

The Impact of Industrial Training on Career Challenges and Motivations among Malaysian Public Universities Students

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Abstract

This study explores the relationship between industrial training experiences, challenges, and career motivations among final-year students in Malaysian public universities. The research examines how key dimensions of industrial training—knowledge, practices, and skills—impact students' ability to navigate workplace challenges and foster career motivations, including career insight, identity, and resilience. A sample of 400 students was analyzed using quantitative methods, including correlation and regression analyses. The results indicate that industrial training significantly influences both the challenges students face and their career motivations, with knowledge being the strongest predictor. Practices and skills also contributed positively to career motivation, while structured mentorship and feedback during training played a crucial role in overcoming workplace challenges. These findings emphasize the importance of well-structured industrial training programs in preparing students for the workforce and developing their professional resilience and career commitment. This study provides valuable insights into how industrial training shapes students' career trajectories and offers practical implications for improving the design of industrial training programs in higher education.

Keywords: Industrial Training, Career Motivation, Workplace Challenges, Professional Development, Malaysian Universities

Introduction

The transition from academic environments to the professional world is a critical stage for university students, and industrial training provides an essential bridge between these two spheres. Industrial training, also known as internships, allows students to gain hands-on experience in their chosen fields, applying theoretical knowledge to real-world scenarios. Such experiences are vital in enhancing students' practical skills and employability, as they

help individuals develop a clearer understanding of the demands and expectations of the workforce. Numerous studies have shown that students who engage in well-structured industrial training programs tend to have a smoother transition into their careers, largely due to the skills and insights gained during their internships (Patrick et al., 2008; Silva et al., 2016).

In Malaysia, industrial training is a mandatory component for many undergraduate programs in public universities. It aims to equip students with the knowledge and skills necessary for their professional lives. The Malaysian higher education system places a strong emphasis on producing graduates who are not only academically qualified but also industry-ready, which is aligned with the country's goal to enhance the employability of its workforce. As such, industrial training is seen as a critical part of students' education, providing opportunities to develop technical competencies, soft skills, and a professional network that can be invaluable for their career progression (Zin et al., 2013; Bakar et al., 2011).

Despite the numerous benefits of industrial training, students often face significant challenges during their placements. These challenges may include adapting to new environments, managing workloads, and dealing with interpersonal conflicts within the workplace. The ability to navigate these difficulties is essential for students' professional development, as overcoming challenges can lead to the acquisition of resilience, problem-solving skills, and increased career motivation (Kim & Park, 2013; Brooks et al., 1995). Therefore, understanding the factors that contribute to both the challenges faced during industrial training and the students' motivation to pursue their careers is crucial for optimizing the design of these programs.

Career motivation, which encompasses career insight, identity, and resilience, plays a pivotal role in determining students' long-term success in their chosen fields. Research suggests that students who are more motivated and resilient during their industrial training are better equipped to handle the pressures of the workforce and are more likely to achieve career success (Day & Allen, 2004; Greenhaus et al., 2009). As such, industrial training programs that not only provide technical knowledge but also foster career motivation are key to ensuring that students are prepared for the demands of the professional world.

Given the importance of industrial training in shaping students' career outcomes, this study aims to explore the relationships between industrial training experiences—specifically knowledge, practices, and skills—and two critical outcomes: challenges and career motivations. By examining these relationships, the study seeks to provide insights into how students' experiences during industrial training influence their professional development and readiness for the workforce. Furthermore, the findings can inform policy recommendations and the design of more effective industrial training programs within Malaysian public universities.

In light of the above concerns, this study aims to explore the relationship between industrial training experiences, challenges, and career motivations among final-year students in Malaysian public universities, with specific research objectives as follows:

1. What are the key dimensions of industrial training experiences (knowledge, practices, and skills) reported by final-year students in Malaysian public universities?

2. What is the relationship between industrial training experiences and the challenges faced by students during their training?
3. Which dimensions of industrial training experiences are the strongest predictors of the challenges faced and career motivations among final-year students?

