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The Evaluation of Internship in the Digital Information Age: A Case Study

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ABSTRACT

This study evaluates the merits and challenges associated with onsite and online internships, focusing on their impact on objective achievement, intern-industry interaction, interdisciplinary learning, and globalization through the four-I's framework: intentional, interconnected, interdisciplinary, and international. By comparing the experiences of 21 students engaged in eight-week onsite programs alongside 21 online interns, the study finds that online internships offer flexibility and global accessibility, enhancing international skills. However, they score lower in intentionality, interactivity, and interdisciplinary learning. In contrast, onsite internships excel in providing hands-on experiences, real-time observation, teamwork, and the development of interdisciplinary skills development, albeit underutilizing international dimensions. Future investigations could explore how technological advancements like augmented reality and virtual reality might enhance online internships. Additionally, it could examine how digital tools and social media platforms could facilitate interaction among online interns, mentors, and host companies within the evolving internship landscape.

KEYWORDS

curriculum alignment, intentional, interconnectivity, interdisciplinary, international, internship, mentor, professionalism

1. INTRODUCTION

The concept of the modern internship emerged in the medical field in the 1920s (Taylor Research Group, 2014) and has since gained widespread adoption in academia across the globe. Internships, essentially a modern form of professional apprenticeships that originated in the trade guilds of Europe in the 11th and 12th centuries (Forbes, 2009), saw a surge due to the expansion of the Internet in the 1990s, providing more opportunities for student participation. The growing IT sector, particularly the application of information communication technology (ICT) for socioeconomic development, led to increased investment in developing nations (Fry et al., 2008).

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Internships include any professional work experience related to a student's academic major. Students partner with organizations, engaging in work that benefits both parties (Friesenborg, 2002). The governments of developing countries have established internship programs in universities to help students understand how ICT can be integrated into society (Crossley et al., 2012). Universities' emphasis on internships supports economic growth by facilitating students' acquisition of the essential skills needed to compete in demanding and evolving national and global economic environments (Schambach & Dirks, 2002).

To enhance learning, educators frequently employ experiential learning pedagogies (Leary & Sherlock, 2020). However, for an internship to be effective, students must consciously engage and not simply view it as a job or potential gateway into future full-time employment (Cannon & Geddes, 2019).

The aim of internship programs is to help the transition of students from academia to a professional work environment (Nicho et al., 2021). During internships, students have opportunities to acquire extensive hands-on experience in a variety of business situations (Crossley et al., 2012). These experiences allow them to put abstract concepts and derived knowledge to practical use (Fry et al., 2008), expanding their subject knowledge (Leary & Sherlock, 2020). Internships also allow them to establish connections with global businesses and industries, strengthening their capacity to recognize opportunities and repurpose their knowledge (Aldianto et al., 2018).

From an industry perspective, the managers of 94.9% of companies in one worldwide survey described internships as a crucial component of all students' training, crucial for shaping their personalities and preparing them for the workplace (Elad, 2022). Internships also introduce young professionals with new ideas and ways of thinking into businesses, increasing the competitiveness of the workforce. Thus, an internship can be described as a structured form of academic and interdisciplinary knowledge acquisition that is both challenging and largely practice-oriented (Agnew & Kahn, 2014).

The global higher education sector has increasingly turned to experiential learning pedagogies, including internships and service-learning opportunities, to complement teacher-centered knowledge-transfer approaches. This approach actively involves students in the learning process (A. Kolb & D. Kolb, 2006). Meanwhile, digital technologies offer new resources to help individuals' engagement in professional contexts and the development of new skills for navigating the challenges posed by the information age (Bowen, 2012). While internships have been associated with concrete experience, reflective observation, abstract conceptualization, and active experimentation (McMullan & Cahoon, 1979), these areas must now be adapted for the 21st-century workplace.

1.1 Problem Statement

Researchers and educators have been debating the value of internships, particularly for undergraduate students, as they are viewed as both a contributing factor to and a potential solution for the challenge surrounding youth unemployment (Frenette et al., 2015). Internships provide numerous advantages; however, challenges persist when bridging the gap between theoretical knowledge and practical application (Gashaw, 2019).

Interns face challenges in both onsite and online internship programs. Regarding the onsite perspective, these challenges include a limited connection between the industry and the university, instances where company supervisors assign tasks to interns that are unrelated to their field, and infrequent visits by university supervisors (Gashaw, 2019). This is supported by empirical research that highlights several issues, including supervisors' lack of interest in involving students in relevant tasks, inadequate mentoring, and support from supervisors (Birhan & Merso, 2021). In addition, there is a mismatch between interns' skills and expectations and what the organization requires. Interns also may lack interest and underestimate the true nature of the work (Soffi et al., 2020).

Even before the COVID-19 pandemic, the use of virtual or remote internships had been steadily rising (Feldman, 2021; Pittenger, 2021). However, the pandemic helped educators' exploration of alternative teaching and learning methods (Seo & Kim, 2021). In this respect, virtual internships help interns enter organizations of their choice, regardless of their location or potential limitations due

disabilities that might impede mobility and other commitments. While a virtual internship program can lead to success for both interns and employers, it can also turn into a wasteful, unsuccessful endeavor for both parties. The outcome hinges on effectively balancing the expectations of all involved through meticulous planning, organized execution, and clear communication (Massingill, 2013).

In a virtual internship setting, various technological challenges arise during the program. Supervision needs to be facilitated through communication technology platforms. These challenges encompass navigating the online setting, crafting online content and pedagogical skills to suit the online platform, struggling to build confidence due to the absence of instant responses in the online environment, and a lack of clear and continuous interaction between students and supervisors (Ugalingan et al., 2021). Additional challenges encompass issues such as unreliable internet connections, conflicting schedules, the limited functionality of communication tools like WhatsApp, and the need for thorough preparation in terms of mental, physical, and financial aspects due to anxiety (Muslimin & Harintama, 2020). Given the diverse challenges between onsite and online internships, there is a need for research that focuses on determining and measuring the short-term and long-term implications of virtual internships on professional development (Bawadi et al., 2023).

Consequently, the current research on virtual internships is limited, leaving numerous unanswered questions, notably about the criteria defining a successful virtual internship. For instance, in science and technology courses, educators and science students have expressed concern regarding the potential impact of inadequate practical skills in a virtual environment as compared to students in social science disciplines (Elhaty et al., 2020). Amidst conflicting reports about the advantages, challenges, and issues impacting interns in both onsite and online environments, conducting an empirical evaluation of these two modes in a realistic science and technology context may unveil important insights for undergraduate students engaged in practical technology courses.

These insights may encompass both commonalities and distinctions, allowing administrators and educators valuable opportunities to enhance the internship experience for future professionals. The proposed research aims to evaluate the challenges and benefits of onsite and online internships in relation to the achievement of the objectives, intern-industry interaction, interdisciplinary aspects, and globalization.

Accordingly, the authors framed the primary research question for this study: What strategies can universities employ to enhance online vocational initiatives in the new information age, ensuring universal access for interns?

It is useful to break this broad question into four sub-questions associated with the Four-I's framework (intentional, international, interdisciplinary, and interconnected; Bird et al., 2011):

- **RQ1:** How can stakeholders ensure that the objectives of internships are realized in both online and onsite environments? (intentional)
- **RQ2:** How can stakeholders ensure that interns are able to put into practice what they have learned in the classroom in both online and onsite environments? (interconnected)
- **RQ3:** How can the online and onsite modes of internships ensure an interdisciplinary orientation? (interdisciplinary)
- **RQ4:** How can online and onsite internships serve as a context for providing students with a global experience? (international)

The authors use the terms “internetworked user” and “information age” interchangeably in this article. Section 2 discusses the benefits and challenges of internships from both an onsite and online perspective, considering the intern, educational institution, and industry standards. Section 3 outlines the methodology employed in this study. In Section 4, the authors delve into the data analysis and present the findings. Section 5 addresses the research questions and overall discussion section before concluding and offering suggestions for future research.

2. RELATED WORK

2.1 Internship Benefits

Internships, a complex learning framework with constructivist roots, support students in gaining knowledge through practical applications and a critical reflection of their experiences (Baert et al., 2021). Interns can experience a variety of benefits from onsite and online internships, as each offers distinct advantages to the stakeholders (i.e., interns, educational institution, and industry). See Figure 1.

Onsite internships offer students useful hands-on work experience (Burayak et al., 2023), allowing them an opportunity to apply the lessons learned in the classroom to real-world, professional scenarios. Interns who complete onsite internships can connect in person with professionals in their field of study. Developing these professional connections may be essential for securing future employment and engaging in professional development opportunities (Hora et al., 2020; Karunaratne & Pere, 2019).

