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The influence employability of vocational students through internship experiences and 21st-century competencies: a moderated mediation model

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ABSTRACT

Using the social cognitive theory, this study examines the mediation role of 21st-century competencies in the relationship between student internship sxperience and employability of vocational students and the role of moderation of psychological capital on the relationship between SIE and 21stCE. This study aims to analyse the employability of vocational students through internship experience and 21st century competencies through a moderated mediation model. This study collected data through a direct survey of 266 vocational students in Aceh Province. SPSS V.25 and SmartPLS 4.1.0.3 are used to test the proposed hypothesis. The findings revealed that SIE positively increased EVS through the 21stCE. Further research shows that the effect of SIE on 21stCE is more significant for students with high PsyCap than for low PsyCap. This study expands the existing literature on the relationship between SIE and EVS by integrating SCT from the perspective of vocational education. These findings offer valuable insights and guidance for policymakers for education management regarding how and when SIE leads to better EVS among vocational students. This is one of the pioneering empirical studies highlighting SIE's importance to EVS among vocational students in the developing Aceh Province in Southeast Asia. In addition, the study confirms that 21st-century competencies play an essential role in explaining how SIE drives EVS.

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1. Introduction

Vocational schools are increasingly gaining attention from various circles, especially because of their crucial role in preparing a workforce that is not only ready-to-use, but also competent in various industrial sectors. Amidst the dynamics of globalisation and the Industrial Revolution 4.0, the demand for workers with high practical and technical skills has increased significantly. (González-Pérez & Ramírez-Montoya, 2022), In this context, internship experience for students emerges as one of the effective strategies to enhance their employability. Through internship experiences, students not only acquire practical skills, but also instil important values that will be a strong foundation for their future career success (Lee & Ahn, 2021). Nonetheless, the internship experience had a significant positive impact on students' employability (Bawica, 2021; Downs et al., 2024; Y.-A. Kim et al., 2022; Pianda et al., 2024). However, on the other hand, there are also recent studies that report different results, suggesting that not all internship experiences provide the expected benefits (Saidani et al., 2022). This indicates the need for a more in-depth evaluation of the quality and relevance of the internship programmes offered, in order to truly meet the needs of the industry and best prepare students.

Mediation of 21st century competencies on student employability in the context of vocational education. Previous research has investigated the mediating effects of psychological capital (Gupta et al., 2019; Yang et al., 2022). Career Entry Worries (Ebner et al., 2021), the relationship between internship

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experience and student employability. However, there are few empirical studies related to the influence of 21st-century competencies on the employability of vocational students. In particular, vocational students (González-Pérez & Ramírez-Montoya, 2022; Mahmud & Wong, 2022) show that the 21st Century competencies are an antecedent of vocational student employability. Other research also reports that 21st-century competencies affect the employability of vocational students, as these skills are essential for graduates to be well-prepared for the demands of the contemporary job market (Habets et al., 2020). Gupta et al. (2019) confirm the mediating role of psychological capital in the relationship of internship experience to employability, even suggesting testing the mediation effect of 21st-century competencies. Howell et al. (2024) emphasize the need to study predictors of student internship experience driven by 21st-century competencies.

Employability is a very important concept in the context of career development, especially with regard to the influence of psychological capital on individual career satisfaction and success. In addition, previous studies have shown the role of mediation, such as employability, in the influence of psychological capital on career satisfaction and success (Ayala Calvo & Manzano García, 2021; Elsey et al., 2022), and the moderation role of various variables related to vocational education, such as student internship experiences such as supervisor support, and job characteristics (Cai et al., 2019). The role of moderation of student Internship experience about psychological capital on Job Anxiety (Belle et al., 2022). The literature often overlooks key factors of psychological capital, such as hope, optimism, resilience, and efficiency. These factors are crucial for enhancing academic performance, boosting student engagement, and improving well-being. They also provide job seekers with a competitive edge in achieving their career goals (Kiat et al., 2020; Sulaiman et al., 2020). In addition, psychological capital as a strong foundation can influence the internship experience on 21st-century competencies (Fawaid et al., 2022; Y. F. Guo et al., 2021). Psychological capital as a driver of employability perception through work-integrated learning experiences, digital leadership competencies, and intercultural competencies (Ng et al., 2022; Zhan et al., 2024). In addition, psychological capital encourages the extent to which students' internship experiences arouse enthusiasm and soul to be able to improve 21st-century competencies so that they become professional students in their fields (Kotb et al., 2024).

However, there is a lack of empirical evidence on how internship experiences affect the employability of vocational students. Given this gap, researchers try to study the mechanism of how student internship experiences can create and improve employability among vocational school students in Aceh Province. In addition, it is still unclear how 21st-century competencies mediate the relationship between internship experience and employability and whether psychological capital can weaken or enhance the role of students' internship experience on 21st-century competencies. Previous research related to the influence of internship experience at university, internship experience on competence, academic performance, and the development of employability of college students (Caviggioli, 2024; Thompson et al., 2021). Although these findings can be generalized to vocational schools in Aceh Province, they cannot be applied to vocational students because there are differences in policy, education, administration, and infrastructure systems. In addition, there are many studies related to internship experience on graduate employability in higher education than in vocational schools. Employability-related studies are critical because of the ongoing unemployment challenges among vocational students. BPS Report (2023), and the International Labour Organization (2020) the youth unemployment rate was higher (16.46%) than the overall adult unemployment rate of 5.45%. In this context, it is important to increase the employability of vocational students so that they have confidence, hope, resilience, and self-efficacy when entering the world of work.

Significant challenges are being faced by SMK students in Aceh Province in securing gainful employment. Ironically, the youth unemployment rate has also risen, suggesting an imbalance between acquired skills and job availability. This requires an evaluation of the effectiveness of vocational education programs and curriculum adjustments to better suit the needs of the job market and industry dynamics. Therefore, increasing employability can support the country's socio-economic development. In addition, students' internship experience contributes to regional economic development compared to students who do not have internship experience (Elena & Estebanez, 2020; Mendis, 2024). Internship programs at vocational schools provide valuable work experience and equip students with the knowledge, attitudes, and skills necessary to face challenges in the world of work (Anjum, 2020; Cui et al., 2024).

This study aims to analyse the employability of vocational students through internship experience and 21st century competencies through a moderated mediation model. This investigates students'21st century competencies as a mediating construct in the relationship between students' internship experience and vocational students' employability. The novelty of this research lies in the incorporation of internship experience and 21st century competencies for vocational students. Different from previous studies that address these aspects separately, this research explores the interaction between practical experience and skills development to face the challenges of the modern world of work. With a moderated mediation model, it is expected to identify factors that influence the relationship, providing insights into the preparation of vocational students for the labour market. The importance of research can be directed towards developing vocational education curricula that are more relevant and responsive to industry needs. By understanding how internship experiences and 21st century competencies interact to influence employability, educational institutions can design more effective internship programmes and align curricula with the skills required by the world of work. The research will provide data and analyses that can assist policy makers in Aceh in formulating strategies to improve the quality of vocational education and apprenticeships, in line with the evolving needs of the labour market.