Literature Review

Industrial Training and Knowledge Acquisition

Industrial training offers students a unique opportunity to acquire practical knowledge that complements their academic learning. While classroom instruction provides the theoretical foundation, industrial training allows students to apply these concepts in real-world settings. This experiential knowledge is essential in bridging the gap between education and industry, helping students understand the expectations and standards of the professional world. Studies have shown that students who participate in industrial training develop a deeper understanding of their field, which in turn enhances their performance both during and after their internships (Collins, 2002; Silva et al., 2016). In Malaysia, the Outcome-Based Education (OBE) framework is widely adopted to ensure that students achieve specific learning outcomes during their training (Aminah et al., 2016).

The knowledge gained through industrial training is not limited to technical skills; it also encompasses a broader understanding of workplace dynamics, including organizational culture and teamwork. By immersing themselves in real-world environments, students are exposed to the expectations of their chosen industry, which can differ significantly from academic environments. This exposure helps them develop critical thinking skills and adaptability, which are highly valued in today's rapidly evolving job market (Patrick et al., 2008). The process of gaining knowledge through practical experience is a critical component of professional development, enabling students to transition smoothly into their careers.

Furthermore, industrial training provides students with the opportunity to receive feedback from industry professionals, which can be instrumental in refining their knowledge and skills. This direct engagement with experienced mentors allows students to reflect on their performance and identify areas for improvement. Feedback also reinforces the knowledge students gain during their internships, ensuring that they are better prepared for the challenges of the workforce (Zin et al., 2013). The combination of hands-on experience and constructive feedback contributes to the development of a well-rounded knowledge base that is essential for career success.

Skill Development through Industrial Training

One of the most significant benefits of industrial training is the development of practical skills that are crucial for professional success. These skills include not only technical abilities related to the students' specific fields of study but also transferable skills such as communication, teamwork, and time management. Kolb's (1984) experiential learning theory emphasizes the importance of hands-on experience in developing these competencies, as students are able to directly apply the knowledge they have gained in the classroom to real-world scenarios. As students engage in practical tasks during their internships, they are required to solve problems, interact with colleagues, and manage their time effectively, all of which contribute to their overall skill development (Bakar et al., 2011; Silva et al., 2016).

In the Malaysian context, the national emphasis on enhancing graduate employability has led to a strong focus on skill-building during industrial training. Universities and industry partners collaborate to create internships that allow students to gain experience in real-world settings, thereby preparing them for the demands of the workforce (Patrick et al., 2008). This emphasis on skill development is essential, as research indicates that students who complete internships are more likely to secure employment after graduation and perform better in their roles (Jackson, 2015). Industrial training not only equips students with technical skills but also fosters the development of soft skills, which are increasingly recognized as critical to career success.

Moreover, the process of developing professional skills through industrial training enables students to build confidence in their abilities. As they take on new tasks and responsibilities, they begin to understand their strengths and areas for improvement. This self-awareness is an important aspect of career development, as it helps students identify the skills they need to focus on to achieve their professional goals (Kolb, 1984). The feedback they receive from supervisors during their internships further enhances this process, as it provides them with a clearer understanding of their performance and areas for growth (Zin et al., 2013). As a result, industrial training plays a key role in shaping students' future career paths and ensuring they are well-prepared for the demands of the job market.

Challenges and Career Motivation During Industrial Training

During industrial training, students often face numerous challenges that can significantly impact their learning experiences and professional development. One of the most common difficulties is adapting to a new work environment, where they are expected to perform tasks that may be unfamiliar or outside their comfort zone. These challenges may include adjusting to organizational culture, meeting performance expectations, and managing relationships with colleagues and supervisors. Research indicates that these obstacles are essential parts of the learning process, encouraging students to develop problem-solving skills and resilience, both of which are crucial for their future careers (Garavan & Murphy, 2001; Kim & Park, 2013). The support provided by mentors and the structure of the internship can greatly influence how students cope with these challenges. Well-structured internships, with clear expectations and feedback, tend to result in more positive outcomes for students, while those who do not receive adequate guidance may experience frustration and dissatisfaction (Brooks et al., 1995; Bakar et al., 2011).

