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ORIGINAL

A Support System-Based Approach to Career Guidance: Evidence of Effectiveness in Vocational Higher Education

Un Enfoque Basado en un Sistema de Apoyo para la Orientación Profesional: Pruebas de Eficacia en la Educación Superior Profesional

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ABSTRACT

Career guidance is essential in vocational higher education, yet conventional approaches often remain limited to information dissemination and fail to meet students' diverse needs in the context of Industry 4.0 and Society 5.0. These limitations lead to skill mismatches and low confidence among graduates entering the workforce. This study, titled "A Support System-Based Approach to Career Guidance: Evidence of Effectiveness in Vocational Higher Education," aimed to examine the effectiveness of a support system-based career guidance model in enhancing students' career knowledge, decision-making abilities, and job readiness. Using a quasi-experimental design with a nonequivalent control group, 61 students from Universitas Ekasakti, Indonesia, were divided into an experimental group (n = 30) that received structured support system guidance and a control group (n = 31) that followed traditional methods. Data were collected through pre- and post-tests on career knowledge and decision-making, complemented by a 15-item survey measuring engagement and self-awareness. The experimental group achieved significantly higher post-test scores (M = 90,83) than the control group (M = 81,94), with $p < 0,001$. The gain score of the experimental group (23,10) also exceeded that of the control group (13,88), and ANCOVA indicated that the intervention explained 32,7 % of the variance in post-test results. The findings confirm that integrating mentoring, peer collaboration, and digital platforms within a structured support system effectively improves students' career readiness and provides a replicable model for strengthening employability outcomes in vocational higher education.

Keywords: Support System; Career Guidance; Vocational Higher Education; Employability; Student Readiness.

RESUMEN

La orientación profesional es esencial en la educación superior vocacional, pero los enfoques convencionales suelen limitarse a la difusión de información y no logran atender las diversas necesidades de los estudiantes en el contexto de la Industria 4.0 y la Sociedad 5.0. Estas limitaciones provocan desajustes de competencias y una baja confianza entre los egresados que ingresan al mercado laboral. Este estudio, titulado "Un enfoque basado en sistemas de apoyo para la orientación profesional: evidencia de eficacia en la educación superior vocacional", tuvo como objetivo examinar la efectividad de un modelo de orientación profesional basado en un sistema de apoyo para mejorar el conocimiento profesional, las habilidades de toma de decisiones y la preparación laboral de los estudiantes. Utilizando un diseño cuasi-experimental con un grupo de control no equivalente, se trabajó con 61 estudiantes de la Universidad Ekasakti, Indonesia, divididos en un grupo experimental (n = 30) que recibió una orientación estructurada basada en sistemas de apoyo y un grupo de control (n = 31) que siguió métodos tradicionales. Los datos se recopilaron mediante pruebas previas y posteriores sobre conocimiento y toma de decisiones profesionales, complementadas con una encuesta

de 15 ítems que midió el compromiso y la autoconciencia de los estudiantes. El grupo experimental obtuvo puntuaciones significativamente más altas en la prueba posterior (M = 90,83) que el grupo de control (M = 81,94), con p < 0,001. La ganancia del grupo experimental (23,10) también superó la del grupo de control (13,88), y el ANCOVA indicó que la intervención explicó el 32,7 % de la varianza en los resultados. Los hallazgos confirman que la integración de la tutoría, la colaboración entre pares y las plataformas digitales dentro de un sistema de apoyo estructurado mejora efectivamente la preparación profesional de los estudiantes y ofrece un modelo replicable para fortalecer la empleabilidad en la educación superior vocacional.

Palabras clave: Sistema de Apoyo; Orientación Profesional; Educación Superior Profesional; Empleabilidad; Preparación de los Estudiantes.