2. Literature review and hypotheses

2. 1 Theoretical background

Social cognitive theory (SCT) is a theory developed by Albert Bandura, a psychologist; this theory explains the impact of internships on student employability on triadic interaction determinism, which states that a combination of personal and environmental factors affects human behavior. This theory is widely applied in the fields of education, social, behavioral, and mental health in improving career decisions, especially employability (Oben & van Rooyen, 2023; Scott et al., 2024). SCT is also the most important component in research related to the internship experience, psychology capital, and 21st-century competence as a personal variable (Middleton et al., 2019). 21st-century competence is an indicator that is measured for students in facing the demands of work with rapid changes in an increasingly complex and dynamic work environment, as well as having an impact on the internship experience and human behavior (Thornhill-Miller et al., 2023). The internship experience provides an opportunity for students to develop psychological capital in overcoming challenges in the workplace (Elmose et al., 2024). In summary, essential factors in the social cognitive model are measures of internship experience, psychological capital, and 21st-century competence. These are directly related to and relevant to the three variables discussed in this study.

2. 2 Employability of vocational school students

The employability of vocational students (EVS) is an important aspect that is influenced by various factors, such as general skills, knowledge-building ability, innovative characteristics, job readiness, vocational self-concept, personal traits and traits, social experiences, and workplace training, as well as professional attitudes built (Ahmid et al., 2023; Cheng & Lu, 2023; Jiang et al., 2022). Vocational education plays an important role in students' employability for employment, economic and industrial development (Xia et al., 2022). Previous research conceptually and empirically stated that internship experience affects student employability (Choe et al., 2023; Irwin et al., 2019; Saidani et al., 2022). Similarly, according to Lo Presti et al. (2023) when an internship involves a socialization strategy of the organization and high resources, this can increase a person's employability. This study conceptualizes a person's employability as confidence to succeed and adapt in a changing work environment. SCT on student employability as an individual, environmental, and behavioral factor can emphasize the importance of psychological capital to their ability to develop career interests and make career decisions (Oben & van Rooyen, 2023).

Psychological capital such as hope, optimism, resilience, self-efficacy, internship experience, and 21st-century competencies affect student employability (Habets et al., 2020; Ma, 2021; Z. Wang & Samu, 2023). Most importantly, Lo Presti et al. (2023) in Italy, Zhang et al. (2022), To and Lung (2020), and

Chen and Gan (2021) in China, a significant positive association between internship experience and student employability was reported. Other research has found that the positive role of 21st-century psychology capital variables and competencies are essential factors in vocational education support systems in academic success for improving students' employability and preparing them for the rapidly changing world of technology (Kaiser et al., 2019; Mahmud & Wong, 2022). Moreover, a Study by Li et al. (2022) Observing the positive relationship between innovation ability and social adaptability to self-efficacy to employability. To face the challenges of a rapidly changing labor market, internships require strong psychological capital to foster morale and motivation, thereby increasing employability (Alessandri & Filosa, 2024; Chiesa et al., 2018). Therefore, 21st-century competence can be considered a mediating factor between internship experience and employability (Bargsted et al., 2021).

2.3. Relationship between student internship experience and employability of vocational school students

The internship is a process in which a mentor or supervisor provides direct experience to students or interns in a real work environment based on the field of study. In addition, internships also provide opportunities for Generation Z as interns to develop practical skills and collaboration processes, build professional networks, and broaden their horizons with their industry or field of study (Leránoz-Iglesias et al., 2023; Shtembari & Elgün, 2023). Internships are designed to integrate practical work experience, maximize skills development for students, and help prepare for a successful career future, as well as provide added value to their education to provide increased employability of vocational students (Huang et al., 2021; Lo Presti et al., 2023; Stamati & Willmott, 2023).

The results of previous research are that the internship experience has a positive impact on the employability of vocational students by increasing the suitability of organizational needs and attractiveness (Sekiguchi et al., 2023). The effect of the extension of the internship period on the work outcomes of vocational school graduates highlights the importance of practical work experience in increasing employability. Internships not only equip students with industry-specific skills but also help them develop soft skills and build professional networks (Alp et al., 2023). Internships also play a crucial role in career decision-making, as they allow students to explore different industries and gain practical insights into their future professions (Yoto et al., 2020). Additionally, internships serve as a bridge between academic learning and real-world application, enhancing students' understanding of job expectations and demands (Haddad-Adaimi et al., 2022; Isaacs & Spencer, 2022). Therefore, the literature supports the idea that internships significantly contribute to vocational students' employability by equipping them with practical skills, personal development opportunities, and valuable work experience. Based on the above findings, the following hypothesis is proposed:

H1. Internship experience have a significant positive influence on employability of vocational students

2.4. 21st-century competencies as mediating

21st-century competencies (21stCE) are defined as a combination of knowledge, skills, and attitudes that a person possesses to effectively carry out a particular task or job necessary to succeed in the 21st century. According to Paquette et al. (2021) competency is a person's capacity to display general skills with a certain level of performance when applied to one or more entities of knowledge. Applying practical skills, practice-based learning, self-assessment, accountability, and individual learning experiences can determine competencies (Braxton, 2023). Previous research has found that competencies influence individual performance to achieve better outcomes, contribute effectively to the work environment, and increase the likelihood of success in achieving personal and organizational goals (Bruning & Campion, 2022). 21st-century competencies need to be improved for students to compete in an increasingly complex and global job market. In the digital era, the ability to adapt to new technologies is the main key in the industrial world (Bolatan et al., 2024; H. Wang & Li, 2023). This research can support vocational schools in taking the right steps to help improve 21st-century competencies. Through internship

experiences, students can improve the competence of each student so that they can provide positive results for vocational schools (Zulkarnain & Mujahidin, 2023).

Studies by Pacher et al. (2023), and Daga et al. (2023) that 21st-century competencies play an essential role in the success of vocational schools in improving student employability and student performance and impacting job satisfaction. Students with high 21st-century competence can achieve high employability and good performance (Aleksić et al., 2022). Because individual students have strong enthusiasm and motivation, innovative collaboration, and success in overcoming various academic challenges (So et al., 2023). Students with high proficiency and career can achieve high employability on average and quickly enter the job market (Fushtei et al., 2022). A review and empirical literature conducted by Mokhtar et al. (2022), Rizwan et al. (2021), and Y.-J. Kim and Hanseo University (2021) Finding a positive and significant relationship between competencies and employability of vocational students. According to Daryono et al. (2023) competence is a central concept for vocational students, reflecting the abilities, skills, and attitudes that students have to succeed in the world of work. However, we do not understand how a person's intervention impacts 21st-century competence. Based on the above findings, the following hypothesis is proposed:

H2. Internship experience have a significant positive influence on 21st-century competence

H3. 21st-century competence has a significant positive influence on employability of vocational students

Previous research has shown that 21st-century competencies are one of the critical predictors of success in achieving success for society and the modern economy as well as the transition to the world of work (Habets et al., 2020; Niu et al., 2021; Rios et al., 2020). These competencies include critical thinking, collaboration, and problem-solving for industry (Fletcher et al., 2023). Therefore, the industry provides a platform for students through internships to apply theoretical knowledge in the real world as an experience to become a contemporary workforce (Sheikh et al., 2023). According to Richardo et al. (2023) Interns can gain valuable work experience opportunities and develop 21st-century competencies such as collaboration, critical thinking, and technological proficiency. Therefore, the internship experience can increase the competence of the 21st century in facing future challenges (Fu et al., 2023; Shtembari & Elgün, 2023).