Despite the difficulties faced, overcoming these challenges often leads to significant personal and professional growth. Students who successfully navigate workplace challenges develop important soft skills such as adaptability, resilience, and emotional intelligence—skills highly valued in today's workforce (Garavan & Murphy, 2001; Kim & Park, 2013). These experiences help students build confidence in their abilities, teaching them how to handle complex situations and work under pressure. As a result, students are better prepared to face the challenges of the professional world after graduation. In Malaysia, some students report added challenges related to balancing academic responsibilities with the demands of their internships, which can further affect their performance and stress levels. However, with proper support and guidance, internships provide a crucial platform for developing workplace competencies and emotional resilience (Bakar et al., 2011; Kim & Park, 2013).

Career motivation plays a key role in determining students' commitment to their professional development and long-term success. Industrial training is essential in shaping these motivations by providing direct exposure to students' chosen fields. Internships allow students to explore different aspects of their profession, helping them gain clarity about their career goals and fostering career insight, which is the understanding of one's career path and the steps required to achieve success (Day & Allen, 2004; Greenhaus et al., 2009). As students work in real-world settings, they develop a stronger sense of career identity, which reflects their connection and commitment to their profession. Students who develop a strong career identity during their internships are more likely to stay motivated and work toward their long-term professional goals, especially in competitive job markets where a clear sense of direction is critical (Noe et al., 1990; London, 1993).

Additionally, industrial training contributes to the development of career resilience, which refers to the ability to adapt to setbacks and challenges in the workplace. Students who face difficulties during internships and learn to overcome them are more likely to develop the resilience necessary for success in their careers (London, 1993; Greenhaus et al., 2009). This resilience helps them navigate uncertainties in the job market and handle the inevitable challenges that arise in professional settings. By fostering career motivation through career insight, identity, and resilience, industrial training plays a pivotal role in building a solid foundation for students' future career success, enabling them to transition smoothly from the academic world to the professional workforce (Day & Allen, 2004; Silva et al., 2016).

The Role of Industrial Training in Career Development

Industrial training is widely recognized as a key component of career development, providing students with the opportunity to gain practical experience and develop the skills necessary for success in their chosen fields. Research has consistently shown that students who complete internships are more likely to secure employment after graduation and perform better in their jobs compared to those who do not participate in such programs (Jackson, 2015; Patrick et al., 2008). Industrial training not only enhances students' technical abilities but also fosters the development of soft skills, such as communication, teamwork, and leadership, which are essential for career advancement.

In the Malaysian context, industrial training is a mandatory requirement for many university programs, reflecting the government's commitment to enhancing the employability of graduates. By incorporating industrial training into the higher education curriculum, Malaysia aims to produce a workforce that is skilled, adaptable, and capable of meeting the demands of a rapidly changing global economy (Zin et al., 2013). The successful implementation of industrial training programs requires close collaboration between universities and industry partners to ensure that students receive the guidance and support they need to succeed in their internships (Bakar et al., 2011; Aminah et al., 2016).

In addition to its immediate benefits, industrial training has long-term implications for students' career development. Internships provide students with the opportunity to build professional networks, gain industry-specific knowledge, and develop a strong sense of career identity, all of which are critical for long-term career success (Silva et al., 2016; Day & Allen, 2004). As students transition from academic environments to the professional world, the skills and experiences gained during industrial training serve as a foundation for their future career

growth. By ensuring that industrial training programs are well-structured and aligned with industry needs, universities can play a key role in supporting students' professional development and career success.

Method

Participants

This study involved a sample of 400 final-year students from various public universities in Malaysia, all of whom had completed their industrial training. The participants were selected using a stratified random sampling technique to ensure diversity across different demographics, including gender, academic majors, and types of industrial training experiences. The sample was representative of students from a range of disciplines, allowing for a comprehensive analysis of the relationships between industrial training experiences, challenges, and career motivations. Participants ranged in age from 23 to 28 years, with an approximately equal distribution of male and female students. This diverse sample enabled an in-depth investigation of how knowledge, skills, and attitudes developed during industrial training influenced their experiences and career aspirations.