Through internships, students can explore several career options within their area of study (Anjum, 2020). Internships often include ongoing feedback from mentors and supervisors (Benson, 2013). According to Rothman (2007), interns can receive and apply constructive feedback. Additionally, internships encourage students to explore opportunities outside of their familiar environment, helping them adapt to unfamiliar surroundings (Succi & Canovi, 2020), which can support personal development, heightened self-assurance, critical thinking, time management, and a broader viewpoint.

Online internships help interns enter organizations of their choice, regardless of their location and potential disabilities that might otherwise restrict their mobility and other commitments (Seo & Kim, 2021). Internships offer students opportunities to learn about many cultures, work methodologies, and communication standards. These experiences aid students develop a deeper awareness of the host culture, its people, and the effects of cross-cultural interactions (Ozlanski, 2023).

Moreover, online internships provide a unique platform for interns to enhance their soft skills, including organization, time management, and the ability to set priorities (Mihail, 2006). Online internships offer flexible scheduling, allowing students to work from home on the weekends and evenings, providing an avenue to align with their curricular goals (Hruska et al., 2022).

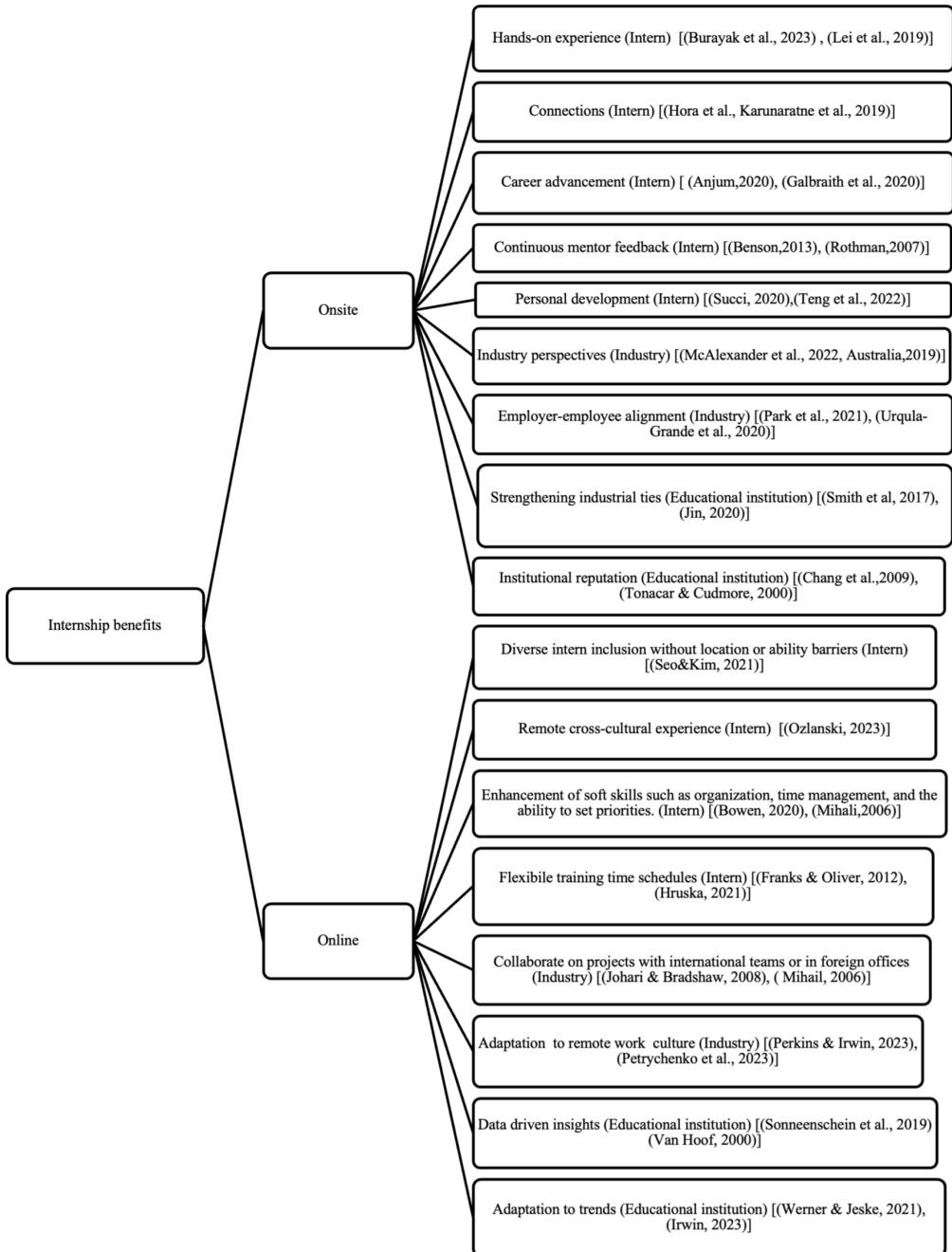
Onsite internships provide a practical path between educational institutions and industries, improving students' learning experiences as they prepare for their post-graduate career (Jin, et al., 2020; Smith, 2017). Offering high-quality onsite internships can enhance the reputation of educational institutions among prospective students, parents, and employers (Toncar, & Cudmore, 2000).

Numerous online internship platforms offer data and insights on the effectiveness, involvement, and outcomes. Educational institutions can use this information to evaluate the success of their internship programs and make significant modifications (Johari & Bradshaw, 2008; Mihail, 2006). In today's job market, remote work and virtual collaboration have grown. Educational institutions prepare students to adapt to job market trends by offering them online internship opportunities (Perkins & Irwin, 2023; Petrychenko et al., 2023).

Onsite internships give students industrial perspectives into the operations of various industries and businesses (McAlexander et al., 2022). Students can observe corporate culture, comprehend market trends, and discover the opportunities and problems faced by the industry. Internships also give employers the ability to evaluate potential future employees before committing full-time positions (Park & Jones, 2021). This perspective allows companies the chance to assess the internship program and potential hires, lowering the risk associated with the hiring process (Urquía et al., 2020).

Online internships offer industries the valuable opportunity to engage on projects with overseas teams or in foreign offices. The interns' skills are enhanced by this experience while promoting the organization's competitive edge and its innovative, global presence (Sonnenschein et al., 2019; Van, 2000). As remote work becomes more common, offering online internships acquaints interns with online communication tools, collaborative techniques, and norms associated with remote work. This will help industries to introduce the remote working culture to future employees (Perkins, & Irwin, 2023; Werner & Jeske, 2021).

Figure 1. Internship benefits based on stakeholders: Intern, educational institution, and industry



2.2 Theoretical Framework: 4I's in Internship

ICT has become a major catalyst for changes in working conditions, particularly with respect to the accessing, handling, and exchange of information, teaching methods, learning approaches, and scientific research (Mikre, 2011). Hence, there is a need to reevaluate the assessment of internship effectiveness in the current information age. This reassessment should encompass the objectives

of the internship, the quality of intern-industry interactions, the incorporation of interdisciplinary elements, and the intern's adeptness in navigating a global environment.

The Four I's framework, proposed by Bird et al. (2011), helps interns to take advantage of ICT, providing a suitable framework for addressing both current and future concerns. In the present study, the authors used the Four-I's framework to evaluate the efficacy of instruction and learning in the context of ICT-based internships. Specifically:

- **Intentionality:** The need to ensure that the goals of the internship are met.
- **Interconnectivity:** The blending of theory and practice as a key objective.
- **Interdisciplinary:** Internships that involve multiple subject areas.
- **International:** The wide geographical applicability of internships.

Thus, the Four I's involve well-established goals, the acquisition of knowledge, and the participation of stakeholders (Bird et al., 2015).

Taking each concept individually, a focus on intentionality in internship programs ensures the realization of the objectives, primarily the main goal of helping students bridge the gap between academic theory and the practical application of learning (Thompson, 1950). A focus on interconnectivity facilitates interns' efforts to translate their classroom learning into real-world environments (J. Wrenn & B. Wrenn, 2009). A significant goal and advantage of internships is the integration of theory and practice.

An interdisciplinary approach within internships provides insights that make academic disciplines more salient and appropriate, benefitting both students and their respective fields of study (Hoyle & Deschaine, 2016). An internship program should be based on the understanding and application of theory in the development and deployment of skills. Engaging in such processes increases interns' competence and self-efficacy as they attempt to integrate theory with practice (Coker, 2020).

In the realm of experiential learning, ICT has opened new possibilities, including virtual internships (Nagatsuka et al., 2013). The fundamental premise of working remotely and gaining experience through virtual internships relies on practicality. Telecommuting has become increasingly common now that businesses and individuals are connected due to the availability of broadband internet and high-speed computer equipment.