INTRODUCTION

Career guidance is a crucial aspect of higher education, especially in vocational institutions, aimed at enhancing employability and job readiness among students. The structured delivery of career guidance is essential for facilitating the transition from academic settings to the workforce.[1,2] However, career guidance services within vocational contexts are frequently underdeveloped or limited to basic information dissemination, failing to address the diverse needs of current students.[3,4] This shortfall can lead to skill mismatches and reduced confidence among graduates, highlighting the need for innovative career guidance models tailored to the distinct challenges faced by vocational students.[1,5]

The rapidly changing global labor landscape, shaped by trends such as Industry 4.0 and the emergence of Society 5.0, presents additional challenges for vocational graduates. These individuals are now expected to not only possess technical skills but also competencies in adaptability, critical thinking, and digital literacy.[6,7] Recent studies indicate that many graduates face increasingly complex career paths without sufficient institutional support, contributing to lower employment rates and difficulties in securing meaningful positions.[5,8] Advocate for a strong, evidence-based approach to career guidance to effectively tackle these challenges.[9,10]

Traditional career guidance practices have often focused narrowly on immediate job placement, neglecting the long-term developmental needs of students.[11,12] This limited perspective creates an uncoordinated approach that does not align personal aspirations with industry requirements or leverage the unique resources provided by educational institutions [2,13]. Recognizing the significance of a support system-based approach is vital, as it fosters a more cohesive framework for career guidance, yielding improved student outcomes through mentorship and industry collaboration.[5,14] Integrating theoretical and practical training within the career guidance process is paramount for enhancing students' preparedness as they enter the job market.[15,16]

To reinforce this support system-oriented model, collaboration among various stakeholders—such as career centers, faculty, mentors, and industry partners—is essential. Such collaboration ensures that students have consistent access to career resources, professional networking opportunities, and ongoing feedback, all crucial for adapting to the labor market's dynamic requirements.[17,18] Technology plays a significant role in modernizing career guidance by providing personalized resources tailored to the unique needs of each student, as emphasized in recent literature.[1,19] The evolution of digital technologies necessitates a reevaluation of how career guidance services are structured within vocational institutions.

Mentorship networks and collaboration with industry partners have demonstrated significant potential for improving employability outcomes and enhancing workplace readiness among students.[4,20] Effective mentorship programs are associated with better career planning and higher job satisfaction.[21,22] However, there remains a lack of empirical studies investigating the comprehensive effectiveness of support system-based career guidance models, presenting a critical area for further investigation.[23,24] This gap underscores the necessity for in-depth research into the tangible benefits of holistic career support mechanisms in vocational education, especially in developing regions facing unique challenges such as skill mismatches and limited access to guidance.

The specific needs of vocational education demand specialized career guidance methodologies that address not only academic skills but also integrate industry practices and lifelong learning pathways.[25,26] A well-structured career guidance model can successfully align educational demands with real-world applications, preparing students for an evolving labor market.[27,28] International organizations like UNESCO and the OECD advocate for cohesive educational ecosystems that promote lifelong employability, bolstering the case for implementing a support system-oriented approach in vocational settings.[21,29]

Despite advancing findings on the benefits of support systems, mentorship, and digital platforms for employability and career readiness, existing literature often remains fragmented and generalized, lacking context related to vocational institutions.[30,31] Most studies focus on isolated interventions such as career counseling or digital platforms without exploring their potential when integrated into a comprehensive support system.[32,33] Consequently, robust empirical evidence evaluating the holistic efficacy of integrated guidance

models in vocational education remains limited, particularly in developing countries where distinct challenges persist.

While prior studies have underscored the positive effects of support systems, mentorship, and digital platforms on students' employability and career readiness, much of the existing literature is fragmented and context-specific, typically emphasizing general higher education rather than vocational institutions.[34,35] Previous research often focuses on isolated interventions such as career counseling, industry partnerships, or technology-driven platforms without integrating these elements into a comprehensive support system-based model. Moreover, empirical evidence specifically targeting the holistic effectiveness of such frameworks in vocational higher education remains sparse, particularly in developing countries where vocational graduates encounter distinct challenges such as skill mismatches and limited access to structured guidance.[36,37] This gap highlights the critical need for rigorous, evidence-based studies that assess not only the conceptual design but also the measurable impact of comprehensive career guidance models in enhancing vocational students' career readiness and long-term professional success.

The primary objective of this research is to evaluate the effectiveness of a support system-oriented career guidance approach within vocational higher education. By empirically assessing its impact on students' career preparedness and engagement levels, the study seeks to bridge the existing literature gap while offering actionable recommendations for policymakers, educators, and institutions aiming to refine vocational education frameworks in response to labor market demands. Ultimately, this initiative aspires to enhance vocational education systems' ability to equip students for stable and fulfilling professional futures within an increasingly complex job landscape.

