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A Correlation Based Modeling of Industry on Campus Implementation on Ethics, Professionalism, and Digital Competency

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Abstract−In this research, the use of the industry on campus (IoC) approach at Baling Community College and its impact on the students' ethicality, professionalism, and digital capability is considered. Early findings revealed that the students possessed relatively average levels of ethicality, professionalism, and skillful usage of technological aids, making it necessary to introduce an intervention measure. For this reason, the comprehensive module of IoC approach, which involves ethical considerations, professionalism, and digital skills, was devised through the means of reflective learning, mentoring, and case studies carried out in the real industrial environment. The findings have shown substantial improvement regarding all three areas with digital competence displaying the most considerable growth. Based on the results, the combination of experiential learning in the form of participation in case studies under the guidance of industrial mentors, together with active use of the digital tools, increases students' abilities to apply ethical and professional aspects of performance. Nonetheless, the problems were recognized, such as the lack of time, inconsistencies in mentoring, and difficulties in evaluation.

Keywords: Industry-on-Campus; Ethics; Professionalism; Digital Competency; Vocational Education

1. INTRODUCTION

It can be argued that the Industry-on-Campus (IOC) model developed at Baling Community College is a practical embodiment of the transfer of learning from a theoretical environment to the real one. In other words, the model begins with introducing students to an actual job, rather than a simulated exercise, where students are expected to develop their technical competencies while simultaneously building their professional identity. Such an approach corresponds to the increasing need to produce graduates with not only a high level of technical skills but also strong ethical competencies and digital skills due to technological developments in modern industries (Fino et al., 2021; Zulfadli, 2025; van Laar et al., 2020). The increasing involvement of digital technologies in every aspect of work and production processes makes digital skills equally important as professional and ethical competencies. As industry mentors get involved in the learning process, their input through the sharing of knowledge and expertise is crucial to students' success. Indeed, this stage of learning becomes vital since students understand that professionalism entails more than mere completing of the tasks in a timely manner. However, if learners do not receive adequate guidance, it may be hard for them to avoid unethical behaviors, including improper use of digital resources (Quyet et al., 2021; Gichuru, 2023).

The main point of IOC model is to facilitate cooperation among the students, lecturers, and mentors from the industry working in the classroom environment and the industry itself. Through this cooperation, learners are able to build such skills as collaboration, responsibility, decision making, and teamwork as part of the process of producing in a real environment, specifically the field of apparel manufacturing. At the same time, students use digital tools to design products, communicate with one another and their customers, and organize production. This means that they simultaneously improve their technical skills along with building their ethical competencies and professionalism, while interacting with clients, facing deadlines, and meeting specific product quality standards. As it was stated by Atwa et al. (2024), both ethical competencies and professional skills require exposure to industry environments in order to develop adequately. Meanwhile, working with digital technologies in this context enhances students' capabilities of dealing with data, communicating, and decision making, which constitutes the basis of 21st-century skills (van Laar et al., 2020). In other words, the essence of this model consists in the integration of ethics, professionalism, and digital skills into the routine activities of students. Consequently, students become punctual, honest, communicative, and responsible users of digital technologies as part of the learning experience rather than in theoretical discussions. Thus, the effectiveness of this model can be explained by the fact that experiential learning is the best way to develop ethical awareness and professionalism (Mazurek, 2020).

The four major components of IOC model include management and financing, implementation mode, cooperation, and infrastructure, which allows maintaining and enhancing the sustainability of this model and keeping up with the industry needs. Management and financing contribute to cultivating a sense of responsibility and accountability as part of the production process. Meanwhile, the implementation mode facilitates the process of gaining knowledge and skills from industry. Furthermore, cooperation promotes cooperation between institutions and the industry. Finally, infrastructure, especially in terms of the availability of modern digital devices, enables learners to engage in current activities and technologies used in the industry. This is crucial for the development of digital skills of students, which is becoming increasingly important in technical and vocational education programs (Falloon, 2020; van Laar et al., 2020). Indeed, as it was emphasized by Balakrishnan et al. (2022) and Azcárraga and Derive (2023), institutional and implementation support is needed for sustaining ethical and professional development. To summarize, the Industry-on-

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Campus model is an excellent example of a transformation of theoretical education into a lived experience that prepares graduates well for the professional world. This model guarantees the technical competence, ethical orientation, and digital skills of graduates, corresponding to the requirements of modern industries. Thus, it can be concluded that the purpose of the present study, namely the modeling of IOC implementation, was successfully achieved.

