
Hypothesis 5 Test Results

Regression Model	Description	Regression Coefficient	t_{count}	Sig.
5	Constant	58,014	0,865	0,388
	X_2	-1,008	-1,760	0,080
	Z	-1,169	-0,882	0,379
	$X_2 \times Z$	0,022	2,123	0,035
	$R^2 = 0,502$			

Based on the results of the Moderated Regression Analysis (MRA) presented in Table 11, the interaction between collaboration skills and work motivation ($X_2 \times Z$) has a calculated t-value of 2.123, which is greater than the critical t-value of 1.97, with a significance level of 0.035 (< 0.05). The resulting moderation regression equation is as follows:

$$Y = 58.014 + 1.008X_2 – 1.169Z – 0.022(X_2 \times Z)$$

These results indicate that work motivation plays a significant role in moderating the effect of collaboration skills on students' work readiness, whereby collaboration skills have a more optimal impact when supported by a high level of work motivation. Therefore, the fifth hypothesis (H_5) is accepted.

The Role of Work Motivation in Moderating the Effect of Knowledge Construction on Students' Work Readiness

Table 12.
Hypothesis 6 Test Results

Regression Model	Description	Regression Coefficient	t_{count}	Sig.
6	Constant	58,014	0,865	0,388
	X_3	-0,404	-0,322	0,748
	Z	-1,169	-0,882	0,379
	$X_3 \times Z$	0,017	0,710	0,478
	$R^2 = 0,502$			

Based on Table 12, the results of the Moderated Regression Analysis (MRA) indicate that the interaction between knowledge construction and work motivation ($X_3 \times Z$) has a calculated t-value of 0.710, which is less than the critical t-value of 1.97, with a significance level of 0.478 (> 0.05). The resulting moderation regression equation is as follows:

$$Y = 58.014 - 0.404X_3 - 1.169Z + 0.017(X_3 \times Z)$$

This suggests that work motivation does not play a role in strengthening the effect of knowledge construction on students' work readiness, indicating that cognitive competencies tend to be more stable and are more influenced by instructional processes rather than motivational factors. Therefore, the sixth hypothesis (H_6) is rejected.

Coefficient of Determination (R^2) – Moderation Model

Table 13.
Results of Coefficient of Determination (R^2)

Model	R Square
1	0,532

Based on Table 13, the coefficient of determination (R^2) for the moderation regression model is 0.532, indicating that communication skills (X_1), collaboration skills (X_2), and knowledge construction (X_3), along with their interactions with work motivation as a moderating variable, explain 53.2% of the variance in work readiness (Y). This increase in R^2 suggests that the inclusion of the moderating variable contributes to strengthening the explanatory power of the model compared to the model without the moderating variable.

Discussion

The Effect of Communication Skills on Students' Work Readiness

The results indicate that communication skills have a positive and significant effect on the work readiness of vocational high school (VHS) students, affirming that the ability to clearly convey ideas, understand work instructions, and build professional interactions is a crucial prerequisite in the transition from education to the workforce. This finding aligns with Croucher et al. (2020), who emphasize that effective communication plays a vital role in enhancing individuals' adaptability, negotiation, and professionalism within work environments.

Moreover, communication skills function not only as interpersonal competencies but also as adaptive mechanisms enabling students to adjust to workplace culture and organizational demands. Polite, targeted, and contextual communication strengthens students' confidence and the quality of their social interactions, directly impacting their readiness to face industrial demands (Novianti et al., 2025). Well-developed communication skills also bolster self-confidence and social interactions, thereby directly affecting their preparedness for industry requirements (Putra et al., 2020). Although this relationship may be influenced by other factors such as industrial work experience and intensity of social interactions outside school, the current findings reinforce that communication skills are a foundational 21st-century competency significantly contributing to work readiness, especially within vocational education contexts focused on professional preparedness (Sudarsono et al., 2024).

The Effect of Collaboration Skills on Students' Work Readiness

Findings reveal that collaboration skills significantly affect students' work readiness, underscoring the importance of the ability to work in teams, share roles proportionally, and complete tasks collectively in modern work environments. This outcome supports research by Putra et al. (2020) and Rofiudin et al. (2024), which highlighted that communication and collaboration skills substantially contribute to enhancing vocational students' work readiness. Conceptually, collaboration skills not only improve group work effectiveness but also foster responsibility, tolerance, and sustainable interpersonal communication quality, competencies increasingly demanded by industry (Mulyono et al., 2023).

Through collaborative activities, students have opportunities to exchange knowledge, solve problems collectively, and develop interpersonal competencies relevant to workplace demands (Hidayatulloh, 2022). Nonetheless, the influence of collaboration skills on work readiness can also be understood as the result of interaction between individual competencies and a supportive learning context, such as project-based learning models and school cultures that nurture teamwork from an early stage (Rofiudin et al., 2024).

The Effect of Knowledge Construction on Students' Work Readiness

Knowledge construction demonstrates the strongest significant effect on students' work readiness, indicating that critical thinking, integrating theoretical concepts with real-world practice, and problem-solving constitute essential cognitive competencies to face the complexities of the workforce. This finding corroborates the notion that work readiness is shaped not only by social and interpersonal skills but also by the quality of cognitive processes that enable students to construct, comprehend, and apply knowledge contextually.