21st-century competencies mediate the relationship between internship experience and employability. These findings are in line with Yang (2021), that competency development through internship experience can strengthen technical skills and enhance students' ability to adapt to technological changes and new job demands. Internships positively affect student employability, which will be mediated by 21st-century competencies such as technology, creativity, life and career skills, communication skills, problem-solving abilities, and social skills acquired during internships play an essential role in improving student's readiness to enter the workforce (Ebner et al., 2021; Özeren, 2023). Based on the above findings, the following hypothesis is proposed:

H4. 21st-century competence mediates the relationship between internship experience and employability of vocational students

2.5. Psychological capital as moderating

Psychological capital is an individual's positive psychological resources, which include self-efficacy, optimism, hope, and resilience (Chaffin et al., 2023; R. Wang et al., 2022). These four dimensions collectively play an important role in enhancing individuals' psychological well-being and their capacity to deal effectively with challenges. Self-efficacy provides confidence that individuals are capable of achieving set goals, while optimism creates hope for positive future outcomes. Hope, in turn, encourages individuals to formulate plans and strategies to achieve those goals, while resilience enables them to bounce back from failures and stay focussed on goals despite facing obstacles. Psychological capital is important in personal and professional development, influencing engagement, motivation, coping strategies, job performance, and overall well-being (Al Kahtani & & Sulphery, 2022; Yao et al., 2022). By cultivating psychological capital, individuals can improve their ability to overcome challenges, achieve goals, and thrive in

various areas of life (Geremias et al., 2022). Psychological capital significantly increases an individual's engagement, motivation, and coping strategies, which are essential for personal and professional development (Silva et al., 2022). Individuals with high psychological capital are more likely to exhibit proactive behavior, perseverance, and a positive mindset, which are essential for success in areas such as education, work, and personal life (P.-L. Chen et al., 2023).

In addition, psychological capital has been linked to improved job performance, job satisfaction, and overall well-being (Y. Wang et al., 2012). Psychological capital can also impact an individual's readiness to adopt new technologies, teaching effectiveness, and workplace well-being (Kadiyono & Pardosi, 2023; Sun et al., 2022). In line with the principles of positive psychology, this concept underscores the importance of leveraging the individual's internal psychological resources to achieve positive outcomes and success in different aspects of life (C. Wang & Wang, 2021). Individuals with high psychological capital tend to be better at dealing with challenges and uncertainties, improving their ability to adapt and thrive in various situations. Research by Bi and Jin (2021) shows that psychological capital, including positive psychological resources such as self-efficacy, hope, resilience, and optimism, plays an essential moderating role in the relationship between students' internship experiences and developing 21st-century competencies. Based on the above findings, the following hypothesis is proposed:

H5. Psychological capital moderates the relationship between internship experience and 21st-century competence so that the relationship is stronger when the internship experience is good.

The research model and proposed hypothesis are shown in Figure 1.

3. Methodology

The author applies a quantitative research design with a cross-sectional data approach because this allows researchers to collect data easily and quickly in the form of information at a certain time, at a relatively low cost, and can provide a clear and comprehensive picture related to the phenomenon studied in a certain period (Olsen & George, 2004; Pandis, 2014).

3.1. Sample and data collection

The research was conducted at a vocational school in Aceh Province. Research data was collected through vocational students. In 2022, the number of vocational schools in Aceh Province is 220 vocational schools and 15,435 vocational students in Class XII. The sample was taken using a random cluster

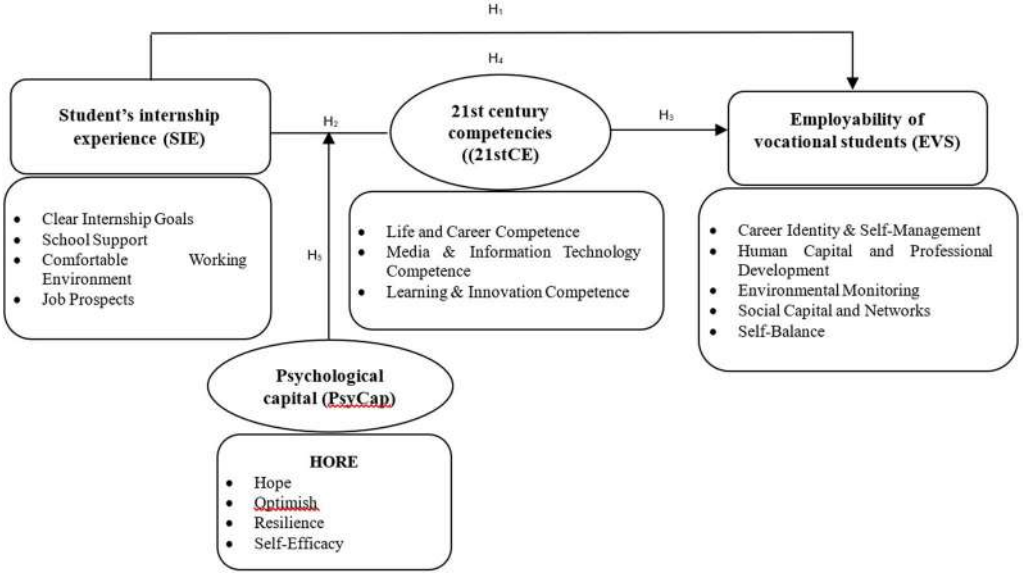

Figure 1. Research model and proposed hypothesis.

Table 1. Respondent characteristic.

Vocational students profile (n = 266)	Frequency	%
Gender		
Male	111	41,7
Female	155	58,3
Age (year)		
16 year	22	8,3
17 year	184	69,2
18 year	60	22,6
School status		
School country	259	97,37
School Private	7	2,63
Acreditation		
A (very good)	150	56,39
B (good)	116	43,61

sampling technique, and as many as 266 students in 17 vocational education institutions in Aceh Province were obtained. This study uses a questionnaire with four variables distributed to interns in the business and industrial world. Before the survey was conducted, we asked the principal for permission to gather school supervisors and grade XII students in the classroom to provide briefings on the purpose and importance of the research and how to fill out the questionnaire. Furthermore, it discusses the confidentiality of participants as stated in the informed consent attached to the questionnaire. Questionnaires were given directly to researchers to reduce the influence of authority on participants. The number of questionnaires was 266 for vocational students, which were further analyzed. Table 1 describes the characteristics of the respondents in this study.