Indeed, it is evident that despite the increasing popularity of Industry-on-Campus (IOC) models, previous studies have paid little attention to measuring the interrelationships between ethical competence, professionalism, and digital skills. Specifically, some researchers, like Fino et al. (2021), emphasized the importance of ethics education within curricula, while others, such as Atwa et al. (2024), stressed the importance of experiential learning in professional contexts. Meanwhile, no study considered these concepts simultaneously in a quantitative framework. Similarly, studies like van Laar et al. (2020) focused on digital skills in isolation and did not discuss their relationship to professionalism and ethics. Thus, a gap in research exists regarding the relationships between ethical and professional competencies, and digital skills in vocational and technical education within a real-world industry-based environment. This research contributes by suggesting a correlation-based IOC model considering ethical competence, professionalism, and digital skills as interrelated constructs.

2. RESEARCH METHODOLOGY

2.1 Latest Literature Review or Grand Theory

The research methodology consisted of a structured four-stage approach based on the IOC implementation framework. Specifically, in Stage 1, there was conducted a baseline assessment of students' ethics, professionalism, and digital competency levels using reliable surveys [6], [17]. The next stage involved the execution of a structured intervention module, which included experiential learning, mentorship, and digital technologies. Stage 3 was marked by continuous monitoring and observation through digital portfolios and mentor evaluations for capturing any behavioral changes in real-time. Finally, statistical analysis (Spearman correlation test and paired sample t-test) was used at Stage 4 to explore relationships between variables and the effect of IOC intervention on them. The use of such methodology allows empirical validation and practical implementation of the proposed model within vocational education settings.

Recent publications highlighted the need for incorporating ethics, professionalism, and digital competency in vocational technical education through IOC programing initiatives. First, empirical data shows that exposure to experiential learning environments fosters enhanced ethical awareness, teamwork, and problem-solving skills among students [1]. Second, the incorporation of realistic situations into curriculum design has proved beneficial in promoting better ethical decisions and professionalism among learners [8]. However, apart from those two aspects, contemporary literature has indicated the importance of developing students' digital competencies, since they require being able to make decisions and perform actions within the scope of digital communication [7], [21].

In other words, learning has shifted its focus from merely gaining knowledge to learning through applied practice with new technologies. Apart from that, ethics committees and governance structures can contribute to improved ethical awareness of students [2]. Constant interaction with mentors can be considered a crucial element of long-term development of students' ethical behavior and professional skills along with responsible use of digital technologies [19]. Thus, while interacting with mentors, learners gain technical, professional competencies, and learn how to responsibly use various digital devices within the learning process.

Experiential Learning Theory (ELT) provides a strong theoretical foundation for explaining how ethics, professionalism, and digital competence are developed through a cycle of experiencing, reflecting, conceptualizing, and experimenting [20]. In addition, exposure to actual ethical problems can positively affect the development of moral reasoning, especially when combined with reflective approaches and digital devices such as e-portfolios [16]. In addition, faculty engagement plays an important role in shaping students' attitudes towards professionalism [11]. Finally, students' perception of ethics education is closely linked to the level of digital competency [21].

2.2 Location and Sampling

This study was carried out in Baling Community College, located in Kedah, Malaysia. It is an educational institution located in semi-rural areas that exhibits a high level of cooperation with various industries related to agriculture, manufacturing, logistics, and information technology. The college makes extensive use of the Industry Exposure and Competency (IOC) program that allows students to participate in practical activities within industry. Even though they receive practical experience within industry, currently, there is no systematic approach to evaluating students' growth in terms of their ethics, professionalism, and digital competencies. These issues raise concerns regarding the alignment of institutional values with changing industry requirements, especially those associated with information technology when digital technologies serve as the main means of communication, decision-making, and other workplace activities [9], [21].