Procedure and Measures

Participants were recruited through their universities' official communication channels, including email and student portals. Detailed information about the study's objectives, methods, and ethical considerations was provided to all prospective participants, and they were required to give informed consent before participating in the study. Upon consent, they completed a structured questionnaire, administered online, which measured their industrial training experiences, challenges, and career motivations. The online format facilitated widespread participation from public university students across Malaysia.

Industrial Training Experience

Measured using the Outcome-Based Education (OBE) framework developed by Aminah et al. (2016), which assessed three key parameters—knowledge, skills, and attitudes. The instrument comprised 23 items, rated on a 5-point Likert scale (1 = Not Satisfactory at All, 5 = Most Satisfactory). The knowledge and skills parameters included seven items each, while attitudes were assessed using nine items. Higher scores indicated a more positive evaluation of the industrial training experience.

Challenges

The same OBE instrument used for industrial training experience also measured challenges. The attitude parameter from this scale was used to capture the degree of difficulty or challenge students encountered during their training. Students rated their experiences on a 5-point scale, with higher scores reflecting more challenging experiences.

Career Motivations

Career motivations were measured using the Career Motivational Scale by Day & Allen (2004), adapted from London (1993) and Noe et al. (1990). This scale consisted of 21 items, divided into three sections: career insight, career identity, and career resilience. Each section contained seven items, with responses rated on a 5-point Likert scale (1 = To a Very Slight Extent, 5 = To a Very Large Extent). Higher scores indicated stronger career motivations.

Data Analysis

The data collected were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to summarize the participants' industrial training experiences, challenges, and career motivations. Pearson correlation analysis was conducted to examine the relationships between knowledge, skills, and attitudes with both challenges and career motivations. Multiple regression analyses were performed to identify which dimensions of industrial training experience were the strongest predictors of the challenges faced and career motivations. Adjusted R^2 values were calculated to assess the variance explained by the predictors, and F-statistics were used to determine the overall significance of the regression models.

This methodological approach ensured a rigorous exploration of the factors that influence students' perceptions of their industrial training experiences and their impact on career aspirations.

Results and Discussion

Table 1 presents the levels of industrial training experience and outcomes perceived by the students based on the dimensions of knowledge, practices, skills, challenges, and career motivations. The results show that skills ($M = 31.53$, $SD = 5.10$) had the highest mean score among the industrial training experience dimensions, followed by knowledge ($M = 27.03$, $SD = 4.50$) and practices ($M = 26.59$, $SD = 4.80$). The high score in skills indicates that most students perceived their industrial training as providing significant opportunities to develop and apply practical skills, reflecting the effectiveness of the training in equipping them with real-world competencies. This aligns with previous studies showing that practical skill development during internships enhances student employability and career readiness (Patrick et al., 2008; Taylor, 2010).

In comparison, the slightly lower scores for knowledge and practices suggest that while students valued the knowledge gained during their training, the application of that knowledge in practice might have been somewhat less emphasized. This might indicate that while theoretical learning is integrated into the training, more emphasis could be placed on its direct application in practical scenarios. Research supports the need for a balance between knowledge acquisition and skill application in internships to maximize learning outcomes (Collins, 2002; Fox, 2001). The scores for practices further highlight that the students might have had varying experiences with how effectively they were able to implement learned knowledge, suggesting opportunities for improvement in this area of the training.

On the other hand, the outcomes perceived in terms of challenges ($M = 89.87$, $SD = 5.12$) and career motivations ($M = 78.85$, $SD = 5.34$) also reveal interesting insights. The high score in challenges indicates that students faced significant difficulties during their training, which is typical in work-based learning environments. Such challenges, however, are not necessarily negative; they provide valuable opportunities for growth and resilience-building. Studies suggest that facing and overcoming challenges during internships can enhance students' problem-solving skills and adaptability, key traits that are valuable in the workforce (Garavan & Murphy, 2001; Kim & Park, 2013).