3. METHODOLOGY

The College of Technological Innovation at Zayed University, United Arab Emirates, includes a mandatory eight-week full-time internship program within its undergraduate program. The programs aim to help students acquire skills specific to their professions that they may not be able to acquire in classroom settings (Krippendorff, 1980).

At the end, summative and formative methodologies serve to evaluate the participants. Formative assessments involve meetings between students' faculty supervisors and the internship site supervisor and a site supervisor survey. Summative methods include weekly progress reports, a final summary report, and a student presentation. Students pass or fail based on these summative and formative assessments. However, comprehensive objective evaluations are currently lacking.

When evaluating the Four I's and exploring ways to enhance vocational initiatives in the information age for universal access to internships, the authors' approach centered on inductive reasoning and drawing generalizations from their observations. Their content analysis focused on the final reports and assessments of 21 students who completed onsite internships during the first spring term of 2021, in addition to the 21 students who completed online internships during the same period.

Content analysis involves inferring communication content from observations using repeatable and reliable methodologies (Krippendorff, 1980). As such, it provides an empirical basis for tracking

changes in public opinion and systematically sorting through vast amounts of data with relative ease (Stemler, 2000). Content analysis is also useful for studying patterns in documents. Krippendorff (2018) justified the use of this methodology, stating that it is suited for deriving meanings from texts like written documents.

In this study, the interns’ positive evaluations served as the basis for assessing their overall satisfaction. Positive evaluations have been taken into consideration to determine the overall satisfaction based on content. Qualitative research aids in understanding the human condition in various contexts (Bengtsson, 2016), including internships. The authors’ qualitative methodology, involving a thorough investigation of the internship process and inductive data analysis based on preconceived notions, is commonly employed in similar studies (Bengtsson, 2016; Miles & Huberman, 1994).

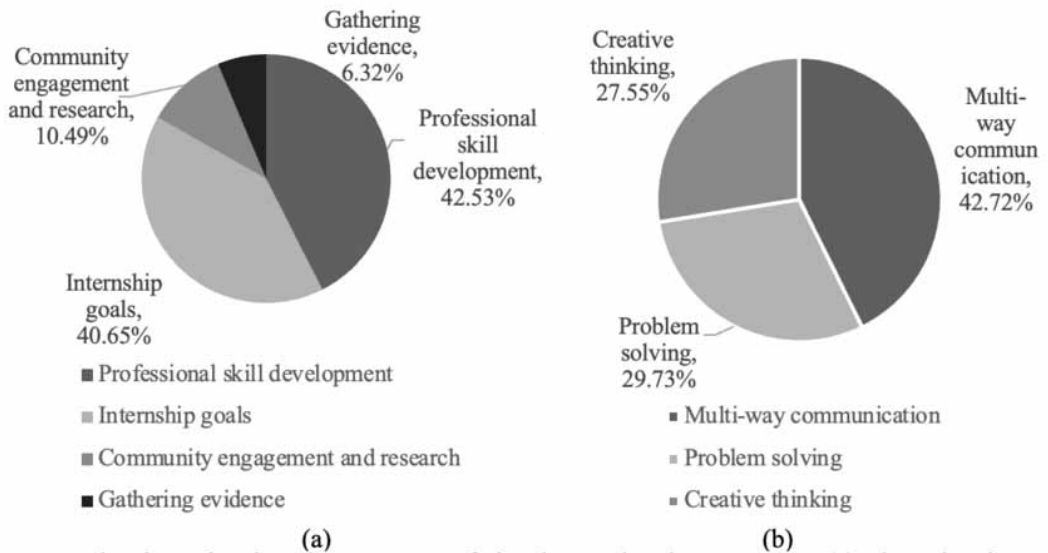
4. DATA ANALYSIS

The authors employed the qualitative research software tool NVIVO 12 to analyze the data. The data consisted of final internship reports from 42 interns, including a summary of their education, training, and experiences during the eight-week program. The authors identified declarative statements and classified them based on inductive nodes, specifically the Four I’s, and the sub-nodes (14 themes). The classifications were arbitrary and consistent with the recommendation that researchers be creative when examining qualitative data in addition to counting words and their frequencies (Miles & Huberman, 1994). This was also applied when measuring the strength of the nodes.

4.1 Measuring the Four I’s for the Onsite Internship Program Based on Coverage

Table 1 displays the level of coverage of the 14 themes, categorized as intentional, interdisciplinary, interconnected, or international. Figure 2 depicts the distribution of themes within the intentional and interdisciplinary constructs for onsite internships, providing a graphical representation of the coverage of these key aspects within the internship program. The intentional construct explores four themes. Among these, “professional skill development” had the highest coverage at 42.53% followed

Figure 2. Coverage of themes within the intentional and interdisciplinary constructs for onsite internships



by “internship goals” at 40.65%, and “community engagement and research” at 10.49%. The theme “gathering evidence” had the lowest coverage at 6.32% (see Figure 2(a)).

These findings suggest that the students were especially interested in acquiring practical experience in technical skills while working in a professional setting. It also indicates the need for a deeper understanding of community needs and the gathering of data to enhance overall practice. In Figure 2(b), the graphic showcases the percentage of coverage for all three themes under an interdisciplinary perspective. From this perspective, “multi-way communication” had the highest coverage of the three themes, amounting to 42.72%, followed by “problem-solving” at 29.73%, and “creative thinking” at 27.55%. These results indicate that the students considered communication among themselves, instructors, professionals, and members of the community to be beneficial, contributing additional knowledge during the internship program.

However, the results highlight the need for more initiatives within the program to encourage students’ creative thinking and enable the introduction of innovative perspectives into the workplace.

Figure 3 illustrates the distribution of themes within the interconnected and international constructs for onsite internships, providing a visual representation of these key aspects within the internship program. Figure 3(a) displays the coverage for all 14 themes from the interconnected perspective. Within this perspective, “knowledge and connection shared” had the highest coverage of the four themes, accounting for 34.4%. This was followed by “teamwork” at 30.23%, “active collaboration among multiple participants” at 30.30%, and “role of messenger” at only 5.07%.

Students share and enhance their duties through collaboration. In fact, the emphasis on “knowledge and connection shared” indicates that participants were interacting and exchanging knowledge and contacts. In turn, it created a form of positive feedback. On the other hand, Figure 3(b) displays the coverage for the three themes from the international perspective. Among these themes, “real-time observation,” received the highest coverage at 73.91%, followed by “international level abilities and competencies” at 26.08%, and “physical visit to other countries” with only 11.52% coverage.

These results indicate that real-time observation of interns ensured the program’s effectiveness and viability. However, initiatives need to be implemented within the internship program to encourage students to explore international settings, utilize new technologies, and leverage their multilingualism for greater advantage.

Figure 4 displays the overall coverage of the 14 themes in the four-I’s framework. As the bar chart indicates, it is evident that the most crucial components of the four I’s (ensuring the success of situations, people, communication, cooperation, and learning) were interconnectedness, intentionality, and interdisciplinarity. These results highlight the close connections that participants formed while interacting with members of their teams, engaging in active collaboration, and sharing knowledge.

Additionally, the chart illustrates that interdisciplinarity and intentionality reflect the diverse goals of the participants, the strategies used to achieve these goals, and the many roles performed across disciplines. It becomes evident that internship programs must stress internationalism and adhere to a robust conceptual framework to improve interns’ chances for success and expanded learning.

The success of international internships depends not only on language proficiency but also on comprehensive preparation, an understanding of the culture, and operational details of the host firms, program specificities, and professional advancement in the host nation. Interns’ real-world job experience can, thus, transform their capacity to work outside their home countries in the context of enhanced global interconnection, interdependency, and shared professional goals and common visions.

2.2 Measuring the Four I’s for the Online Internship Program Based on Coverage

Table 2 shows the extent of coverage across the 14 themes under the four constructs (intentional, interdisciplinary, interconnected, and international). Figure 5 illustrates the distribution of themes within the constructs of intentional and interdisciplinary, specifically for online internships, providing insight into the coverage of these key aspects within the internship program.