Moreover, industry reports point to problems with ethical behavior, professionalism, and proper utilization of digital tools among students [19]. Thus, considering the increasing importance of digital technologies within companies, the absence of structured digital competency evaluation becomes evident. There is a need for an integrated approach to the issue under consideration [7]. The study included 29 participants enrolled in the Fashion and Apparel Certificate program. Students were selected randomly from the IOC pilot group. A quantitative research methodology was used along with a structured questionnaire based on the principles of Experiential Learning Theory to evaluate ethics,

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professionalism, and digital competencies. The reliability of the research tool was tested in a pilot study, involving 10 respondents. Internal consistency was assessed using the Cronbach's alpha coefficient, yielding results above 0.7 [17], [6]. Baling Community College provides adequate institutional and industrial support for the research [3].

2.3 Stages of IOC Model Implementation

The overall structure of the Industry-on-Campus implementation model is illustrated in Figure 1, which presents the integration of ethics, professionalism, and digital competency within a structured learning framework.

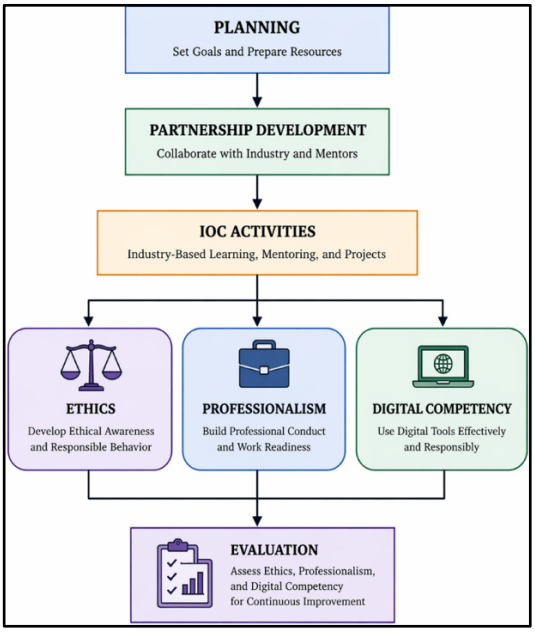

Figure 1. Industry on Campus Implementation on Ethics, Professionalism and Digital Competency

Figure 1 illustrates the sequential process of implementing the IOC starting from the planning and input phases and moving onto collaborative learning involving students and industry mentors. According to the model, it is through experiential learning that ethics, professionalism, and digital competency are developed simultaneously. IOC involves a series of well-defined processes including four stages. Stage one covers collaborative planning, where faculty members, students, and industry mentors collaboratively set goals regarding ethics, professionalism, and digital competency. It has been established that stakeholder involvement in early planning makes it possible to integrate and monitor programs effectively [18]. Students' levels of ethics, professionalism, and digital competency were assessed using baseline assessments conducted via standardized tools [21]. Also, training was provided to faculty members and industry mentors on ethical behaviors and digital competency [11], [21].

Stage two revolves around designing and integrating a module for ethics, professionalism, and digital competency into the IOC process. Collaborative planning was also carried out with industry experts to make sure that the module would reflect workplace realities. Students were engaged in different types of activities such as case studies, role-playing, and reflection to help them grapple with ethical problems and professional situations. Meanwhile, digital tools were used to enhance critical thinking and responsible use of technology [13], [16], [7]. Monitoring made sure that the program was implemented according to intended learning outcomes [20].

Stage three focuses on the creation of a digital tracking system for monitoring students' progress. The students documented their experiences in relation to ethical problems and digital tools. This process promoted reflection and self-regulation among students, and mentors gave constant feedback to the students to promote collaborative learning. The adoption of a digital tracking system coincides with current digital competency frameworks, particularly communication, critical thinking, and responsible technology usage skills [21].

Stage four highlights evaluation and sustainability processes. Quantitative and qualitative measures were used to evaluate the impact of the intervention in terms of improvement in ethics, professionalism, and digital competency among learners [20]. Recommendations were also made for the improvement of the model for institutionalization purposes. Structures such as the Ethics and Digital Competency Advisory Panel were recommended for the purposes of monitoring and aligning with industry standards [9], [2], [7].

3. RESULTS AND DISCUSSION

Figure 2 presents the implementation model of Industry on Campus (IOC) at Baling Community College, outlining the key processes and interactions that support the development of ethics, professionalism, and digital competency.