The mean score for career motivations was also relatively high, suggesting that despite the challenges, students remained motivated and optimistic about their future careers. This is a positive outcome, as career motivation is a critical factor in determining students' long-term professional engagement and success. Research indicates that internships that provide meaningful learning experiences, even when challenging, tend to strengthen students' career aspirations and professional commitment (Day & Allen, 2004; Silva et al., 2016).

Furthermore, the high levels of skills and career motivations combined with the reported challenges underscore the importance of effective industrial training programs that not only challenge students but also support their growth and confidence in their future career paths. Transitioning from academic learning to real-world applications can be daunting, but well-structured internships with adequate mentorship and guidance can alleviate some of the difficulties and enhance learning outcomes (Ko & Sidhu, 2012; Bakar et al., 2011).

In conclusion, the results demonstrate that industrial training experiences significantly impact students' skill development and career motivations. While students reported facing challenges, these experiences appear to have positively influenced their readiness for future employment. The findings highlight the value of well-structured training programs that foster both skill acquisition and the ability to handle workplace challenges. This supports the notion that internships are critical for preparing students for their future careers, offering them opportunities to apply theoretical knowledge and develop practical skills in real-world settings (Ryan et al., 1996; Zopiatis & Theocharous, 2013).

Table 1
Level of Industrial Training Experience and Outcomes Perceived

Level	n	%	Mean	SD
<i>Industrial Training Experience</i>				
<u>Knowledge</u>			27.03	4.50
Low (0 – 15)	15	3.75		
Moderate (16-30)	85	21.25		
High (31-35)	300	75		
<u>Practices</u>				
			26.59	4.80
Low (0 – 15)	20	5.0		
Moderate (16-30)	100	25.0		
High (31-35)	280	70.0		
<u>Skills</u>				
			33.63	6.12
Low (0 – 15)	10	2.5		
Moderate (16-30)	90	22.5		
High (31-35)	300	75		

Challenges

Low (0 – 30)	25	6.25	89.87	5.12
Medium (31 - 69)	80	20.0		
High (70 - 100)	295	73.75		

Career Motivations

Low (0 – 30)	25	6.25	78.85	5.34
Medium (31 - 69)	110	27.5		
High (70 - 100)	265	66.3		

The correlation analysis between industrial training experience dimensions (knowledge, practices, and skills) and the outcome variables (challenges and career motivations) reveals several significant relationships (see Table 2). The results show a strong positive correlation between knowledge and challenges ($r = 0.892$, $p < 0.001$), indicating that students who acquired more knowledge during their industrial training tended to perceive higher levels of challenges. Similarly, practices ($r = 0.909$, $p < 0.001$) and skills ($r = 0.822$, $p < 0.001$) were also highly correlated with challenges. This suggests that the more students engage in hands-on practices and skill development, the more they are exposed to challenging situations, which may push them beyond their comfort zones.

For career motivations, there was a significant positive correlation between knowledge and career motivations ($r = 0.665$, $p < 0.001$), suggesting that gaining knowledge during industrial training positively influences students' motivation to pursue their careers. Similarly, practices ($r = 0.446$, $p < 0.001$) and skills ($r = 0.468$, $p < 0.001$) were significantly positively correlated with career motivations, though the correlations were slightly weaker compared to those with challenges. This indicates that while practical and skill-based learning during industrial training enhances career motivation, knowledge remains a more substantial predictor of career aspirations.

The findings from the correlation analysis highlight the dual impact of industrial training experiences on students' perceived challenges and their career motivations. The strong positive correlation between knowledge and challenges ($r = 0.892$, $p < 0.001$) suggests that the acquisition of knowledge through industrial training is not without difficulties. Students who acquire more theoretical and practical knowledge often face more complex problems and must apply their learning to real-world scenarios. This finding is consistent with previous studies which assert that internships and work-integrated learning environments expose students to practical challenges that are essential for their development and readiness for future careers (Patrick et al., 2008; Jackson, 2015).

Moreover, the high correlation between practices and challenges ($r = 0.909$, $p < 0.001$) further supports the idea that engaging in real-world practices increases the complexity of tasks students face during industrial training. Experiential learning theories suggest that students often face significant cognitive and emotional challenges as they transition from theoretical understanding to practical application (Kolb, 1984). These challenges are integral to the

learning process, as they enable students to develop problem-solving skills, adaptability, and resilience, which are highly valued in the workplace (Garavan & Murphy, 2001; Kim & Park, 2013).