Table 1. Extent of the coverage of the themes in each construct based on the four i's for onsite internships

	Intentional			Interdisciplinary			Interconnected			International			International visits to other Countries	International	
	A: 1.1 Professional Skill Development	B: 1.2 Internship Goals	C: 1.3 Community Engagement and Research	D: 1.4 Gathering Evidence	D: 2.1 Creative Thinking	E: 2.2 Multi-way Communication	F: 2.3 Problem Solving	F: 3.1 Teamwork	G: 3.2 Active Multiple Participants Collaboration	H: 3.3 Knowledge and Connection Shared	I: 3.4 Role of Messenger	InterConnected			F: 4.1 Real Time Observation
1: Report_01	1.93%	1.81%	0.00%	2.28%	6.02%	10.31%	0.0%	10.83%	5.6%	10.5%	5.70%	21.79%	0.0%	0.0%	0.00%
2: Report_02	1.73%	11.16%	0.00%	4.0%	16.89%	1.54%	1.54%	9.7%	6.7%	10.68%	10.68%	28.06%	0.0%	0.0%	0.00%
3: Report_03	11.56%	6.28%	0.0%	2.36%	20.20%	12.54%	10.1%	30.28%	1.1%	2.4%	7.76%	11.21%	2.4%	1.6%	0.00%
4: Report_04	9.29%	12.29%	1.88%	23.46%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.00%
5: Report_05	11.70%	11.7%	2.79%	0.0%	26.19%	6.8%	0.78%	8.86%	6.0%	14.93%	6.02%	26.97%	0.0%	0.0%	0.00%
6: Report_06	9.49%	9.49%	1.42%	1.42%	21.82%	9.42%	9.42%	28.26%	4.0%	4.01%	5.70%	13.72%	0.0%	0.0%	0.00%
7: Report_07	3.64%	3.64%	0.0%	0.0%	7.28%	0.0%	0.0%	0.0%	5.7%	5.7%	13.93%	25.33%	0.0%	0.0%	0.00%
8: Report_08	8.71%	8.71%	1.82%	1.93%	21.17%	10.2%	6.85%	22.1%	14.8%	16.61%	0.0%	31.43%	0.0%	0.0%	0.00%
9: Report_09	18.50%	14.31%	5.14%	5.14%	43.09%	13.29%	13.29%	46.53%	17.5%	5.34%	14.75%	37.61%	0.0%	0.0%	0.00%
10: Report_10	2.06%	2.06%	4.84%	0.0%	8.96%	10.46%	13.17%	34.01%	10.2%	2.74%	7.53%	30.59%	0.0%	0.0%	0.00%
11: Report_11	13.39%	13.39%	0.0%	0.0%	26.78%	4.19%	4.19%	12.57%	17.0%	22.84%	22.84%	79.74%	0.0%	0.0%	0.00%
12: Report_12	4.87%	4.87%	2.69%	2.69%	15.12%	5.77%	11.2%	28.17%	14.2%	14.16%	14.16%	42.48%	0.0%	0.0%	0.00%
13: Report_13	6.11%	3.75%	0.0%	0.0%	9.84%	0.0%	0.0%	0.0%	3.9%	0.0%	0.0%	3.92%	0.0%	0.0%	0.00%
14: Report_14	5.94%	4.20%	1.95%	0.0%	12.09%	2.21%	0.38%	2.97%	7.2%	5.49%	9.91%	22.57%	1.2%	0.0%	0.00%
15: Report_15	10.01%	8.03%	1.63%	2.88%	22.55%	3.39%	3.33%	8.39%	8.2%	5.6%	7.92%	21.73%	7.0%	5.87%	0.00%
16: Report_16	10.22%	10.22%	0.0%	0.0%	20.44%	0.0%	1.63%	1.63%	5.9%	5.85%	5.85%	21.00%	0.3%	0.0%	0.30%
17: Report_17	26.22%	19.88%	11.66%	5.63%	63.39%	13.82%	13.82%	53.35%	18.4%	18.36%	25.71%	66.43%	6.5%	0.0%	0.00%
18: Report_18	26.53%	26.53%	13.41%	0.0%	66.47%	20.75%	25.78%	70.38%	21.9%	16.51%	28.07%	66.48%	0.0%	0.0%	2.60%
19: Report_19	10.07%	10.07%	4.53%	0.0%	24.67%	6.53%	9.41%	25.35%	4.8%	4.94%	5.70%	16.22%	0.0%	0.0%	0.00%
20: Report_20	17.75%	17.52%	2.71%	2.71%	40.69%	11.11%	5.04%	32.74%	6.0%	14.74%	14.55%	35.27%	0.0%	0.0%	0.00%
21: Report_21	11.66%	11.66%	0.0%	0.0%	23.32%	2.05%	8.1%	11.24%	8.1%	6.06%	6.06%	20.23%	0.0%	0.0%	0.00%
Total (out of 100)	221.38%	211.55%	54.59%	32.92%	520.44%	120.4%	129.93%	437.06%	187.08%	187.46%	212.84%	618.78%	16.63%	5.87%	25.1%
Total (out of 100)	42.53%	40.65%	10.49%	6.32%	100.0%	27.55%	29.73%	100.00%	30.23%	30.30%	34.4%	100.0%	73.91%	26.08%	100.0%
Overall Total (out of 100)	13.85%	13.23%	3.42%	2.04%	100.0%	7.53%	8.13%	100.00%	11.73%	11.73%	13.6%	100.0%	1.04%	0.37%	0.69%

Figure 3. Coverage of the themes within the interconnected and international constructs for onsite internships

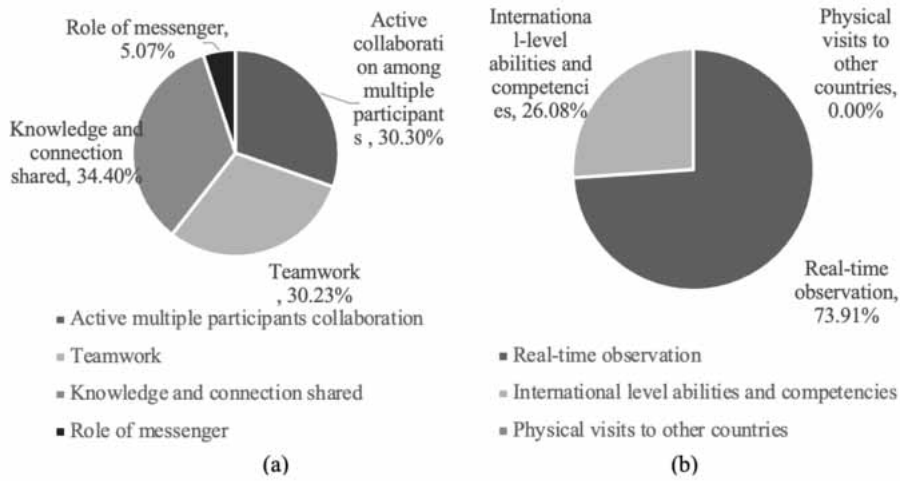
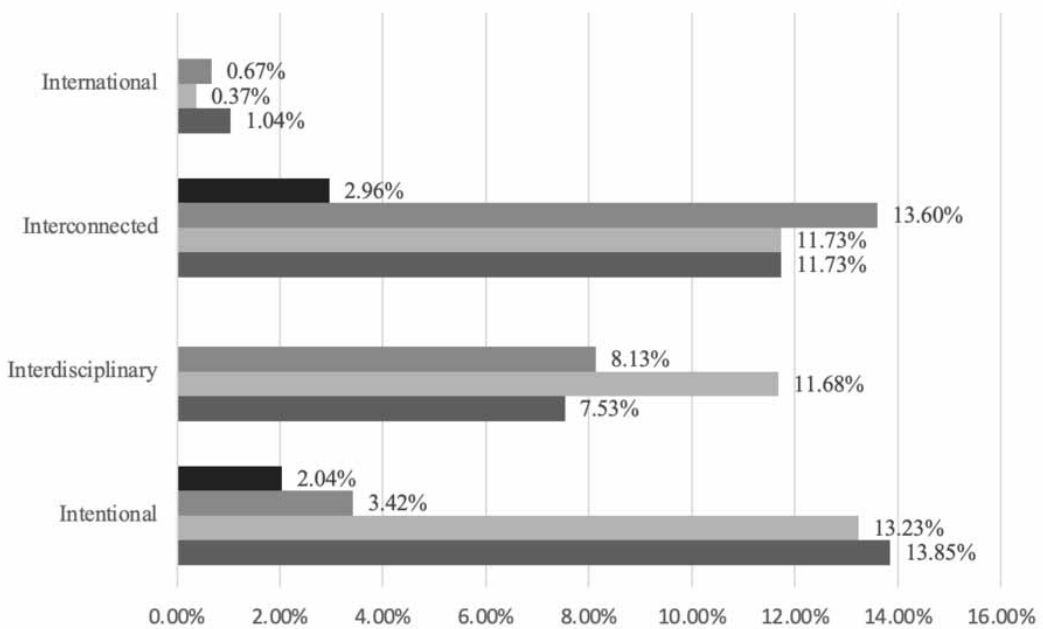