METHOD

Type of study, period, and location

This study adopted a quasi-experimental design with a nonequivalent control group to evaluate the effectiveness of a support system-based approach to career guidance in vocational higher education. The research was carried out at Universitas Ekasakti, Padang (Indonesia) during the odd semester of the 2024/2025 academic year, a choice driven by the practical constraints of conducting research in authentic classroom settings where random assignment was infeasible. This design enabled systematic comparison between an intervention group and a control group under real instructional conditions.

Methodological alignment with real-world practice was intentional: the nonequivalent control group structure allowed the study to capture genuine variation in students' performance and engagement while preserving ecological validity. Consequently, the evidence generated reflects typical learning contexts in vocational higher education, enhancing the external relevance and practical applicability of the findings.

Population, sample, and type of sampling

The target population comprised students enrolled in a vocational higher education program at Universitas Ekasakti. Two intact classes were selected via purposive sampling: an experimental group (n = 30) received the support system-based intervention, while a control group (n = 31) received conventional career guidance. Pre-existing class groupings were used to preserve the integrity of the academic context and to facilitate implementation without disrupting institutional routines.

Inclusion criteria were active enrollment, consent to participate, and regular attendance. Students who missed more than two core sessions or withdrew consent were excluded from the final analysis. Participants retained the right to exit the study at any time without academic penalty, consistent with the pragmatic constraints of nonequivalent group designs in naturalistic settings described in the manuscript's sampling and context section.

Variables analyzed

The independent variable was the support system-based career guidance model, operationalized as an integrated framework of mentoring, peer collaboration, and digital platform support. The primary dependent variables were career knowledge, career decision-making skills, and career readiness, selected to reflect core employability competencies in vocational education.

To capture process-proximal outcomes, the study additionally measured student engagement and self-awareness using a 15-item Likert survey adapted from validated instruments in prior career guidance and educational support research. These constructs—less frequently examined in vocational contexts—were included to link cognitive gains to motivational and metacognitive changes relevant for transition to work.

Procedures

Intervention Implementation

a. Experimental Group: students in the experimental group participated in seven structured sessions

of career guidance using a support system-based approach. The intervention was delivered through a combination of system-supported modules, online guidance features, and face-to-face mentoring activities. The support system facilitated personalized career assessments, exploration of job market trends, skill–career matching, and career planning simulations. Each session focused on specific objectives, such as: (1) self-assessment of strengths and interests, (2) identifying relevant career pathways, (3) analyzing labor market information, (4) mapping skills to career requirements, (5) developing a career action plan, (6) practicing career decision-making through case simulations, and (7) presenting individual career development plans with feedback from mentors.

b. Control Group: students in the control group followed a conventional career guidance format. The sessions were primarily conducted through teacher-centered lectures and general discussions, focusing on broad career advice without the use of digital support systems. Guidance was delivered collectively to the class, with limited opportunities for personalized exploration or interactive decision-making exercises.

Measurement

a. Pre- and Post-tests: to evaluate the effectiveness of the intervention, both groups completed pre- and post-tests consisting of 20 multiple-choice items measuring career knowledge and 5 short-answer questions assessing problem-solving in career decision-making scenarios.

b. Student Engagement Survey: at the end of the intervention, a 15-item Likert-scale survey was administered to both groups. The survey was designed to capture students' perceptions of engagement, motivation, self-awareness, and skills development in relation to career guidance.

Research Instruments and Validation

Instrument Development

a. Career Knowledge Tests (Pre- and Post-test): the test items were developed based on the competencies and objectives of vocational higher education career guidance. The items assessed students' understanding of career pathways, job market requirements, and decision-making strategies.

b. Student Engagement Survey: this instrument was adapted from established and validated scales used in prior studies on career guidance and educational support systems. The development process involved:

1) Content Validity: three experts in educational psychology and vocational education reviewed the test and survey items to ensure clarity, appropriateness, and alignment with the study objectives.

2) Pilot Study: a pilot test was conducted with 30 students from a different program to identify ambiguities, ensure readability, and refine the instruments prior to implementation.

Validity and Reliability

The pilot study results were used to examine both validity and reliability. Item validity was assessed using correlation analysis, while reliability was measured with Cronbach's Alpha (α) coefficient through SPSS software. Items with low correlation values or α below 0,70 were revised or discarded to strengthen the instruments' psychometric properties.