The profile of the vocational students studied consisted of 266 participants, with the gender composition showing that female students dominated, reaching 58.3%, while male students totalled 41.7%. The majority of students were 17 years old (69.2%), indicating that this age is a key phase in vocational education, followed by students aged 18 years (22.6%) and 16 years (8.3%). Most students (97.37%) were enrolled in public schools, reflecting better access to vocational education in such institutions compared to private schools (2.63%). In terms of accreditation, 56.39% of students were from A-accredited schools, while 43.61% were in B-accredited schools, indicating generally good educational standards.

3.2. Data analysis

This study measures the scale using a 5-point Likert-type scale (1 represents strongly disagree and 5 represents strongly agree). This study uses four control variables, namely, age, gender, school status, school accreditation (Arthur & Koomson, 2024; Pitan & Muller, 2020).

3.2.1. Student internship experience (SIE)

For the student internship experience, we used 14 fourteen indicator items developed by Jawabri (2017), and Luk and Chan (2020) a vocational student has experience with academic assignments that include clear internship objectives, school support, a comfortable work environment, and job prospects to prepare for work and social life in the community. These indicators include 'I had clarity from the beginning about what I learned during the internship' and 'I have learned a lot about employee experience and other skills through the internship experience'. The alpha score of Cronbach's internship experience in this study was 0,919.

3.2.2. 21st-century competencies (21stCE)

For the 21st-century competencies, we used 10 indicator items developed by Trilling and Fadel (2012) namely the ability of vocational students to develop life and career competencies, learning and innovation competencies, and technology and information media to prepare for society's industrial and social work life. Such indicators include 'I can adapt to change and be flexible in learning and group activities' and 'I can think creatively, work creatively, and create innovations'. The value of Cronbach's alpha 21st-century competencies in this study was 0,907.

3.2.3. Psychological capital (psycap)

For psychological capital, we use 14 indicator items developed by Luthans and Youssef-Morgan (2017)Vocational students' positive psychology characteristics, which include hope, optimism, self-efficacy, and resilience, interact with each other to prepare for work and social life in society. Cronbach's alpha value of psychological capital in this study was 0,926.

3.2.4. Employability of vocational students (EVS)

For vocational student employability, we use 12 indicator items developed by Van Der Heijde and Van Der Heijden (2006), and Lo Presti et al. (2019) the vocational students' work skills in human capital and professional development, social capital and networking, career identification, self-management, environmental monitoring, and balance contribute to social work and social life. Indicators include 'I can discuss professionally with various professions or technical aspects of the job' and 'I can achieve a balance between career goals and the support of colleagues'. The employability value of vocational school students Cronbach's alpha in this study was 0.917.

The data of this study was analyzed in two stages; in the first stage, the research framework was tested using confirmatory factor analysis (CFA) to evaluate the validity and reliability of the measurement model. In the second stage, the research and control variables are put into different models to test the research hypothesis. This study uses hierarchical regression analysis with the application of SPSS Statistics V.23 as statistical analysis and SmartPLS SEM V.4.1.0.3 as modeling analysis (Hayes, 2022; Henseler et al., 2015).

4. Results

4.1. Descriptive statistics

The statistical descriptive analysis results on the correlation matrix, mean, standard deviation and composite reliability values show that each construction received an average score between 3.83 and 4.15. This shows that the respondents received a fairly high score, as seen in Table 2. These results also reveal that the data is distributed normally . The correlation between the constructions shows the students' internship experience ($r = 0.476^*$), 21st-century competencies ($r = 0.418^*$), and 3.2.3. Psychological capital ($r = 0.437^*$) was positively and significantly correlated with the employability of vocational students.

The table above reveals the relationship between the various constructs assessed in 266 vocational students. There were no significant correlations between gender and the other constructs, while age showed a weak negative correlation with accreditation, which may indicate that older students tend to be in schools with better accreditation. Internship experience had significant positive correlations with 21st century competencies and psychological capital, suggesting that practical experience supports the development of students' psychological skills and abilities. In addition, 21st century competencies showed strong relationships with employability and psychological capital, confirming the importance of modern skills in improving employment opportunities. Overall, these data suggest that practical

Table 2. Descriptive statistics analysis.

			Correlation							
Constructs (n = 266)	Mean	Std. Deviation	1	2	3	4	5	6	7	8
1. Gender	1.58	0.49	1							
2. Age (year)	2.14	0.54	(0,045)	1						
3. School status	1.03	0.16	0,139	(0,044)	1					
4. Acreditation	1.51	0.50	(0,041)	−0,200**	(0,026)	1				
5. Student internship experience	3.98	8.55	(0,032)	(0,057)	(0,024)	(0,027)	1			
6. 21st century competencies	3.83	5.88	(0,052)	(0,111)	(0,009)	(0,026)	0,636**	1		
7. Employability of vocational students	4.15	8.02	0,026	−0,134*	0,054	(0,117)	0,697**	0,740**	1	
8. Psychological capital	3.95	7.06	(0,055)	(0,112)	(0,015)	(0,024)	0,648**	0,777**	0,714	1

Note(s): The AVE are the italic numbers in the diagonal line cells for discriminant validity.
*$p < 0.05$.
**$p < 0.01$.

experience, psychological capital and 21st century competencies play an important role in improving vocational students' readiness to enter the world of work.

4.2. Confirmatory factor analysis

Analysis of construct validity and reliability showed that although many constructs had good validity with outer loading values above 0.60, the composite reliability for most constructs was below the ideal standard (0.70). The Student Internship Experience (SIE) construct had outer loadings that ranged from 0.625 to 0.917, with a CR of 0.504, indicating moderate reliability. Similarly, 21st Century Competencies (21stCE) and Psychological Capital (PsyCap) showed good validity, but with CRs of 0.546 and 0.513 respectively, reflecting moderate reliability. Employability of Vocational Students (EVS) also shows good validity with outer loadings between 0.656 to 0.806, but its CR of 0.527 indicates less than optimal reliability. In contrast, the Competence * Psychological Capital construct showed excellent results, with perfect validity and reliability values (1.000), signalling that the integration between competence and psychological capital is highly relevant and reliable. These results suggest the need for improvements in measurement or review of items to increase the overall reliability of the construct in Table 3.