Figure 4. Coverage of the 14 subthemes under the four-I's framework for onsite internships



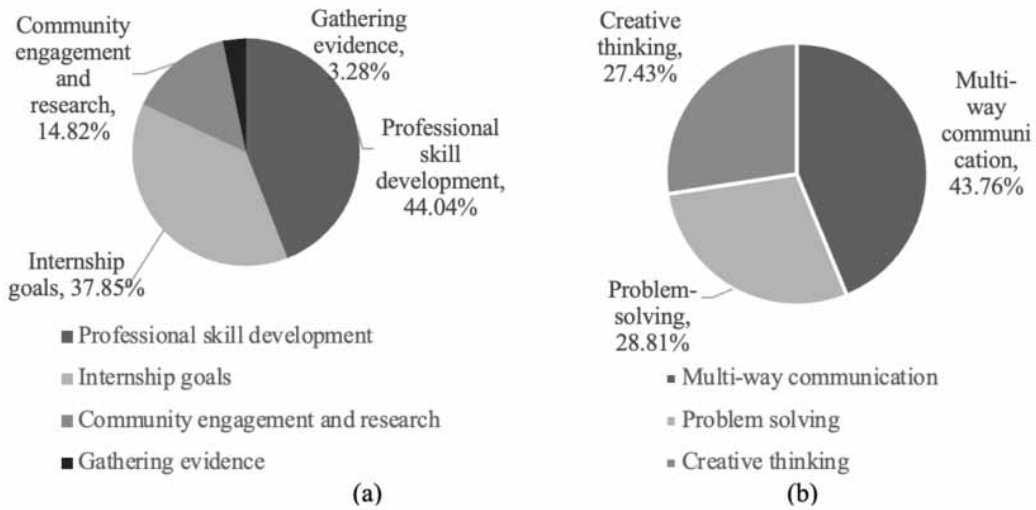
In Figure 5(a), among the four themes under intentional (displayed in the last row labeled summative value [Total]), “professional skill development” scored very high, reaching 44.04% coverage. Following this, “internship goals” was 37.85% and “community engagement and research” was 14.82%. The “gathering evidence” score was the lowest at 3.28%.

These results demonstrate students’ enjoyment of the practical aspects of developing technical skills in a professional environment. However, more attention should be paid to the students’ learning and understanding of community needs and the acquisition of data to improve overall practice.

Table 2. Extent of the coverage of the themes in each construct based on the four-is framework for online internships

	Intentional			Interdisciplinary				Interconnected			International			International visits to other Countries		
	A: 1.1 Professional Skill Development	B: 1.2 Internship Goals	C: 1.3 Community Engagement and Research	D: 1.4 Gathering Evidence	D: 2.1 Creative Thinking	E: 2.2 Multi-way Communication	F: 2.3 Problem Solving	F: 3.1 Teamwork	G: 3.2 Active multiple Participants Collaboration	H: 3.3 Knowledge and Connection Shared	I: 3.4 Role of Messenger	I: 4.1 Real Time Observation	J: 4.2 International level Skills and Competencies			
1: Report_01	3.54%	4.09%	2.52%	0.0%	10.15%	0.26%	0.46%	0.0%	0.72%	3.2%	0.0%	0.0%	0.3%	0.0%	0.29%	
2: Report_02	1.73%	0.78%	0.92%	0.0%	3.43%	0.93%	0.93%	0.93%	2.79%	1.74%	4.06%	7.90%	0.0%	13.70%	0.0%	
3: Report_03	0.72%	0.0%	0.0%	0.0%	0.72%	0.59%	1.26%	1.85%	3.7%	1.58%	2.29%	0.0%	1.1%	4.97%	1.95%	2.96%
4: Report_04	3.32%	1.36%	0.0%	0.0%	4.68%	1.39%	0.85%	0.12%	2.36%	1.95%	3.85%	0.0%	0.0%	5.80%	1.44%	1.44%
5: Report_05	0.00%	3.04%	3.74%	0.0%	6.78%	1.45%	9.46%	4.22%	15.13%	2.12%	1.26%	3.65%	3.88%	10.91%	0.0%	0.0%
6: Report_06	0.88%	1.07%	0.0%	0.0%	1.95%	0.55%	0.55%	0.0%	6.79%	0.83%	9.15%	10.81%	0.0%	21.10%	0.0%	0.0%
7: Report_07	0.81%	0.0%	0.0%	0.81%	1.62%	1.53%	2.83%	2.43%	6.79%	0.83%	2.26%	0.0%	0.0%	3.09%	0.0%	0.0%
8: Report_08	2.06%	0.18%	0.0%	0.0%	2.24%	0.94%	0.49%	0.94%	2.37%	1.26%	0.0%	0.0%	0.0%	1.26%	0.0%	0.0%
9: Report_09	1.02%	3.66%	0.55%	0.0%	5.17%	0.84%	0.0%	0.0%	0.84%	0.16%	6.57%	6.72%	0.0%	13.45%	1.09%	0.0%
10: Report_10	2.15%	1.52%	0.0%	0.53%	4.20%	0.0%	1.29%	0.05%	1.34%	0.05%	1.54%	0.0%	0.0%	1.59%	0.36%	0.36%
11: Report_11	0.0%	3.68%	0.92%	0.0%	4.60%	2.43%	2.43%	2.43%	7.29%	0.68%	1.61%	1.34%	0.0%	3.63%	0.0%	0.0%
12: Report_12	2.7%	0.0%	0.0%	0.0%	2.70%	0.0%	0.0%	0.94%	2.06%	0.94%	11.19%	0.0%	0.0%	12.13%	0.0%	0.0%
13: Report_13	0.96%	0.0%	0.0%	1.64%	2.60%	0.82%	2.45%	2.45%	5.72%	1.30%	0.0%	2.47%	0.0%	5.09%	0.0%	0.28%
14: Report_14	4.78%	1.12%	0.0%	0.0%	5.90%	4.46%	3.79%	2.51%	10.76%	5.62%	6.25%	0.0%	0.0%	11.87%	0.0%	0.0%
15: Report_15	1.61%	0.96%	0.0%	0.0%	2.57%	0.88%	0.88%	0.88%	2.64%	1.64%	3.29%	0.0%	0.0%	4.93%	0.0%	0.49%
16: Report_16	2.37%	1.06%	0.0%	0.0%	3.43%	3.23%	5.82%	3.23%	12.28%	4.7%	2.33%	0.0%	0.0%	7.03%	0.0%	0.0%
17: Report_17	3.11%	0.89%	0.0%	0.0%	4.00%	1.48%	0.0%	1.48%	2.96%	7.38%	8.09%	0.0%	0.0%	15.47%	0.0%	0.0%
18: Report_18	0.87%	3.45%	3.45%	0.0%	7.77%	2.8%	2.8%	2.80%	8.4%	0.85%	4.27%	2.3%	0.0%	7.42%	0.83%	0.0%
19: Report_19	0.0%	3.5%	0.0%	0.0%	3.50%	0.0%	0.0%	0.0%	0.0%	3.42%	5.09%	5.34%	3.42%	17.27%	5.57%	5.57%
20: Report_20	2.37%	1.67%	0.0%	0.0%	4.04%	0.0%	2.37%	0.0%	2.37%	0.0%	1.93%	0.0%	0.0%	1.93%	0.0%	0.0%
21: Report_21	5.05%	2.45%	1.38%	0.0%	8.88%	2.44%	4.44%	0.0%	6.88%	0.0%	0.0%	0.0%	0.0%	6.00%	0.0%	0.0%
Total	40.05%	34.42%	13.48%	2.98%	90.93%	27.02%	43.10%	28.38%	98.50%	40.56%	75.03%	40.53%	9.72%	165.84%	11.53%	8.44%
Total (out of 100)	44.04%	37.85%	14.82%	3.28%	100.0%	27.43%	43.76%	28.81%	100.00%	24.46%	45.24%	24.44%	5.86%	100.0%	51.08%	37.39%
Overall Total (out of 100)	10.60%	9.11%	3.57%	0.79%	100.0%	7.15%	11.41%	7.51%	100.00%	10.73%	19.86%	10.72%	2.57%	100.0%	3.05%	2.23%

Figure 5. Coverage of the themes within the intentional and interdisciplinary constructs for online internships



In Figure 5(b), the visual shows coverage for the three themes from an interdisciplinary perspective. Of the themes, “multi-way communication” scored high from an interdisciplinary perspective, achieving coverage of 43.76%. This was followed by “problem-solving” at 28.81% and “creative thinking” at 27.43%. These results suggest that communication among students, instructors, professionals, and members of the community fostered the transfer of additional knowledge during the internship program, leading to positive feedback.