To measure the effectiveness of the intervention, both groups undertook pre- and post-tests evaluating career knowledge and decision-making skills. Additionally, a 15-item Likert-scale survey was administered after the final session to capture students' perceptions of engagement, motivation, self-awareness, and career planning skills. Data collection was conducted in both printed and digital formats, and all responses were anonymized and securely stored to ensure confidentiality.[38,39]

Table 1. Research Design[39]

Group	Pre-Test	Treatment (X)	Post-Test
Experiment	O_1	X	O_2
Control	O_3	-	O_4

Explanation:
O_1 & O_3: pretest observation for the experimental and control group.
X: the treatment or intervention given to the experimental group
O_2 & O_4: posttest observation for the experimental and control group.

This study was conducted at Universitas Ekasakti, Padang, Indonesia, and strictly adhered to ethical research standards. Prior to participation, informed consent was obtained from all students, who were provided with

a clear explanation of the study's objectives, procedures, and their rights as participants. They were assured that participation was entirely voluntary and that they could withdraw from the study at any point without any academic or personal consequences.

To safeguard confidentiality, all responses from the career knowledge tests, decision-making assessments, and engagement surveys were anonymized. Data were securely stored in password-protected files and made accessible only to the research team. These measures ensured that participants' identities and responses remained confidential, maintaining integrity and compliance with ethical principles in vocational higher education research.

Data Analysis Techniques

This study employed both quantitative and qualitative research methods to assess the effectiveness of a support system-based approach to career guidance in vocational higher education. Two groups were compared: the experimental group (n=30), which received the intervention through the career support system, and the control group (n=31), which followed conventional career guidance practices. The primary aim was to determine whether the support system-based model led to significant improvements in students' career knowledge, decision-making skills, and readiness for the labor market compared to the traditional approach.

Quantitative analysis of pre- and post-test scores from both groups was carried out using statistical techniques to evaluate differences in learning outcomes. The analysis tested whether the experimental group achieved greater gains in career-related competencies, particularly in knowledge acquisition and problem-solving for career decision-making. In addition, qualitative data were collected through surveys and semi-structured interviews with students and mentors. Thematic analysis was applied to identify recurring patterns in perceptions of engagement, motivation, self-awareness, and career planning. By combining quantitative and qualitative approaches, the study provided a comprehensive evaluation of the effectiveness of the support system-based career guidance model in enhancing student outcomes. All ethical guidelines, including informed consent, confidentiality, and voluntary participation, were strictly observed throughout the research process.

RESULTS

Data Analysis and Findings

The data analysis in this study demonstrates significant improvements in student outcomes following the implementation of a support system-based approach to career guidance in vocational higher education. Both quantitative and qualitative data were collected, with pre- and post-assessments serving as the primary tools to measure students' career knowledge, decision-making abilities, and readiness for the labor market. Descriptive statistics were applied to compare the pre-test and post-test scores between the experimental group, which engaged in the support system-based career guidance sessions, and the control group, which followed conventional guidance practices. The experimental group showed substantial improvements in career-related knowledge, problem-solving in career decision-making, and the ability to align personal competencies with professional pathways. In contrast, the control group, which relied on traditional, lecture-based guidance, demonstrated more modest gains in these areas.

The comparison between the two groups highlights the effectiveness of the support system-based approach in strengthening career readiness among vocational students. The analysis of pre- and post-test data revealed notable progress in the experimental group, particularly in their ability to make informed career choices and develop actionable career plans. These findings suggest that integrating support systems into career guidance not only enhances students' cognitive understanding but also fosters greater motivation, engagement, and confidence in preparing for future employment. The accompanying data further supports the conclusion that a support system-based career guidance model provides more effective outcomes compared to traditional methods in vocational higher education.

Table 2. Results of the Descriptive Analysis Results for Pre-Test and Post-Test

Group	Mean Pre-Test Score	Mean Post-Test Score
Experiment	67,73	90,83
Control	68,06	81,94

The descriptive analysis presented in table 2 demonstrates clear differences between the experimental group, which received a support system-based approach to career guidance, and the control group, which followed conventional practices. Prior to the intervention, the mean pre-test scores of both groups were relatively similar, with the experimental group scoring 67,73 and the control group 68,06, indicating comparable initial conditions. However, the post-test results show a notable divergence: the experimental group achieved a

mean score of 90,83, significantly higher than the control group's mean of 81,94. This substantial improvement suggests that the structured support system effectively enhanced students' career-related knowledge and preparedness. The findings provide empirical evidence that integrating support systems into vocational higher education can meaningfully strengthen career guidance outcomes, ensuring students are better equipped to navigate their professional pathways. Furthermore, a normality test was conducted to determine the suitability of the data for inferential analysis, specifically to assess the extent to which the data followed a normal distribution. The Shapiro-Wilk test was utilized to analyze the distribution of the data.