According to Razavipour and Raji (2022) a reliable instrument is a consistent measurement tool for generating data, providing the same results when used at different times or conditions. Where the reliability value in this study ranges from 0.67 to 0.80, based on the provisions of Bagozzi and Yi (1988), the reliability value is above the minimum value of 0.60. Therefore, the overall results show that the construction meets the validity and reliability values. According to Sarstedt et al. (2019), convergent validity, factor loading, and discriminant validity, which were evaluated by Heterotrait-Monotrait Ratio (HTMT-Ratio) and structural equation model (SEM) examination, were all included in the multivariate fact-based tests. These tests were conducted by examining the explained predictive relevance (Q^2), variance (R^2), and effect size (f^2). This study uses statistical analysis with IBM SPSS Statistic V.25 application and SmartPLS SEM V.4.1.0.3 as modeling analysis (Henseler et al., 2015). The bootstrapping technique of 5,000 for a T-test subsample on 266 vocational school students can be performed with a path coefficient. In this research process, Cronbach's alpha evaluation, loading factor measurement, average variance extracted, and composite reliability are indispensable (Hair et al., 2021).

4.2. Hypothesis testing

Loading factors can be used to test the validity of explicit indicator hypotheses. This suggests that a load greater than 0.50 on two or more factors is significantly noticeable (Hair et al., 2021). Therefore, Figure 2 shows the results of four variables, SIE, 21stCE, PsyCap, and EVS, which are valid metrics for this study's variables. Variable convergence validity is accepted if the AVE value is less than 0.5 and the composite reliability is more than 0.6 (Fornell & Larcker, 1981). According to Hair et al. (2021) Items with a load of 0.40–0.70 should be removed from the assessment to improve composite reliability (CR). Thus, only SIE 7 items for student internship experience and one indicator of the variable are removed to increase the AVE score. Factor loadings, CR, and AVE calculations will exceed the recommended cut-off value. The measurement model has convergent validity (see Figure 3).

This study uses the HTMT method, as Henseler et al. (2015) recommended. In SEM analysis, HTMT is used to measure the validity of a construct in two steps. First, a high HTMT value indicates a lack of discriminatory validity, with accurate limit values of 0.85 and 0.90 (Hamid et al., 2017; Voorhees et al., 2016). Second, the validity of discrimination is determined by the value of the trust interval, and the value of HTMT is less than one. Discriminatory validity is accepted if the HTMT value between constructs is less than 0.85 (see Table 4).

Test the results of analysis and evaluation for the role of mediating competence and moderate role of psychological capital. Henseler et al. (2015) emphasize using calculations using SEM as a measurement model. SEM's direct and indirect effects were examined using four specific criteria. The first was to assess the R2 level of the endogenous latent construct to find the variance value described by each variable (Hair et al., 2021). As Cohen (1988) stated, the evaluation of R^2 values depends on the research topic; i.e. 0.13, 0.26, and 0.09 indicate medium, high, and low values. However, in this study, the R2

Table 3. Confirmatory factor analysis.

Construct's	Outer Loading	α	Rho_A	CR	AVE	Source
Student Internship Experience (SIE)		0,917	0,920	0,926	0,504	Jawabri (2017); Luk and Chan (2020)
SIE1: having clarity from the start about the things I learned during my internship.	0,670					
SIE2: have an easy knowledge of how I will be assessed during my internship.	0,742					
SIE3: I easily found out the standard of work I wanted to do during my internship.	0,625					
SIE4: I had a clear idea of what to do during my internship.	0,667					
SIE5: the school helped me in preparing to find an internship place.	0,711					
SIE6: the school supervisor as the supervising teacher at the school is very supportive of the internship.	0,737					
SIE8: get the same treatment as other employees in a professional manner.	0,661					
SIE9: internship supervisors are approachable and always willing to answer questions.	0,683					
SIE10: Industry supervisors as internship site mentors provide their personal experience as an alternative view in problem-solving.	0,777					
SIE11: Industry supervisors as mentors in the field often convey my performance during the internship.	0,720					
SIE12: the results of the internship significantly affected my social life and well-being.	0,653					
SIE13: have opportunities and chances to develop other skills and get promoted during the internship.	0,762					
SIE14: learn a lot about employee experience and other skills through internship experience.	0,795					
***21st century competencies* (21stCE)**		**0,907**	**0,908**	**0,923**	**0,546**	Trilling and Fadel (2009)
21stCE1: adapting to change and being flexible in learning and group activities.	0,724					
21stCE*2:* able to interact and work effectively with diverse groups.	0,716					
21stCE *3:* able to manage projects and produce various products.	0,765					
21stCE*4:* able to lead and take responsibility in groups and the wider community.	0,737					
21stCE*5:* able to use inductive or deductive reasoning for a variety of situations; with systematic thinking and decision-making.	0,733					
21stCE*6:* able to communicate well and collaborate with other group members.	0,785					
21stCE*7:* able to think creatively, work actively, and create new innovative works.	0,756					
21stCE*8:* able to access, evaluate, use, and manage information accurately and competently both effectively and efficiently to solve problems.	0,715					
21stCE*9:* able to select and develop media used to communicate.	0,759					
21stCE*10:* able to analyze and create information media; appropriate for communication.	0,693					
Psychological Capital (PsyCap)		**0,927**	**0,930**	**0,930**	**0,513**	Luthans and Youssef-Morgan (2017)
PsyCap1: if I face obstacles in my studies, I can think of many ways to overcome them.	0,688					
PsyCap2: many ways to solve various problems.	0,658					
PsyCap3: make the best effort to be able to achieve the goal.	0,655					
PsyCap4: Hope for the best in learning situations during the pandemic.	0,693					
PsyCap5: optimistic that what I do now will be valuable in the future.	0,767					
PsyCap6: I always see the positive side of everything that happens in my studies.	0,753					
PsyCap7: always think that I can realize my dreams in the future.	0,741					
PsyCap8: I can solve various problems related to learning well	0,804					
PsyCap9: when I get a low score, I will immediately try to improve it.	0,726					
PsyCap10: I can address many learning-related issues simultaneously.	0,670					
PsyCap11: easily find some ways to improve my grades.	0,706					
PsyCap12: I believe I can complete difficult tasks.	0,682					

(*continued*)

Table 3. Continued.

Construct's	Outer Loading	α	Rho_A	CR	AVE	Source
PsyCap13: if I find it difficult to do an assignment, I will confidently ask.	0,709					
PsyCap14: believe I can help others with my abilities.	0,757					
Employability of Vocational Students (EVS)		**0,918**	**0,920**	**0,930**	**0,527**	Van Der Heijde and Van Der Heijden (2006) dan Lo Presti et al. (2019)
EVS1: have the ability to discuss professionally with various professions or technical aspects of work.	0,727					
EVS2: I achieved a level of education sufficient to operate as a potential new employee in the job.	0,660					
EVS3: able to evaluate technical skills sufficient to complete tasks or solve problems at school.	0,682					
EVS4: have a satisfactory level of professional experience to operate in my job.	0,656					
EVS5: able to convince others about work, when decisions within the team have to be made.	0,732					
EVS6: building social relationships can have a positive effect on my life.	0,677					
EVS7: have a clear plan for my career.	0,705					
EVS8: I have clear career goals.	0,745					
EVS9: have a clear strategy to achieve my career goals.	0,806					
EVS10: I have a clear idea of the target industry according to my field of work.	0,765					
EVS11: able to achieve a balance between work goals and coworker support.	0,764					
EVS12: able to achieve a balance between career goals and coworker support.	0,774					
Competence * Psychological Capital	2,612	1,000	1,000	1,000	1,000	