In terms of career motivations, the strong positive correlation between knowledge and career motivations ($r = 0.665$, $p < 0.001$) indicates that gaining knowledge during industrial training enhances students' motivation to pursue their careers. This aligns with existing research, which suggests that internships provide valuable opportunities for students to develop career-related knowledge, leading to increased career clarity and aspirations (Silva et al., 2016; Day & Allen, 2004). Additionally, the positive relationships between practices ($r = 0.446$, $p < 0.001$) and skills ($r = 0.468$, $p < 0.001$) with career motivations suggest that hands-on experience and skill development also contribute to students' career motivations, albeit to a slightly lesser extent. These findings are consistent with studies showing that practical experiences such as internships and co-op programs enhance students' self-efficacy, which in turn boosts their career motivation and long-term professional goals (Brooks et al., 1995; Greenhaus, Callanan, & Godshalk, 2009).

The results highlight the importance of well-structured industrial training programs that provide students with opportunities to acquire both theoretical knowledge and practical skills. These programs should be designed to challenge students while also providing the support needed to help them navigate these challenges and foster career motivation. Research has consistently shown that students who face challenges during internships are more likely to develop the critical thinking and problem-solving skills required for successful careers (Garavan & Murphy, 2001; Jackson, 2015). Moreover, industrial training that offers meaningful learning experiences and career-relevant skills tends to result in higher career satisfaction and long-term commitment to the profession (Day & Allen, 2004; Silva et al., 2016).

Table 2

Correlations between Industrial Training Experience and Challenges/ Career Motivations

Variable	Challenges		Career Motivations	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Career	.892**	.001	.665**	.001
Practices	.909**	.001	.446**	.001
Skills	.822**	.001	.468**	.001

N = 400, ** $p < .001$

Table 3 and Table 4 present the regression analyses for challenges and career motivations, respectively. These tables show the predictive power of knowledge, practices, and skills (industrial training experience dimensions) on each of the outcome variables. Specifically, the regression analysis for challenges reveals that all three dimensions of industrial training experience—knowledge, practices, and skills—significantly predict challenges faced by students during their industrial training. Among these predictors, knowledge had the strongest influence ($B = 0.72$, $SE B = 0.11$, $\beta = 0.71$, $p = 0.001$), followed by practices ($B = 0.65$, $SE B = 0.14$, $\beta = 0.68$, $p = 0.002$) and skills ($B = 0.59$, $SE B = 0.13$, $\beta = 0.62$, $p = 0.004$). This model explains 76.2% of the variance in challenges, indicating that students who gained more

knowledge, practiced more hands-on tasks, and developed skills during their industrial training reported higher levels of perceived challenges.

Meanwhile, the regression analysis for career motivations demonstrates that knowledge, practices, and skills also significantly predict students' career motivations, although the impact of knowledge was again the strongest ($B = 0.68$, $SE B = 0.12$, $\beta = 0.70$, $p = 0.001$). Practices ($B = 0.52$, $SE B = 0.15$, $\beta = 0.65$, $p = 0.002$) and skills ($B = 0.48$, $SE B = 0.13$, $\beta = 0.58$, $p = 0.004$) were slightly less predictive compared to knowledge. This model explains 73.4% of the variance in career motivations, showing that practical engagement and skill development during industrial training significantly contribute to shaping students' career aspirations.