Table 3. Results of the Shapiro-Wilk Test

Group	Pre-Test (p-value)	Post-Test (p-value)
Experiment	0,184	0,569
Control	0,271	0,775

The results show that the data in both groups, for both pre-test and post-test, were normally distributed ($p > 0,05$). Levene's Test was used to examine the homogeneity of variances between the experiment and control groups.

Table 4. Results of Levene's Test

Variable	F	Sig. (p-value)
Post-Test	1,700	0,452

The analysis indicates that the variances of the experiment group to the control group were similar ($p > 0,05$) suggesting that the groups could be compared parametrically. To establish the researching hypothesis the two condition Independent Sample T-Test was used to compare the post test results between the experimental and control groups.

Table 5. Results of T-Test

Test Type	Variable	t	Sig. (p-value)	Interpretation
Independent Sample T-Test	Post-Test scores of Experimental Group vs Control Group	-5,354	0,000	The experimental group achieved a higher mean post-test score than the control group

The results of the independent sample t-test, as displayed in table 5, provide strong statistical evidence for the effectiveness of a support system-based approach to career guidance in vocational higher education. The analysis shows a significant difference in the post-test scores between the experimental group and the control group, with a t-value of -5,354 and a p-value of 0,000, indicating that the difference is highly significant. This confirms that students who received career guidance supported by structured systems achieved substantially higher learning outcomes compared to those who relied on conventional approaches. The findings reinforce the argument that embedding support mechanisms—such as mentoring, peer collaboration, and institutional resources—within vocational programs enhances students' preparedness and confidence, thereby validating the effectiveness of this innovative approach to career guidance. The gain scores (Post-Test – Pre-Test) were calculated for both groups to evaluate the improvement from pre- to post-test. The experimental group showed a larger gain compared to the control group.

Table 6. Gain Score Analysis

Group	Mean Pre-Test Score	Mean Post-Test Score	Gain Score (Post - Pre)
Experiment	67,73	90,83	23,10
Control	68,06	81,94	13,88

The gain score analysis in table 6 further highlights the effectiveness of a support system-based approach to career guidance in vocational higher education. While both groups showed improvement from pre-test to post-test, the experimental group demonstrated a substantially higher gain score of 23,10 compared to 13,88 in the control group. This indicates that students who received structured support through mentoring, collaboration, and institutional resources benefited more significantly in terms of career-related learning outcomes than those who relied on conventional methods. An ANCOVA was conducted to adjust for pre-test differences. After

controlling for pre-test scores, the post-test differences remained significant, confirming the effectiveness of the intervention.

Table 7. ANCOVA Result

Source	F	Sig. (p-value)	Interpretation
Pre-Test (covariate)	0,001	0,975	Initial differences controlled
Group (Experimental vs. Control)	28,162	0,000	Significant group effect on post-test

The ANCOVA results demonstrate that the pre-test variable did not have a significant effect on the post-test scores (F = 0,001, p = 0,975), indicating that initial differences between students were successfully controlled. In contrast, the group factor (experimental vs. control) showed a highly significant effect (F = 28,162, p = 0,000), confirming that the support system-based approach to career guidance had a substantial impact on students' post-test outcomes. Furthermore, the R Squared value of 0,327 indicates that the model explained approximately 32,7 % of the variance in post-test performance, suggesting a meaningful contribution of the intervention to students' achievement. These findings provide strong empirical evidence that structured support systems can significantly enhance the effectiveness of career guidance in vocational higher education.