Figure 2. Structural equations mode.

value for the endogenous variable of the direct effect model shows that the 21st-century competency is 0.369, meaning that the student's internship experience influences the change in 21st-century competency of 36.9%. Likewise, the R2 value for the variable employability of vocational students is 0.620,

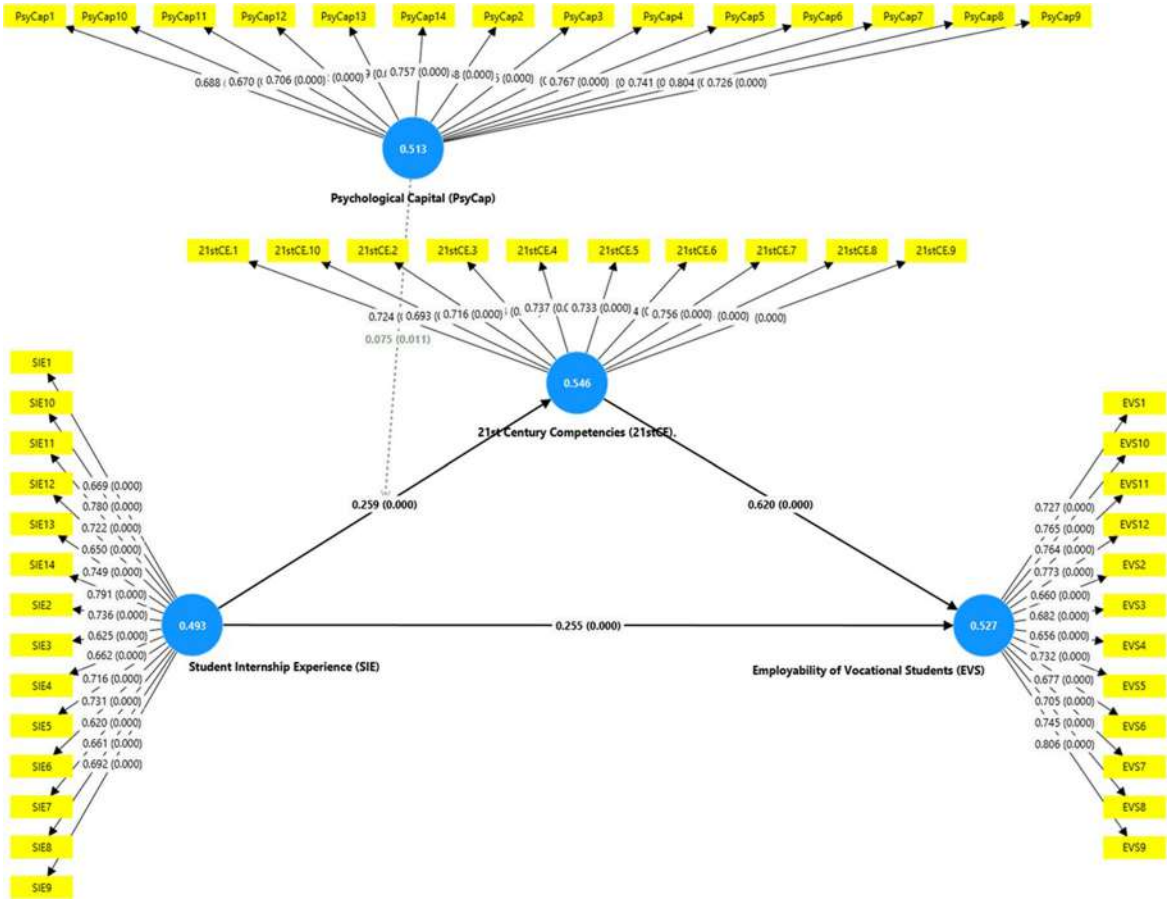

Figure 3. SmartPLS-Path analysis of (n 5 5,000 bootstrapped samples).

Table 4. Discriminant validity; heterotrait–monotrait ratio (HTMT).

Constructs	21st century competencies	Employability of Vocational Students	Moderating effect 1	Psychological Capital	Student Internship Experience
21st century competencies	0,739				
Employability of Vocational Students	0,786	0,726			
Moderating effect 1	−0,394	−0,409	1,000		
Psychological Capital	0,753	0,719	−0,650	0,716	
Student Internship Experience	0,649	0,654	0,531	−0,710	0,710

Table 5. PLS method's coefficient of determination.

Contracts	R^2	R^2 Adjusted	Q^2
21st-century competencies	0,616	0,612	0,319
Employability of Vocational Students	0,652	0,650	0,325

which shows that 62.0% of the change in employability is predicted by the student's internship experience (see Table 5).

Second, in determining predictive relevance (Q^2), Hair et al. (2014) I recommend using the cross-validated redundancy approach because this approach can include essential elements of the path model to predict the omitted data points. Q^2 is calculated using a blindfolding procedure to measure how well the path model can predict the value of its original data. The value of $Q^2 > 0$ indicates that the exogenous construct variable has predictive relevance for the endogen construct variable. Where Q2 = 0.319 for endogenous constructs, the effect of student internship experience and direct competence, while the indirect effect of *student internship experience* on the employability of vocational students is Q2 = 0.325 (see Table 4).

Table 6. The structural equations model's outcomes.

Hypothesis		β	Mean	Standard Deviation	t-values		ρ- values	Remarks
Direct Effect								
H1	SIE → EVS	0,249	0,247	0,066	3,804	0,103	0,000	S
H2	SIE → 21stCE	0,259	0,263	0,068	3,801	0,085	0,000	S
H3	21stCE → EVS	0,623	0,623	0,059	10,551	0,647	0,000	S
Mediating Effect								
H4	SIE → 21stCE → EVS	0,161	0,164	0,051	3,150		0,002	S
Moderating Effect								
H5	PsyCap → 21stCE	0,699	0,697	0,072	9,353	0,500	0,000	S
	Moderating Effect 1 → 21stCE	0,076	0,076	0,032	2,416	0,059	0,016	S

Note(s): Student Internship Experience (SIE), Employability of Vocational Students (EVS), 21st-century competencies (21stCE), Psychological Capital (PsyCap), Supported (S), Not Supported (NS).

Second, Predictive relevance (Q^2), Hair et al. (2014) The cross-validated redundancy approach is recommended because it can integrate critical elements of the path model to predict lost data. Q^2 is calculated using a blindfolding procedure to measure how well the path model can predict the value of the original data. The value of $Q^2 > 0$ indicates that the exogenous construct variable has predictive relevance for the edge construct variable where $Q^2 = 0.319$, student internship experience and competency in the 21st century have a direct effect. In contrast, the indirect effect of student internship experience on the employability of vocational students is $Q^2 = 0.325$ (see Table 4).