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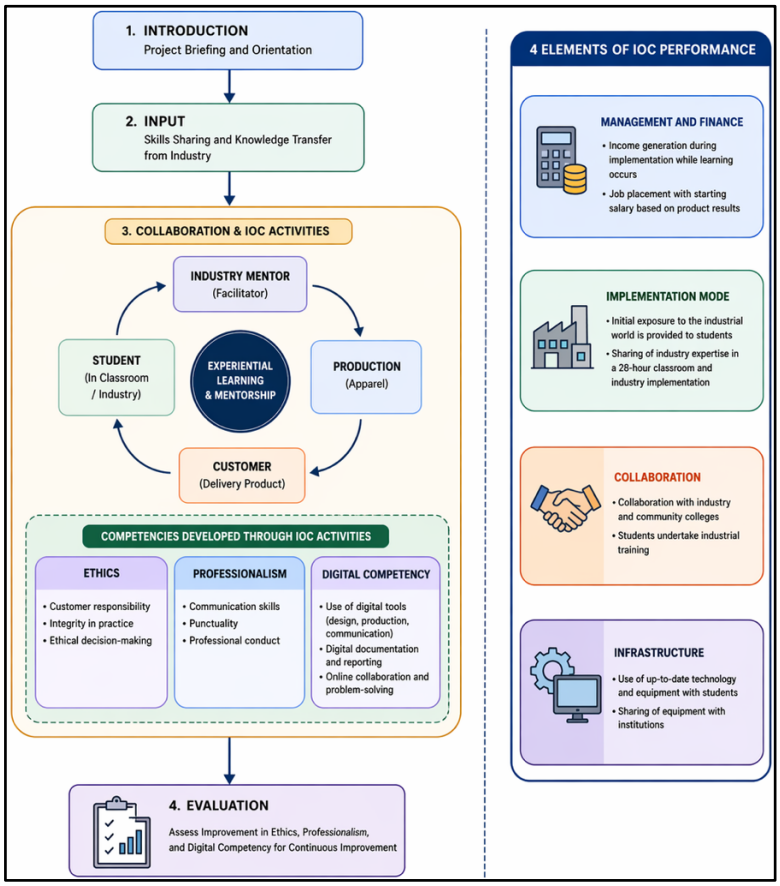

Figure 2. The Implementation Model of Industry on Campus, Baling Community College on Ethics, Professionalism and Digital Competency

3.1 Initial Analysis of Industry-on-Campus Implementation at Baling Community College

In accordance with the IOC approach used at Baling Community College, one can see that there is a natural transition from theoretical knowledge to its practical implementation through developing skills that are going to be applied in real work practice. Authentic industry-related projects can contribute to increasing students' technical skills while also improving their ability to think ethically and professionally and develop digital literacy due to the fact that digital tools are extensively used in this framework. According to various empirical findings, the implementation of real work-related tasks helps increase students' responsibility and professional awareness [15], [21]. Mentoring plays an important role in helping students progress from the "Input" stage. Besides gaining certain technical and communication skills in terms of their specific fields, students learn how to use digital technologies and tools properly. It has been proven that mentoring-based education is helpful in promoting students' ethical behavior and developing professionalism along with digital literacy, which is extremely important for their future careers [10], [7].

As cooperation with peers, professors, and industry specialists is a fundamental part of the IOC model, students have opportunities to engage in authentic productive activities. Collaborative work on assignments and projects allows students to master teamwork, decision making, and professional responsibility and be able to employ digital tools in order to improve communication and information management. Indeed, it has been proved that collaboration in industry environment helps promote moral awareness, professional development, and digital literacy of students [14], [21]. It should be noted that one of the advantages of the suggested framework is that ethics, professionalism, and digital literacy are included in students' everyday practices as opposed to being treated separately as purely academic disciplines. For this reason, students receive sufficient opportunities to cultivate punctuality, honesty, communication skills, digital literacy, and other competencies through participating in practical activities involving customer relations and product/services delivery [4], [16].

Last but not least, the component called "Production and Delivery" forces students to produce excellent results in response to clients' expectations. During the process of creating products or services for their clients, students need to apply their technical skills as well as demonstrate ethical behavior and digital literacy. Thus, all this makes for the appropriate framework for assessing students' progress in acquiring relevant competencies [12], [7].

3.2 Analysis of Participants' Baseline (Before Activity)

Table 1 presents the baseline correlation analysis between ethics, professionalism, and digital competency before the implementation of the IOC model.