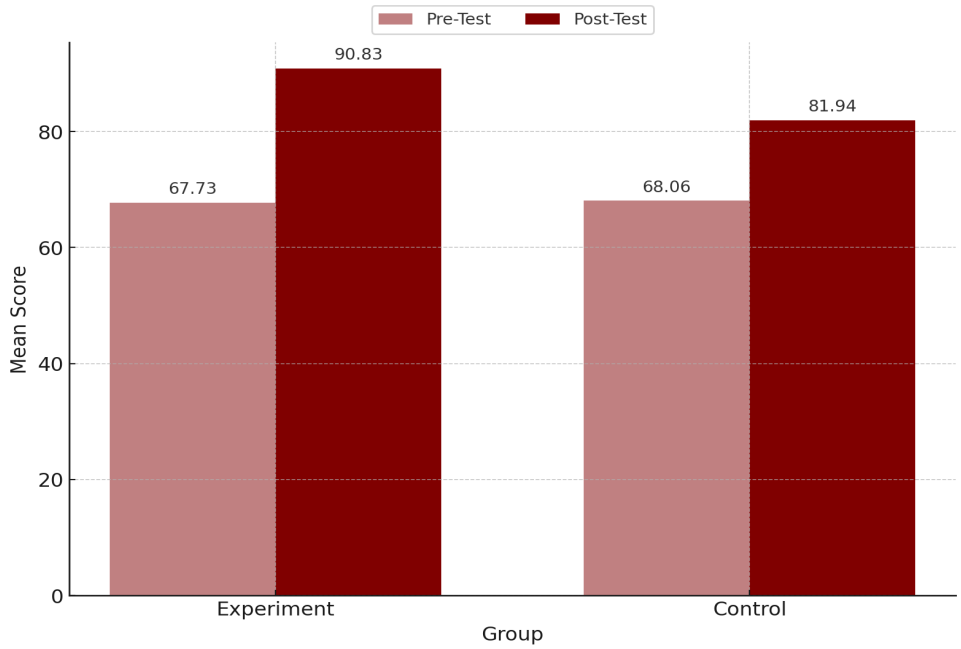

Figure 1. Pre-Test and Post-Test Scores Bar Chart

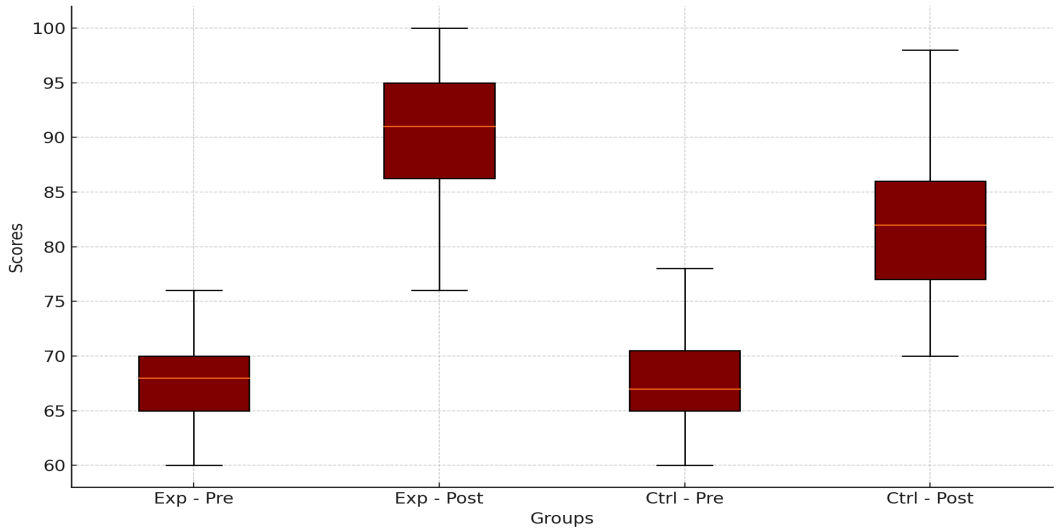

Figure 2. Box Plot Pre-Test and Post-Test Scores

The boxplot visualization illustrates the comparative distribution of pre-test and post-test scores for both the experimental and control groups. The experimental group shows a marked increase in scores from pre-test to post-test, with the median shifting significantly upward, demonstrating the effectiveness of the support system-based career guidance intervention. In contrast, the control group exhibits only a modest improvement over the same period. Moreover, the wider spread of post-test scores in the experimental group indicates greater variability in outcomes, reflecting that while most students benefited substantially, the degree of improvement varied across individuals. Overall, the graphical results provide further evidence that integrating structured support systems enhances students' career-related competencies more effectively than conventional guidance approaches in vocational higher education.