Table 6 shows the positive relationship between students' internship experience and vocational students' employability ($\beta = 0.249$, $p < 0.000$). In addition, the findings show that the direct effect of student internship experience has a significant and positive impact on 21st-century competencies ($\beta = 0.259$, $p < 0.000$) and 21st-century competencies on vocational student employability ($\beta = 0.623$, $p < 0.000$), thus stating **that H1, H2,** and **H3** are accepted. In addition, measure the effect size (f2), according to Hair et al. (2019) Effect size (F^2) measures the influence of independent variables on dependent variables. Cohen (1988), and Lachowicz et al. (2018) the estimated effect size is between 0.02 for small-size effects, 0.15 for medium-sized effects, and 0.35 for large-size effects. Internships provide students with real-world experience, enhancing their employability by developing work readiness skills such as communication, teamwork, and critical thinking (Danniels et al., 2020). Work-based learning, such as internships, improves graduates' perceptions of their readiness for work (Danniels et al., 2020).

The analysis of the influence of student internship experience on vocational student employability reveals an effect size of 0.103, indicating a moderate effect. In contrast, the effect size of student internship experience on 21st-century competencies is 0.085, reflecting a small effect size. However, the impact of 21st-century competencies on vocational student employability is substantial, with an effect size of 0.647, indicating a large effect. Additionally, the relationship between psychological capital and 21st-century competencies shows a large effect size of 0.500, while the moderating effect of psychological capital on the relationship between student internship experience and 21st-century competencies is small, with an effect size of 0.059. These results demonstrate that exogenous variables exert varying influences on endogenous variables, including both large and small effect sizes.

Furthermore, the findings indicate a significant partial mediation effect of 21st-century competencies in the relationship between student internship experience and vocational student employability, with a coefficient of $\beta = 0.161$ and $p < 0.000$, leading to the acceptance of hypothesis H4. Additionally, the moderation of psychological capital between student internship experience and 21st-century competencies has a significant positive effect ($\beta = 0.076$, $p < 0.016$), resulting in the acceptance of hypothesis H5. This suggests that both 21st-century competencies and psychological capital play important roles in enhancing the employability of vocational students. Internships contribute to the development of 21st century skills, such as adaptability and collaboration, which are highly valued in the job market (Danniels et al., 2020). Employability can be predicted using a model that considers the internship context, highlighting the importance of internship quality and relevance (Saidani et al., 2022).

5. Discussion

Previous literature has made significant efforts to investigate the direct impact of SIEs on employability in different contexts (Hunt & Scott, 2023; Pinto & Pereira, 2019; Saidani et al., 2022). This research

emphasizes the critical role of psychological capital and 21st-century competencies in enhancing the employability of vocational students in Aceh, Indonesia, particularly in response to the dynamic demands of the local and global job market. Aceh, with its unique socio-economic context, faces challenges such as high youth unemployment rates and a need for skilled workers who can adapt to rapidly changing industry requirements. Thus, equipping vocational students with the necessary competencies and psychological resilience is vital for their success. This study contributes to the existing literature in several significant ways. First, it utilizes the Social Cognitive Theory (SCT) framework to explore how student internship experiences indirectly foster vocational student employability through the development of 21st-century competencies. Second, it investigates the mediating role of 21st-century competencies in the relationship between student internship experiences and vocational student employability, providing insights into the pathways that enhance job readiness. Third, the study examines whether psychological capital moderates the influence of students' internship experiences on their 21st-century competencies, highlighting the importance of psychological resilience in navigating educational and employment challenges. In the context of Aceh, where economic recovery and development are ongoing, this research is particularly relevant. By focusing on the interplay between psychological capital, 21st-century competencies, and employability, the study offers practical implications for educators, policymakers, and stakeholders aimed at fostering a skilled workforce that meets the needs of both local and global markets.

In line with the proposed hypothesis, students' internship experiences are positively and significantly related to the employability of vocational students. This shows that school support for internships can improve career identity and self-management to enter the workforce by having a solid foundation to achieve long-term success in their careers. The internship experience of students develops a comfortable work environment, job prospects, and clear internship objectives, thereby increasing the employability of vocational students (Chaffin et al., 2023; Dóci et al., 2023; Geremias et al., 2022). These findings are in line with previous research that student internship experiences can help students develop their social networks, self-balance in work-life dynamics, and work environment monitoring, as well as professional human resource development as a basis for building a successful and sustainable career in the future (Kattiyapornpong & Almeida, 2022; Thompson et al., 2021; Zehr & Korte, 2020).

Similarly, the findings of the second hypothesis reveal that students' internship experiences are positively and significantly related to 21st-century competencies. This shows that school support contributes to improving learning competencies and innovation. The involvement of school advisors with guidance can assist students in overcoming problems during internships. This is in line with research by Kurniawan et al. (2021) that group guidance can encourage vocational students to interact and work together, improving their communication skills. Critical thinking and problem-solving skills are part of the 21st-century competencies that must be applied and prepared in hands-on learning to face challenges (Rahman, 2019). Internship programs generally apply 21st-century competencies, such as cultural awareness, sensitivity, collaboration, citizenship, social responsibility, critical thinking, and problem-solving (Plaza Ii & Sual, 2017).

The third hypothesis found that 21st-century competence is positively and significantly related to the employability of vocational students. This shows that vocational students' communication and collaboration skills can provide social capital and networking, namely, building social relationships and convincing others through communication and collaboration skills during the internship. In line with studies by Batistic and Tymon (2017) and English et al. (2021), Developing professional networks and work networks through access to information and resources can positively grow social capital and increase the perception of vocational students' employability. The ability to think critically and solve problems, communication and collaboration skills, and the ability to be creative and innovative vocational students in Aceh Province can increase their insight into the chosen career goals by expectations. Research Wei et al. (2024) critically examines the relationship between vocational education and economic development in the digital age, emphasizing the need to integrate critical thinking, problem-solving, communication, collaboration, and creativity skills into the vocational curriculum.

In particular, 21st-century competencies significantly mediate the relationship between students' internship experience and vocational students' employability. The role of 21st-century competencies play an important role in improving critical thinking and problem-solving skills, communication and collaboration skills obtained through internship experiences from school support such as assistance in finding

an internship place by school supervisors in preparation for student internships, active involvement of school supervisors in facilitating student problems during internships, and the existence of supervisor support during internships, both technical support in the form of administration, writing and preparation of reports, as well as non-technical support such as physical, emotional and psychological support during the internship. In line with research by Shtembari and Elgün (Shtembari & Elgün, 2023), life skills that Generation Z students gain through internships emphasize the critical role of school guidance in facilitating the internship experience. The 21st-century competencies obtained as an internship experience will improve self-identity and self-management in the employability of vocational students. This can be seen in vocational students with career insight, goals, and clear strategies to achieve the expected career. Consistent with previous research, Bani-Amer (2022) provides valuable insights related to internship experience that can improve 21st-century competencies, such as digital technology competencies in vocational education, which are essential for vocational students' self-identity and self-management in their professional journey.