Table 3

Regression Analysis for Industrial Training Experience and Challenges

Variable	Challenges			
	B	SE. B	Beta, β	<i>p</i>
Career	.72	.11	.71	.001
Practices	.65	.14	.68	.002
Skills	.59	.13	.62	.004
R²	.785			
Adjusted R²	.762			
F	225.4			

$R^2 = 0.785$, Adjusted $R^2 = 0.762$, $F = 225.4$ ($p < .005$)

Table 4

Regression Analysis for Industrial Training Experience and Career Motivations

Variable	Career Motivations			
	B	SE. B	Beta, β	<i>p</i>
Knowledge	.68	.12	.70	.001
Practices	.52	.15	.65	.002
Skills	.48	.13	.58	.004
R²	.762			
Adjusted R²	.734			
F	210.8			

$R^2 = 0.762$, Adjusted $R^2 = 0.734$, $F = 210.8$ ($p < .001$)

The findings from the regression analyses further highlight the critical role that industrial training experiences—particularly knowledge, practices, and skills—play in shaping students' perceptions of challenges and their career motivations. The fact that knowledge was the most substantial predictor for both challenges and career motivations underscores the importance of knowledge acquisition during industrial training. Internships and work-based learning environments offer students unique opportunities to apply theoretical knowledge to real-world situations, which, although challenging, are essential for their professional growth (Patrick et al., 2008; Day & Allen, 2004).

The strong relationship between knowledge and challenges ($B = 0.72$, $\beta = 0.71$, $p = 0.001$) suggests that as students gain more knowledge during industrial training, they encounter more complex tasks and challenges. This finding is consistent with previous research indicating that experiential learning environments often require students to confront real-world problems, thereby enhancing their cognitive and problem-solving skills (Kolb, 1984; Garavan & Murphy, 2001). Moreover, the significant impact of practices ($B = 0.65$, $\beta = 0.68$, $p = 0.002$) and skills ($B = 0.59$, $\beta = 0.62$, $p = 0.004$) on challenges further supports the idea that hands-on experience is a vital aspect of student learning, providing them with practical insights into workplace dynamics (Kim & Park, 2013; Jackson, 2015).

For career motivations, the results show that knowledge ($B = 0.68$, $\beta = 0.70$, $p = 0.001$) was again the most significant predictor. This finding aligns with existing literature that emphasizes the role of knowledge acquisition in shaping career aspirations and professional confidence (Day & Allen, 2004; Silva et al., 2016). Students who gain substantial knowledge during their internships are more likely to feel prepared and motivated to pursue their careers. In addition, practices ($B = 0.52$, $\beta = 0.65$, $p = 0.002$) and skills ($B = 0.48$, $\beta = 0.58$, $p = 0.004$) also significantly influenced career motivations, suggesting that practical engagement and skill development enhance students' career readiness and long-term commitment to their professional goals (Brooks et al., 1995; Greenhaus, Callanan, & Godshalk, 2009).

The findings highlight the importance of well-structured industrial training programs that provide opportunities for students to acquire knowledge, practice real-world tasks, and develop practical skills. These programs should aim to challenge students, enabling them to grow professionally and develop the competencies required for their future careers (Patrick et al., 2008; Ryan et al., 1996). By offering meaningful learning experiences, industrial training programs can not only enhance students' knowledge and skills but also foster the motivation they need to pursue successful careers in their respective fields (Day & Allen, 2004; Silva et al., 2016).

Enhancing Industrial Training for Career Development: Key Policy and Educational Strategies

The findings from this study underscore the critical role that industrial training experiences play in shaping both the challenges faced by students and their career motivations. Given the significant impact of knowledge, practices, and skills on these outcomes, there are several key implications for educational policy and the design of industrial training programs.

First, the strong predictive power of knowledge for both challenges and career motivations suggests that training programs must prioritize opportunities for students to deepen their theoretical understanding and practical application of industry-specific knowledge. Educational institutions and industry partners should collaborate to design curricula that integrate both theoretical and hands-on learning to ensure that students are not only knowledgeable but also equipped to handle real-world challenges. Research has shown that work-integrated learning experiences that emphasize knowledge acquisition improve students' ability to transition from academic settings to professional environments (Patrick et al., 2008; Jackson, 2015).

Furthermore, the significant influence of practices and skills on both challenges and career motivations highlights the need for internships to include comprehensive, skill-building

activities. Training programs should expose students to a variety of tasks that allow them to develop industry-relevant competencies. This aligns with research that emphasizes the importance of experiential learning in fostering the practical skills and adaptability required for the modern workforce (Kolb, 1984; Silva et al., 2016). Institutions may consider implementing structured mentorship programs within internships, where students can receive guidance and feedback as they tackle challenging tasks. This can help students navigate the challenges while building their professional confidence and motivation.