However, these results also the need for more initiatives within the program to encourage students’ creative thinking and help them introduce innovative perspectives into the workplace.

Figure 6 illustrates the distribution of themes within the interconnected and international constructs for online internships, providing a visual representation of the coverage of these key aspects within the internship program. Of the four themes, “active collaboration among multiple participants” scored high from an interconnected perspective, achieving a 45.24% coverage. This was followed by “teamwork” at 24.46%, “knowledge and connection shared” at 24.44%, and “role of messenger” with a coverage of only 5.86%. Again, collaboration among students led to the sharing and enhancement of their internship duties. The results show extensive interaction and knowledge exchange between participants. Thus, the low value of the “role of messenger” suggests positive feedback because there is no need for a messenger among interns and supervisors.

Figure 6(a) shows the coverage of all 14 themes from an interconnected perspective. Figure 6(b) presents the coverage of all three themes from an international perspective. “Real-time observation,” one of the three international themes, received the highest coverage at 51.08%. This was followed by “international-level abilities and competencies” at 37.39%. Notably, “physical visits to other countries” received no coverage due to the internship program’ online setting.

These results indicate that the engagement of the interns, observed in real time, guaranteed the effectiveness and viability of the program. However, additional initiatives are needed in the program to encourage students to study in other countries and in new settings, as well as embrace new technologies that leverage their multilingualism.

Figure 7 illustrates the overall coverage of the 14 themes within the Four I’s framework. Per the chart, the most important components of the 4I’s for ensuring the success of situations, people, communication, cooperation, and learning were interconnected, interdisciplinary, and intentional. The chart shows the extent to which the participants interacted, collaborated, and shared knowledge.

Figure 6. Coverage of the themes within the interconnected and international constructs for online internships

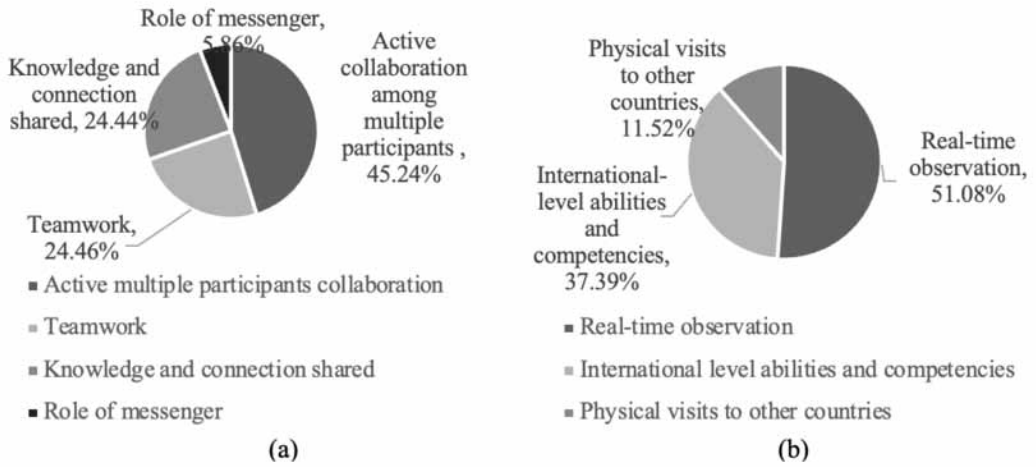
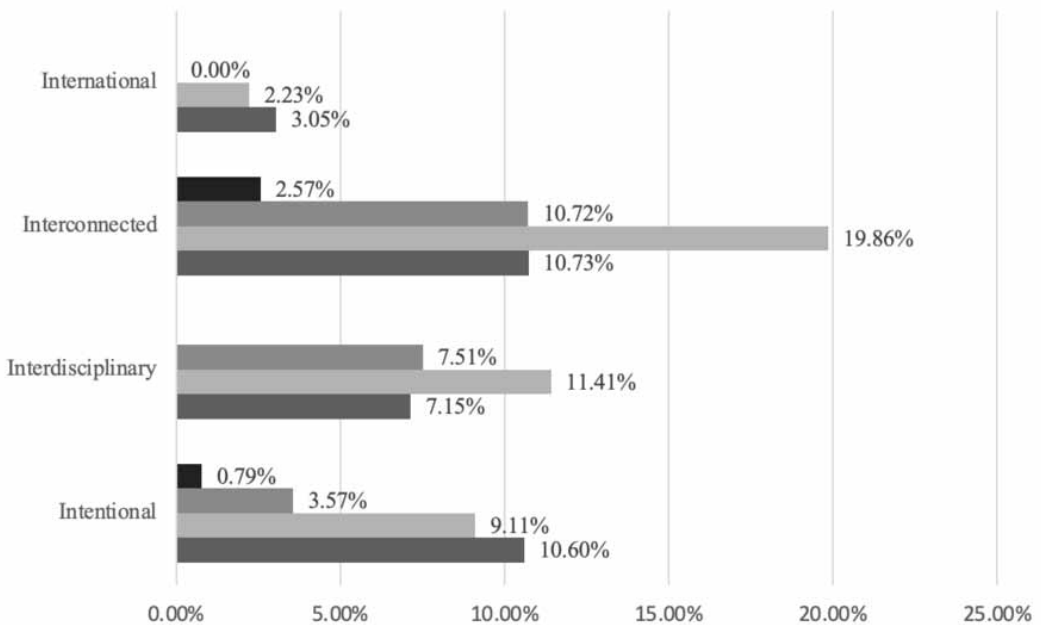


Figure 7. Coverage of the 14 themes within the four-I's framework for online internships



Additionally, interdisciplinary and intentionality represent the various individual goals, strategies, and roles across a range of disciplines.

Online international internships give students opportunities to network with experts, gain practical experience, acquire sought-after skills, and broaden their cultural understanding. These platforms offer alternative solutions to students who are unable to travel or have commitments that interfere with onsite internships. However, before applying to such a program, the students need to establish their legitimacy to ensure a successful and rewarding experience. In general, online international internships can be effective in preparing students for successful careers in a global industry. Such

programs must emphasize cultural sensitivity so that interns respect and understand practices in the host countries. Effective time management is also important, particularly for participants in online international internships, considering the potential need to work across time zones.

5. DISCUSSION

Here, the authors answer the four research questions posed in the article's Introduction. The next subsection describes the study's investigation into the learning resources employed in both onsite and online environments. Then, the subsection addresses the first research question, focusing on how to ensure that the internship objectives are realized in both online and onsite environments (intentionality). The authors present the second research question, exploring ways to help interns apply their knowledge within both environments (interconnectivity). The third research question discusses how to ensure an interdisciplinary orientation. This is followed by the fourth research question, positing the ability of internships to enhance international experiences in both online and onsite environments (international). The final subsection summarizes the overall discussion of findings, implications, and limitations.

5.1 Comparing Experiential Learning in Onsite and Online Internships Based on the Four I's

The relevance of interconnection, intentionality, and interdisciplinarity reflects the close relationship among situations, individuals, communication, cooperation, and learning in internship experiences. Online international internships offer students valuable opportunities to network, gain real-world experience, and develop a better understanding of other cultures. Therefore, such internships can be a worthwhile experience for students who are unable to travel. However, their effectiveness depends on the quality of the program, cultural awareness, and efficient time management.

Upon comparing the 14 themes within the four-I's framework, the authors found that the interns were more satisfied with the onsite program than the online program. Table 3 shows the overall coverage for the four constructs in the IRC for both forms of the program. The most significant difference in reduced positive feedback was found in the interconnected construct, with a difference of -452.94%. Thus, achieving the interconnected construct is more challenging in an online setting. In turn, a focused effort may be required to establish links or interactions among online interns.

The smallest difference was found in the international construct, which achieved a -0.07% between onsite and online internship programs. The minor difference suggests that online international internships can be effective, using technology to facilitate collaboration with businesses and individuals worldwide.

Overall, the evidence indicates that while online internships may duplicate some characteristics of onsite internships, they fail to deliver the same levels of intentionality, interdisciplinary collaboration, and interconnectedness.

Table 3. Comparison of onsite and online internships with respect to the four IRC constructs

	Onsite	Online	Differences in the levels of positive feedback (%)
Intentional	520.44	90.93	429.51
Interdisciplinary	437.06	98.50	338.56
Interconnected	618.78	165.84	452.94
International	22.57	22.50	0.07

5.2 RQ1: How Can Stakeholders Ensure That the Objectives of Internships Are Realized in Both Online and Onsite Environments? (Intentional)

This research question asked how stakeholders can ensure that the objectives of internships are realized in both online and onsite environments. The findings indicate that the participants preferred onsite programs to online programs in fostering intentional constructs. Figure 8 presents the authors' comparison between the onsite and online internship programs in terms of the intentional construct. Participants in the onsite program evaluated the experience more positively, achieving a 221.38% score compared to 181.33% for the online program, reflecting a difference of 40.05%.