This study observes the role of psychological capital as a moderator in students' internship experiences toward 21st-century competence. The results of the empirical study show that psychological capital has a strong and significant moderation effect. The relationship between students' internship experiences and 21st-century competencies was stronger in students with psychological capital than those without. Hope, optimism, resilience, and self-efficacy generated by psychological capital act as a stimulant for vocational students to be able to improve their 21st-century competencies. Students with stronger and higher psychological capital have more confidence in utilizing digital technology and collaborating in teams, strong expectations in planning innovative strategies to develop critical thinking and problem-solving skills, resilience in facing various challenges to rapid changes in the world of work and mastery of technological literacy, and more optimistic in encouraging students to think critically about the future they, as well as continuing to learn throughout life, develop creativity, and innovate. According to Geremias et al. (2022), psychological capital, individuals can improve their ability to overcome challenges, achieve goals, and thrive in various areas of life. Psychological capital can also impact an individual's readiness to adopt new technologies, teaching effectiveness, and workplace well-being (Kadiyono & Pardosi, 2023; Sun et al., 2022; J. H. Wang et al., 2014). Individuals with high psychological capital are more likely to exhibit proactive behavior, perseverance, and a positive mindset, essential for success in education, work, and personal life (P.-L. Chen et al., 2023).

5.1. Theoretical implications

There are three theoretical interpretations in this study. namely, first, many research results related to student's internship experiences and their influence on 21st-century competencies and vocational student employability (Kapoor & Gardner-McCune, 2019; Y.-A. Kim et al., 2022). These results not only help to further validate the use of students' internship experiences in the context of vocational schools in Indonesia (Chang et al., 2023), but also provides a new perspective to explain the aspects of the driving factors of 21st-century competence in improving the employability of vocational students (Ahmid et al., 2023; Thottoli et al., 2024).

Second, the study's results also show that 21st-century competence is an important factor mediating the influence of student internship experience on vocational student employability. It can expand the theoretical understanding of 'how internship experience can affect 21st-century competency and improve vocational student employability'. In line with previous research, the results of this study further confirm the significant mediating role of 21st-century competence in the relationship between student internship experience factors and vocational student employability (Downs et al., 2024; Saidani et al., 2022). Other researchers can use these results to explore other potential variables that link students' internship experiences to student employability outcomes from an individual perspective.

Finally, the results of this study also reveal that student psychology capital can moderate the relationship between students' internship experiences and 21st-century competencies. These conclusions provide new empirical support to previous research models (Hu et al., 2023; Li & Guo, 2024; Lu et al., 2024), that the psychological capital in Educational Institutions and industry can strengthen the influence of

internship experience on 21st-century competencies in individual students. Moreover, This conclusion is in line with social cognitive theory (Middleton et al., 2019; Oben & van Rooyen, 2023), that psychological capital can influence the strong relationship between internship experience and student employability.

5.2. Practical implications

The study results have several significant practical consequences, including research showing that internship experience is essential to improve 21st-century competencies such as critical thinking, collaboration, communication, and creativity. Internships allow students to apply theory into practice, expand professional networks, and understand the world of work. This prepares them for future careers and makes them more adaptive. Therefore, vocational schools must strengthen internship programs with industry partnerships and provide adequate guidance for students so that they are ready and able to face the world of work and challenges in the 21st-century (Dubeau & Chochard, 2024; Y. Guo, 2024). Improving the employability of vocational students is essential to ensure graduates are ready to enter the workforce with relevant skills. High employability enhances the school's reputation, attracts prospective students, and builds relationships with the industry. It also helps reduce unemployment and supports local economic growth.

Second, the mediating role of 21st-century competencies in the relationship between internship experience and vocational student employability allows schools to pay more attention to 21st-century competencies for students, such as life and career competencies, learning and innovation competencies, and technology and information media competencies. So that students can develop skills that are relevant to today's industry needs. Thus, vocational schools can ensure that their graduates have a competitive advantage in the job market and are ready to face the challenges of the professional world (Kaya et al., 2023; Roshid & Haider, 2024). In addition, from the perspective of students, 21st-century competencies are a driver of increasing the employability of vocational students in preparing students for the world of work in the modern era. Therefore, vocational schools are more serious and focused on improving 21st-century competencies through the curriculum to prepare students for the complexities of modern life (Holman & Švejdarová, 2023; Tushar & Sooraksa, 2023). Vocational schools must produce graduates with critical thinking, communication, collaboration, creativity, and digital literacy skills. The last practical implication, the role of student psychology capital, namely, the influence of student internship experience on 21st-century competence, tends to be stronger for students who have high positive psychology capital (J. Wang et al., 2023). Vocational schools increasingly realize the importance of preparing students' psychological capital to face job challenges by implementing mentoring programs, soft skills training, resilience, a supportive learning environment, and collaborating with industry for a sustainable internship experience.

5.3. Limitations and future research

The main limitation of this study, similar to other research, is that the sample group is confined to vocational school students in 17 urban districts in Aceh, Indonesia. While the findings offer valuable insights, they may not be generalizable to all schools across Aceh Province or Indonesia as a whole. Future research should aim to include a broader range of participants, encompassing vocational schools, high schools, and other academic institutions to enhance the representativeness of the results. Additionally, respondents completed the questionnaire independently, without assistance or intervention, to ensure that the data accurately reflect their views and experiences. This approach, while beneficial for capturing authentic responses, may also limit the depth of understanding regarding the nuances of the participants' experiences.

Moreover, the causal relationships between variables should be interpreted with caution. Future studies could benefit from employing experimental and longitudinal designs to assess the impact of students' internship experiences on 21st-century competencies and vocational students' employability more comprehensively. Exploring potential mediators or moderators, such as self-efficacy, resilience, and social support, could provide clearer direction for future studies. Understanding how these factors interact

with students' internship experiences and competencies may yield deeper insights into the pathways that enhance employability. Additionally, investigating contextual factors unique to Aceh, such as cultural influences or economic conditions, could further enrich the research and offer practical implications for educators and policymakers in the region.

6. Conclusion

This study states that there is a positive and significant influence between student internship experience and 21st-century competence and vocational student employability. In addition, competence is a partial mediator in the relationship between students' internship experiences and vocational students' employability. The study's results also stated that student psychological capital moderated the relationship between students' internship experiences and 21st-century competencies. In particular, student psychology capital reinforces the positive and significant relationship between students' internship experiences and 21st-century competencies. The findings of this study are expected to provide enthusiasm and motivation for other researchers to continue this research and develop new insights that can provide significant benefits for vocational schools.

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Institutional review Board statement

This study adhered to the principles of the Declaration of Helsinki and received approval from the Institutional Review Board (IRB) or Ethics Committee of Universitas Padjadjaran (Nomor: 79/UN6.KEP/EC/2025).

Disclosure statement

No potential conflict of interest was reported by the author(s).

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