This aligns with the Higher-Order Thinking Skills (HOTS) framework, which regards analytical reasoning and problem-solving as essential competencies in the 21st-century labor market, supported by Hasan & Pardjono (2019), who found a significant correlation between higher-order thinking abilities and students' work readiness. High-level thinking skills enable students to adaptively tackle complex and dynamic workplace problems (Kapareliotis et al., 2019; Kurniawati et al., 2025). The strong influence of knowledge construction in this study can also be explained by vocational education characteristics emphasizing direct application of theory into practice, making deep cognitive processes a dominant factor in shaping sustainable work readiness (Indrawati et al., 2023).

The Role of Work Motivation in Moderating the Effect of Communication Skills on Students' Work Readiness

The findings show that work motivation plays a significant moderating role in the effect of communication skills on students' work readiness, indicating that communication competencies have a more optimal impact when supported by a strong internal drive to enter the workforce. Theoretically, this aligns with Self-Determination Theory, which posits that work motivation serves as a psychological energy that drives individuals to actively actualize interpersonal competencies in various professional situations (Deci et al., 2017). Students with high work motivation tend to better utilize their communication skills to understand instructions, convey ideas, and establish effective professional interactions, thereby producing higher work readiness (Hidayatulloh, 2022; Indrawati et al., 2023).

However, it is important to consider that highly motivated students may also have clearer career orientations or more intensive work experiences, implying that increased work readiness is influenced not only by communication skills but also by career planning and work experience factors (Popoola & Fagbola, 2023). Nonetheless, this finding contributes theoretically by affirming that work motivation functions as an enhancer that amplifies the effectiveness of communication skills in shaping vocational students' work readiness (Putra et al., 2020).

The Role of Work Motivation in Moderating the Effect of Collaboration Skills on Students' Work Readiness

This study's results demonstrate that work motivation significantly moderates the effect of collaboration skills on students' work readiness, affirming that teamwork capabilities yield more optimal impacts when supported by a strong internal drive to actively participate and contribute. Students with high work motivation tend to be more actively engaged in group work, effectively utilize their social roles, and show commitment to achieving shared goals, resulting in enhanced work readiness (Indrawati et al., 2023; Popoola & Fagbola, 2023). Work motivation encourages students to optimally engage in teamwork, appreciate the roles of other members, and complete tasks collectively, essential competencies in modern workplaces (Mulyono et al., 2023). Consistent with Putra et al. (2020), collaboration skills supported by high work motivation enhance students' adaptability and readiness to face team-based work dynamics and professional demands.

From an alternative perspective, this moderating effect may also be influenced by contextual factors such as classroom climate and collaborative learning strategies implemented by teachers, which play roles in fostering student motivation and cooperation effectiveness (Wahyuningsih et al., 2025). Nevertheless, these findings strengthen the theoretical framework of 21st-century competencies by positioning work motivation as a key affective factor in optimizing collaboration skills, indicating that work readiness is shaped not only by cooperative ability but also by internal willingness to actively engage in team dynamics (Putra et al., 2020).

The Role of Work Motivation in Moderating the Effect of Knowledge Construction on Students' Work Readiness

In contrast to communication and collaboration skills, the findings of this study indicate that work motivation does not moderate the effect of knowledge construction on students' work readiness. The absence of a moderating effect suggests that knowledge construction abilities possess relatively stable characteristics and are not directly dependent on short-term fluctuations in work motivation. From a theoretical perspective, this finding supports the view that cognitive competencies, such as critical thinking, conceptual integration, and analytical problem-solving, are developed through deep learning processes, sustained practice, and systematic pedagogical interventions, rather than being driven solely by affective factors (Kapareliotis et al., 2019).

Furthermore, it can be argued that vocational high school students have internalized higher-order thinking skills through vocational curricula and instructional practices, thereby reducing the significance of variations in work motivation in strengthening the relationship between knowledge construction and work readiness (Hasan & Pardjono, 2019). Consequently, the contribution of knowledge construction to work readiness tends to be consistent and is more strongly determined by the quality of instructional processes than by affective factors such as work motivation (Hidayati & Wagiran, 2020). These findings provide

a theoretical contribution by emphasizing that the role of work motivation in the work readiness model is selective, being more effective in reinforcing social–interpersonal competencies than cognitive competencies. This clarification helps delineate the functional boundaries of work motivation within the framework of 21st-century competencies (Indrawati et al., 2023).

CONCLUSION

Based on the results and discussion presented above, it can be concluded that communication skills, collaboration skills, knowledge construction, and work motivation significantly influence vocational high school students' work readiness. This finding underscores that work readiness is supported not only by technical abilities but also by interpersonal and cognitive competencies, which constitute core 21st-century skills. The moderation analysis indicates that work motivation strengthens the effect of communication and collaboration skills on work readiness, while it does not moderate the relationship between knowledge construction and work readiness. This suggests that cognitive abilities tend to be more stable and are primarily shaped by instructional processes rather than affective factors.

Theoretically, this study contributes to the development of work readiness research by enriching the conceptual model of 21st-century skills, emphasizing the role of work motivation as a selective, rather than universal, moderating variable. These findings extend theoretical understanding by highlighting that work motivation is more effective in enhancing social-interpersonal competencies than cognitive competencies, thereby clarifying the boundaries of work motivation in shaping vocational students' work readiness. The limitations of this study lie in the use of a single quantitative method and the specific moderating variable examined. Therefore, future research is expected to adopt mixed-methods approaches or incorporate additional variables, such as self-efficacy, family support, and practical work experience, to gain a more comprehensive understanding of the factors influencing vocational high school students' work readiness.

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