The onsite internships offered a larger array of resources for the development of “professional skills,” with a rise from 40.05% to 221.38%, an increase of 181.33%. This result indicates that onsite internships provide interns with more opportunities to build their professional abilities, possibly through increased access to resources, mentoring, and coaching.

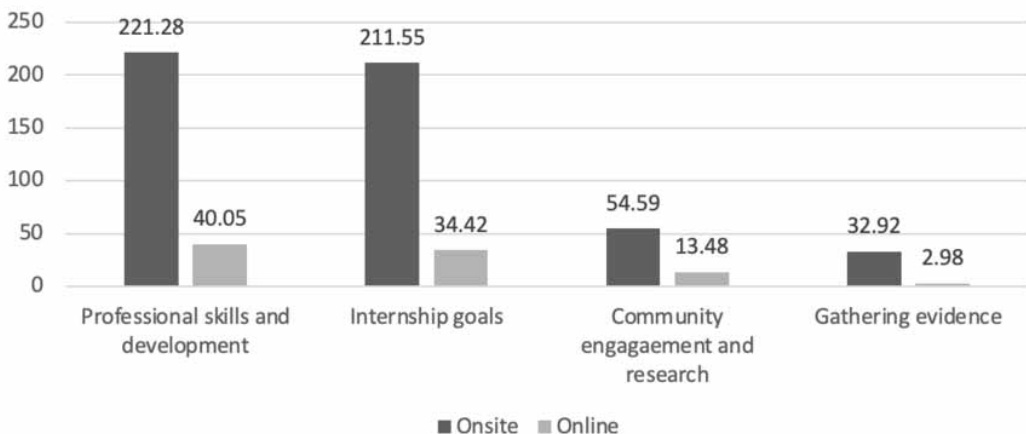
Similarly, “internship goals” showed a notable increase of 177.13% in the onsite setting, rising from 34.42% for the online setting to 211.55%. This result suggests that onsite internships provide interns with more direction and greater clarity regarding the program’s objectives, thereby improving the quality of the participants’ outcomes and experiences.

Likewise, “gathering evidence” increased by 29.94%, from 2.98% to 32.92%, and “community participation and research” increased by 41.22%, from 13.48% to 54.59%. These findings indicate that onsite internships offer more opportunities to interact with the community, carry out research, and compile data as compared to online internships. Such opportunities enhance the participants’ learning and development.

When developing and conducting both onsite and online internship programs, it is imperative to ensure a purposeful approach. The following strategies may be useful in this regard.

- **Clearly state the aims and goals of the internship programs.** Offer interns a clear understanding of their expected achievements throughout the program. This clarity can support students’ ability to maintain their focus and motivation. Methods and tools for establishing this clarity include learning agreements, goal-setting exercises, and routine check-ins with supervisors (Chin et al., 2020).
- **Ensure that the programs are well-supported and structured appropriately.** Introduce structured learning opportunities, mentorship, and coaching to facilitate interns in developing the

Figure 8. Comparison of onsite and online coverage (overall) in terms of the intentional construct



necessary skills and knowledge for success. Additionally, ensure access to relevant technologies, research databases, and educational materials (Tinoco et al., 2020).

- **Encourage an understanding of the host firm as a cohesive community.** Encourage teamwork among interns, managers, and relevant stakeholders to foster a sense of community, building a basis for supportive and cooperative learning. Use regular communication and online team-building exercises to achieve this objective (Winchester et al., 2016).
- **Analyze and measure progress.** Conduct a regular evaluation and assessment of the program’s objectives using routine meetings with supervisors, mentor feedback, and self-evaluation tasks. In addition, adjustments should be made accordingly to facilitate success (Al Ghamdi, 2022).

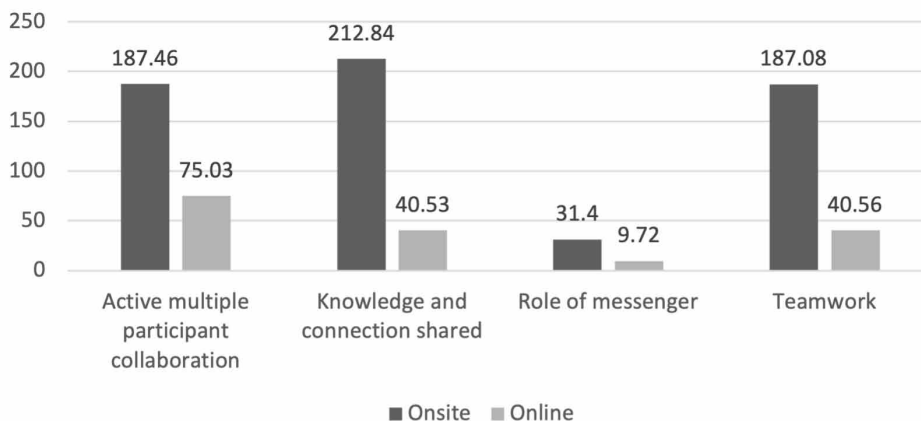
5.3 RQ2: How Can Stakeholders Ensure That Interns Are Able to Put Into Practice What They Have Learned in the Classroom in Both Online and Onsite Environments?

Figure 9 compares onsite and online internships in terms of the interconnected construct. The findings indicate that onsite internships offered significantly more resources compared to online internships. Onsite internships supported an increase of 172.31% (212.84-40.53) in the sharing of knowledge and connections, and a 146.52% increase (187.08-40.56) in teamwork. Additionally, there was a 112.43% rise (187.46-75.03) in active collaboration among multiple participants, and a 21.68% increase (31.4-9.72) in the role of messenger. The results suggest that onsite internships may provide more opportunities for social interactions, group projects, and the development of key skills like cooperation and communication. As a result, companies offering online internships may need to concentrate their efforts on providing opportunities for collaboration and connection to overcome difficulties associated with reproducing onsite experiences.

Interns can adapt their classroom learning to both online and onsite settings by emphasizing interconnectivity and taking part in hands-on learning opportunities. In this way, they can acquire the abilities and knowledge essential for excelling in their respective industries, contributing significantly to their organizations, even in a virtual environment. The following suggestions may prove useful in this regard.

- **Offer experiential learning opportunities.** Encourage interns to participate in experiential learning opportunities, particularly online simulations, where they can apply their classroom knowledge to real-world settings (Bradberry & Maio, 2019).

Figure 9. Comparison of onsite and online internships (overall) in terms of the interconnected construct



- **Encourage collaboration and teamwork.** Through teamwork, interns can use their knowledge and abilities in practical situations, including virtual tasks and projects. This promotes peer-to-peer learning, supporting interns as they build vital communication and problem-solving skills (Kang & Girouard, 2022).
- **Supply digital tools and resources.** Interns can employ online tools, virtual resources and digital databases to apply their classroom learning in practical settings (Park & Jones, 2021).
- **Offer assistance and mentoring opportunities.** Mentoring and coaching, whether conducted individually or in groups, in person or online, can also facilitate the practical application of interns' coursework (Ruggiero & Boehm, 2017).

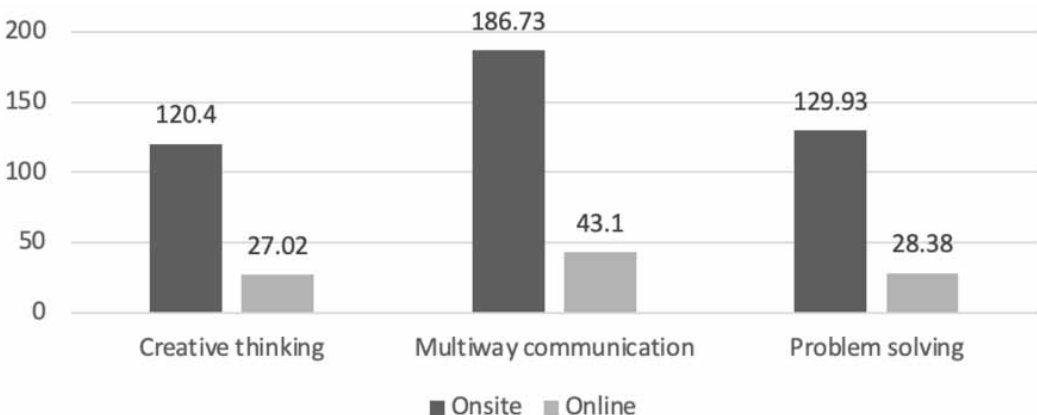
5.4 RQ3: How Can the Online and Onsite Modes of Internships Ensure an Interdisciplinary Orientation?