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Table 1. Baseline Correlation Between Ethics, Professionalism, and Digital Competency

Variables	Ethics	Professionalism	Digital Competency
Ethics	1.000	.839**	.812**
Professionalism	.839**	1.000	.798**
Digital Competency	.812**	.798**	1.000
Sig. (2-tailed)	—	.000	.000
N	29	29	29

Note: p < 0.01

The association among the three variables – ethics, professionalism, and digital competence - is significantly high before the implementation of the IOC intervention. The two variables, ethics and professionalism, have a strong correlation coefficient of r = 0.839 (p < 0.01). This means that there is a high relationship between the two variables before the implementation of the IOC intervention. The relationship between ethics and digital competence is also strongly correlated (r = 0.812, p < 0.01). Individuals who have an understanding of ethics are bound to show higher levels of digital competence. Professionalism and digital competence are strongly correlated (r = 0.798; p < 0.01). Therefore, digital competence is strongly related to both professionalism and ethics in any learning environment [21], [7].

3.3 Impact and Participant Satisfaction Analysis

Table 2 illustrates the correlation between ethics, professionalism, digital competency, and participant satisfaction after the IOC implementation.

Table 2. Correlation Between Ethics, Professionalism, Digital Competency, and Satisfaction

Variables	Ethics	Professionalism	Digital Competency	Satisfaction
Ethics	1.000	.839**	.812**	.884**
Professionalism	.839**	1.000	.798**	.859**
Digital Competency	.812**	.798**	1.000	.872**
Satisfaction	.884**	.859**	.872**	1.000
Sig. (2-tailed)	—	.000	.000	.000
N	29	29	29	29

Note: p < 0.01

According to the correlation analysis, there are strong and statistically significant relationships between ethics, professionalism, digital competence, and satisfaction of the participants with the learning experience. Ethics has a very strong positive correlation with the participants' level of satisfaction (r = 0.884, p < 0.01). This means that participants who have a high level of awareness concerning ethics are more satisfied with the IOC training program. Similarly, there is a strong correlation between professionalism and the satisfaction of the participants (r = 0.859, p < 0.01). This means that the cultivation of professional behavior and attitude towards work has a huge impact on how students perceive their experience. Of interest is also a very strong positive relationship between digital competency and satisfaction (r = 0.872, p < 0.01).

This suggests that digital competency is an important aspect of learning in current times when students need to be prepared for their future career paths in a way that allows them to apply their skills effectively. It is also worth noting that there are strong correlations between digital competence and other aspects of learning, including ethics (r = 0.812) and professionalism (r = 0.798). As a result, the hypothesis regarding the importance of digital skills for modern vocational education proves to be valid. According to the findings, digital competency plays a key role in contemporary vocational education due to its effects on students' technical skills, ethical behavior, and professional attitudes [21], [7].

3.4 Comparative Analysis (Before vs After IoC Implementation)

Table 3 and Table 4 present the comparative analysis of students' competency levels before and after the IOC intervention, including statistical significance testing using paired sample t-tests.

Table 3. Comparison of Mean Scores Before and After IoC Implementation

Variables	Before IoC (Mean)	After IoC (Mean)	Mean Difference	Interpretation
Ethics	3.45	4.28	+0.83	Significant Improvement
Professionalism	3.52	4.31	+0.79	Significant Improvement
Digital Competency	3.38	4.35	+0.97	Highest Improvement

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Table 4: **Paired Sample t-Test Results**

Variables	t-value	Sig. (p-value)	Result
Ethics	-8.45	.000	Significant
Professionalism	-7.92	.000	Significant
Digital Competency	-9.11	.000	Significant

Note: $p < 0.01$

It should be mentioned that in terms of comparing pre and post implementation effects, statistically significant improvement in students' competencies in relation to the chosen variables is noted. Before implementing the IOC model, students' competencies in ethics, professionalism, and digital competence were quite developed already. After implementing the IOC model, there was noted a statistically significant improvement in all three mentioned variables, including 0.97 improvement in digital competence, 0.83 improvement in ethics, and 0.79 improvement in professionalism. Thus, it can be concluded that changes in students' competencies are statistically significant ($p < 0.01$) and that the proposed IOC model has a substantive effect on the development of students' competencies. An especially noteworthy achievement in developing the level of digital competence suggests the importance of applying the technologies used as an integral part of an authentic industry-based learning environment.