In addition to the direct impact on career motivations, the findings suggest that challenges themselves play a formative role in students' career development. Students who face higher levels of challenges during their training are more likely to develop resilience and problem-solving skills, both of which are essential for long-term career success. Therefore, industrial training programs should be designed to include tasks that are challenging but also manageable, with support systems such as coaching and feedback to help students cope with difficulties. Studies have shown that students who are exposed to challenging internships are better prepared to handle the complexities of the workplace (Garavan & Murphy, 2001; Brooks et al., 1995).

Practical Applications for Industrial Training Programs

The robust relationships identified between industrial training experiences and students' perceptions of challenges and career motivations have important practical applications for the design of industrial training programs. First, internships should be structured to provide a balanced mix of knowledge acquisition and skill development, ensuring that students are exposed to both theoretical learning and practical tasks that push them to develop industry-specific competencies. Employers and universities should work together to create internship experiences that are challenging but supported, enabling students to develop both the technical skills and resilience needed for future career success (Kim & Park, 2013; Jackson, 2015).

Additionally, industrial training programs should incorporate reflective components, allowing students to evaluate the challenges they faced and the skills they developed. By reflecting on their experiences, students can better understand how their training contributed to their career motivations and preparedness. Research suggests that reflective practices help students internalize learning and improve their ability to apply knowledge in new contexts (Ryan et al., 1996; Garavan & Murphy, 2001). Institutions could consider integrating reflective journals or debriefing sessions into the internship experience as part of the assessment process.

Limitations and Future Directions

While this study provides valuable insights into the relationship between industrial training experiences, challenges, and career motivations, it also has some limitations. The cross-sectional nature of the study limits the ability to draw causal inferences. Future research could adopt a longitudinal approach to track how students' industrial training experiences influence their career development over time. Longitudinal studies would provide a clearer picture of how knowledge, skills, and challenges during training translate into long-term career success (Patrick et al., 2008; Day & Allen, 2004).

Another limitation of this study is the reliance on self-reported data, which may introduce biases such as social desirability or inaccurate self-assessment. Future studies could use mixed-methods approaches that combine quantitative surveys with qualitative interviews or observations to gain deeper insights into students' experiences during industrial training. This approach could help identify the nuances in how students face challenges and develop career motivations, which may not be fully captured through self-reports alone (Silva et al., 2016; Zainuddin et al., 2020).

Lastly, the findings are based on a sample of students from a single context, which limits their generalizability. Future research could expand the sample to include students from different educational and cultural contexts, allowing for a more comprehensive understanding of how industrial training experiences influence career development. Comparative studies across industries and countries could provide valuable insights into the best practices for structuring effective internships (Greenhaus et al., 2009; Jackson, 2015).

Conclusion

This study highlights the importance of knowledge, practices, and skills in shaping the challenges faced by students during industrial training and their subsequent career motivations. The findings emphasize the need for well-structured industrial training programs that provide students with opportunities to acquire deep industry knowledge while also challenging them to develop practical skills and resilience. These findings have important implications for policy and educational practices. It is crucial for educational institutions and industry partners to collaborate closely to optimize industrial training experiences. This partnership could involve co-developing curricula that integrate theoretical learning with practical applications, ensuring that students gain relevant knowledge and skills needed in the workforce. Moreover, structured mentorship programs can be designed, allowing industry professionals to guide students through their training. Such initiatives can help students navigate workplace challenges more effectively and build the necessary soft skills for future success. Additionally, institutions should create feedback mechanisms to continuously evaluate and improve the industrial training programs based on student experiences and industry needs.

In conclusion, the study underscores the critical role that industrial training plays in students' professional development. By designing programs that challenge students and equip them with the necessary skills, educational institutions can better prepare students for the workforce. Future research should continue to explore the long-term effects of industrial training experiences on career development, with a focus on creating internships that support both skill acquisition and career motivation across different contexts (Patrick et al., 2008; Silva et al., 2016).

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