Figure 10 shows the authors' comparison of the onsite and online internship programs in the interdisciplinary construct. The data shows that onsite internships provide more opportunities than online internships for the development of multi-way communication, problem solving, and creative thinking skills. In the onsite internships, the development of multi-way communication increased by 143.63% (186.73-43.1) compared to online internships. Similarly, problem-solving skills increased by 101.55% (129.93-28.38) and creative thinking abilities increased by 93.38% (120.4-27.02) in the onsite context. These results imply that while online internships offer chances for interdisciplinary learning, onsite internships tend to offer richer learning environments. Both onsite and online internship programs must offer a comprehensive and balanced learning experience that nurtures creative thinking, collaboration, and problem-solving skills to be successful.

Interns in both onsite and online programs can benefit from developing an interdisciplinary orientation through collaboration with experts across sectors and disciplines. The following suggestions may prove helpful in this regard.

- **Collaborate across departments or organizations.** Provide interns with a variety of experiences and viewpoints, involving several departments, groups, and fields of study (Sides & Mrvic, 2017).
- **Provide opportunities for career advancement.** Support programs that focus on multidisciplinary skills like problem solving, creative thinking, and communication. Offer interns opportunities to explore different career paths through workshops, seminars, and online courses (Warr & West, 2020).

Figure 10. Comparison of the coverage for onsite and online internships (overall) in terms of the interdisciplinary construct



- **Encourage interdisciplinary collaboration among interns.** Encourage teamwork across disciplines and give interns opportunities to appreciate the relationships between different subjects. Thus, interns can acquire broadly transferable skills, especially in group projects. Programs that pair interns with mentors from diverse fields can also be valuable in this regard (Hoyle & Deschaine, 2016).
- **Provide interdisciplinary tools and resources.** Internship programs can encourage participants to explore areas outside of their disciplines, exposing them to new ideas and methodologies by through interdisciplinary resources and virtual tools (Ashcroft et al., 2020).

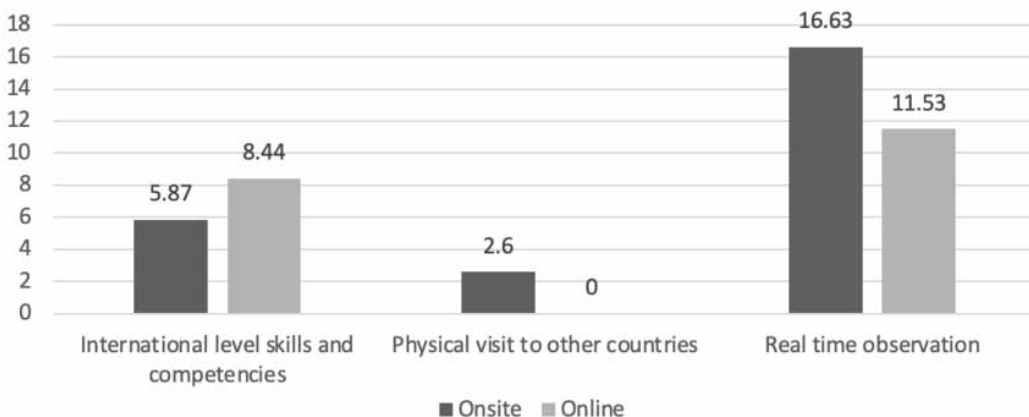
5.5 RQ4: How Can Online and Onsite Internships Serve as a Context for Providing Students With A Global Experience?

Figure 11 shows the differences between the onsite and online internship programs in terms of the international construct. The findings in the figure indicate that onsite internships provide more opportunities for “real-time observation” than online internships, with a considerable increase of 5.1% from 11.53% to 16.63%. Onsite internships, however, showed a significant decrease of 2.57%, from 5.87% to 8.44%, in terms of “international level skills and competencies.” The percentage of “physical visits to other countries” increased by 2.6%, from 0% to 2.6%. Notably, while onsite internships provided more opportunities for real-time observation, the online format provided access to more global resources and experts, expanding the interns’ international knowledge and abilities.

The following strategies can enhance the international features of onsite and online internships.

- **Associate with global organizations.** Expose students to various cultures, languages, and traditions through partnerships with international organizations and businesses (Tan & Umemoto, 2021).
- **Provide remote international internships.** Offer interns opportunities to engage in collaborative projects with international teams or work in foreign offices. This allows for exposure to international business methods and cross-cultural exposure without having to travel (Gill, 2020).
- **Encourage overseas travel.** Enhance opportunities to travel abroad for assignments, meetings, or conferences in which interns can network and learn about cultures and business methods (Wong et al., 2021).

Figure 11. Comparison of the coverage of onsite and online internships (overall) in terms of the international construct



- **Provide cultural knowledge.** Supply interns with cultural training to familiarize them with the traditions and customs of the country in which they will be working or visiting (Griffin & Coelho, 2019).

5.6 Overall Discussion and Implications

This research aimed to examine the approaches, practices, and challenges of online and onsite internship programs at the College of Technological Innovation, Zayed University in the United Arab Emirates based on the 4I's framework. The data revealed that onsite internships excel in providing hands-on resources, fostering real-time observation, promoting teamwork and multi-way communication, and enhancing the cultivation of interdisciplinary skills. These findings align with research findings by Gashaw (2019), which stated that internships provide numerous advantages in applying classroom theories to real-world work environments, bridging the gap between theoretical knowledge and practical application. Conversely, the research indicated that online internships offer amazing flexibility and technology-driven accessibility, fostering the development of skills and competencies at an international level. This finding contradicts previous findings (Ugalingan et al., 2021), which outlined challenges in navigating the online setting, crafting online content and pedagogical skills to suit the online platform, building confidence in the absence of instant responses, and maintaining continuous interaction between students and supervisors.

The findings from this study reveal a wide range of implications for the improvement of internship programs. First, internship programs need to carefully combine online and onsite experiences to capitalize on the distinct advantages offered by each approach. By skillfully combining the adaptability of online platforms with the immersive learning opportunities fostered by in-person interactions, programs can respond to a variety of learning preferences and provide a thorough skill development journey. Second, adding more technical tools to online internships has the potential to enhance their international scope. Online programs are capable of bridging geographical boundaries by incorporating virtual alliances, international initiatives, and partnerships with experts from other regions. Last, the study emphasizes the value of resource management within onsite internships. Focusing on providing robust resources, supportive environments, and real-world experiences can enhance the value of in-person participation within these programs.

6. CONCLUSION

The research focused on evaluating the challenges and benefits of onsite and online internships in relation to goal achievement, intern-industry interaction, interdisciplinary aspects, and globalization. It used the theoretical framework of the four-I's, encompassing intentional, interconnected, interdisciplinary, and international constructs. Through empirical assessment comparing reports from 21 students in an onsite eight-week program with 21 students in the online version, the study emphasized the intricate relationship between the advantages and disadvantages of each technique. This comparison offered insights into how internships could be intentionally structured to harness the benefits of both online and onsite environments.

Accordingly, our study demonstrates the strengths of online internships, highlighting their flexibility and technology-driven accessibility, which foster the development of skills and competencies at an international level. However, they scored low in intentional, interactive, and interdisciplinary aspects compared to onsite programs. Onsite internships excel in providing hands-on resources, enabling real-time observation, promoting teamwork, and multi-way communication. They excel in cultivating interdisciplinary skills, efficient resource management, and in-person collaborative interactions. Participants in onsite internships established strong connections, engaged in teamwork and collaboration, and achieved their objectives in interdisciplinary learning. However, the international aspect of these internships was underutilized.

This study has unveiled significant findings while acknowledging several limitations, suggesting avenues for further investigation. Expanding the sample size beyond 42 interns could enhance the generalizability of the findings. Additionally, exploring internships that expand beyond 3, 6, or 12 months may offer insights beyond the eight-week evaluation conducted for both onsite and online programs. Replicating this study within extended programs could yield insightful revelations. Exploring this study from a cross-cultural perspective holds promise as an avenue for investigation. Integrating data triangulation from stakeholders and site managers has the potential to fortify the conclusions drawn from this study. Despite offering insightful information, these limitations call for additional research, shedding light on broader strategic initiatives. Future studies can examine how ICT, particularly through augmented and virtual reality technologies, can expand the intentional, interactive, and interdisciplinary experiences of online interns by replicating real-world work settings and model cross-cultural interactions. Investigating the potential of social media platforms and digital tools to promote interaction and cooperation among interns, mentors, and host companies is another avenue for research.

CONFLICT OF INTEREST

The authors of this publication declare there are no competing interests.

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