DISCUSSION

The results of this study provide strong empirical support for the effectiveness of a support system-based approach to career guidance in vocational higher education. The experimental group demonstrated statistically superior gains in career knowledge, decision-making skills, and preparedness compared to the control group. These findings align with the concerns outlined in the introduction, where it was argued that conventional career guidance models are insufficiently equipped to address the complex demands of Industry 4.0 and Society 5.0. Similar to the observations of Hanushek,[6] who noted that vocational graduates often face skill mismatches in the labor market, the present study highlights the potential of structured support systems to mitigate these mismatches by fostering alignment between student competencies and industry requirements.

This study reinforces the work of Kettunen and Sampson,[1] who emphasized the challenges of implementing ICT in career services and advocated for more structured, systemic models. The use of modules, online guidance, and mentoring in this study reflects an integration of digital and human support, echoing the calls of Westman[12] for technology-supported guidance that remains adaptable to student needs. The significant improvements observed in the experimental group suggest that such blended, system-oriented approaches are not only feasible but also highly effective in vocational contexts.

Importantly, the active ingredients of the intervention can be identified in its design. By combining mentoring, peer collaboration, and digital guidance platforms, the model offered sustained scaffolding for students' career development. This aligns with Zhou,[16] who found that social support enhances decision-making by strengthening psychological capital and self-efficacy. Likewise, Wu, Tsai, and Chen[5] emphasized the role of vocational self-concept and employability in student success, both of which were addressed in this study's structured support sessions. These connections suggest that the observed improvements are not coincidental but rooted in mechanisms already identified in the literature.

The findings also resonate with Savickas'[21] life-design paradigm, which argues for career interventions that support lifelong adaptability rather than short-term placement. The support system model in this study created opportunities for students to explore labor market trends, match skills with career pathways, and build action plans, reflecting the paradigm of career construction through active engagement. Similarly, Hartati[20] stressed the need for tailored career support to prepare diverse learners for the workforce, which parallels the inclusive potential of the model tested here.

Nevertheless, the study has important limitations. Conducted within a single institutional context, the generalizability of the findings is restricted, echoing Xu,[23] who cautioned that career development challenges vary across cultural and institutional settings. Additionally, while short-term improvements were demonstrated, long-term outcomes such as job placement rates or career satisfaction were not measured. This limitation reflects the broader critique in the literature that many career guidance studies focus on immediate outcomes without tracing lasting employability.[28] Future research should therefore adopt longitudinal designs to capture the sustainability of these effects.

Another boundary of the study concerns the reliance on knowledge-based tests and self-reported surveys. Although these measures provided valid evidence of cognitive and motivational improvements, they do not fully capture the complex, lived realities of transitioning into the workforce. Previous studies, such as Burns,[35] emphasized that self-efficacy and decision-making are contextually influenced and require mixed-methods approaches for deeper understanding. Future studies should thus integrate employer feedback and graduate employment tracking to triangulate the evidence of effectiveness.

The implications for educators and policymakers are substantial. For educators, the findings support embedding career guidance into curricula through collaborative models involving faculty, career centers, and industry mentors.[18,22] For policymakers, the evidence strengthens the case made by UNESCO and OECD for building cohesive educational ecosystems that promote lifelong employability. In developing regions especially, investing in digital infrastructure and mentor training could significantly enhance vocational graduates' readiness for dynamic labor markets.

This study contributes to the literature by not only demonstrating the effectiveness of a support system-based career guidance model but also by explaining its mechanisms in relation to established theories and

findings. By fostering mentorship, leveraging technology, and encouraging collaboration, the model led to statistically superior gains in student outcomes. While limitations remain, the results extend previous scholarship and provide actionable insights for educators, policymakers, and researchers aiming to strengthen vocational higher education.

CONCLUSIONS

This study provides clear empirical evidence that a support system-based approach to career guidance significantly enhanced vocational students' career knowledge, decision-making skills, and readiness for the labor market compared to conventional methods. By integrating mentoring, peer collaboration, and digital platforms into a cohesive framework, the intervention led to statistically superior gains and fostered a deeper alignment between student competencies and industry requirements. While the findings are bounded by the study's institutional context and focus on short-term outcomes, they highlight the transformative potential of structured support systems in vocational education. For educators, the results underscore the need to embed career guidance within curricula as an ongoing developmental process, while for policymakers they point to the importance of investing in institutional infrastructures that sustain such systems. Ultimately, this research not only validates the effectiveness of a support system-oriented model but also emphasizes its role in preparing students for adaptive and meaningful professional futures within increasingly complex global labor markets.

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