It is consistent with findings of other scholars that point out that digital competence is one of the key elements of 21st-century skills [21] as well as professional competencies [7]. Moreover, the achieved improvements in variables linked with ethics and professionalism can imply that through experiential learning offered in the IOC framework, students develop values. In particular, during their work, students tend to follow ethical principles as recommended by mentors due to digital competence that contributes to the process. Considering the fact that the most notable increase was achieved in digital competency, it can be suggested that learning environments enhanced with technology positively influence students' engagement, efficiency, and self-confidence while performing tasks. Actions associated with communication, action tracking, and organizational processes performed through the help of technological tools positively affect professionalism along with the further development of ethics. Thus, it may be concluded that the implemented IOC model helps to improve digital competence, ethics, and professionalism in the context of professional competencies.

3.5 Discussion

Consequently, based on the obtained results, there is sufficient evidence regarding the positive role of digital competency in increasing students' awareness of ethics and professionalism in terms of the IOC. To be more specific, contrary to the assumption about the existence of distinct constructs within the given model, it becomes evident that digital competency, ethics, and professionalism are related phenomena. Thus, people that exhibit high digital competency levels tend to behave more professionally and ethically compared to others. The hypothesis advanced by the researchers states that "digital competency is an essential attribute of professionals in contemporary industrial organizations" [21]. Previous studies have demonstrated that digital competency is an intermediary mechanism in experiential learning and mentoring that improves the efficacy of these processes. The integration of digital platforms in the model contributes to enhanced student participation in the learning process, allowing for better documentation of achievements and experiences during mentoring [1]. Therefore, the obtained results only confirm this hypothesis. Another important finding derived from the current analysis reveals that the implementation of digital competency concepts helps students understand these constructs more clearly in real practice. Hence, the study outcomes are also consistent with digital competency frameworks proposed before [21]. Additionally, it is possible to conclude that IOC contributes to increased student satisfaction, as such environments appear to be more relevant for developing required competencies.

One of the most interesting conclusions drawn based on the current analysis concerns the enhancement of the digital competency indicator under IOC. As compared to the indicators related to ethics and professionalism, the mean difference in the indicator in question was the highest one, revealing the fact that industry interaction and incorporation of digital tools allow improving students' digital competency. Such an increase fosters students' awareness of the importance of adequate and responsible usage of technology both in learning and professional activities [7]. It should be noted that mentorship positively influences all three indicators under consideration. Namely, the observed correlation between mentorship and digital competency suggests the idea that mentor guidance is critical in developing digital competency and professionalism, as well as the idea that mentors are responsible for helping mentees learn how to use digital tools properly. This idea has been proven by previous researchers [19].

As mentioned above, the significant correlation was identified between the digital competency indicator and participants' satisfaction. Thus, it can be concluded that the introduction of technology to the learning process contributes to making this process more exciting for students. Consistent with previous findings, the implementation of digital technology helps develop digital competencies [21] and increases learners' involvement in learning process. This paper brings new information regarding the nature of students' ethical behavior under digital technologies in learning environments. Under the influence of new technologies, ethics faces new challenges, including the problem of ethical usage of digital tools. Consequently, the implementation of digital technologies in IOC allows students to deal with these challenges effectively and makes the process of developing ethical and digital competencies smoother.

It can be hypothesized based on the obtained findings that digital technologies in the learning process result in the formation of a holistic concept in which the development of students' digital competency goes hand in hand with ethics and professionalism development. Such an idea should be considered valid provided that participants engage in the IOC program regularly and can rely on proper mentorship. In summary, it is necessary to state that the introduction of digital competency as the primary learning factor contributes to professional, ethical, and related competencies development of participants in the course of their learning process.

4. CONCLUSION

This study shows that the IOCs model provides significant contributions towards improving students' ethics, professionalism, and digital skills through hands-on learning and interaction with industry players. While the baseline test scores were moderate, the post-test results showed significant improvement in students' competence, especially regarding digital skills. The significant correlations between the variables indicate the interdependence between these competencies rather than their being independent constructs. The mentoring relationship and digital engagement were found to be major motivators towards ensuring professional ethics and professionalism among the participants. The current study has added value to existing knowledge regarding the development of an IOCs model based on the concept of correlations, where digital skills are viewed along with other competencies including ethics and professionalism. Although faced with some constraints such as a small number of participants and limited time for implementing the intervention program, this model can help vocational training institutions provide industry-ready employees in Industry 4.0.

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