The Role of Project-Based Internships in Shaping Engineers' Careers

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***Abstract*-Project-based internships are becoming crucial for enhancing Engineering education as they make students apply the classroom learning to real-world problems and recommend solutions, which helps develop their skills and makes them better prepared for the profession they are seeking to pursue. This study intended to study factors influencing the effectiveness of project-based internship in developing students professionally and enhancing their career preparedness. Industry type and workplace culture moderates the relationship, which helped develop a conceptual framework for the study. Data were collected using a survey from 279 Engineering graduates pursuing Engineering program. The findings of the paper highlight the crucial impact of structured internships on improving students' readiness for professional environments, supported by a varied sample of engineering students. The most advanced techniques of PLS-SEM were used to assess such constructs as Professional Development (PD), Project-Based Learning (PBI), Work Related Competencies (WPC), and these constructs revealed high reliability and validity. Specifically, project-based internships were found to positively influence the professional development of students. This relationship was significantly mediated by students' prior knowledge and the quality of feedback and mentorship they received. Additionally, both industry type and workplace culture played moderating roles, shaping the strength and direction of key relationships in the model. These findings highlight the contextual and experiential nuances that influence internship effectiveness. The research is one of the few on studying such in-depth relationships in Indian context.**

***Keywords*—Project-based internships, Professional development, Industry types, Engineering education, Campus to Corporate, Higher Education**

I. INTRODUCTION

In the educational landscape, acquiring critical and logical thinking skills and problem-solving abilities stands as an imperative for students pursuing professional courses (Green, 2020) which help bridge the gap between the transition of a student to an industry professional. When students enter into the professional environment, they need to adapt and implement their learnings in this new world of work, which they often find challenging(Ilban & Kaşlı, 2013). Integration internships into academic curriculum can lead to students being better skilled to implement the theoretical knowledge at their workplace(Tynjälä, 2008). The academic internships act as a bridge between the theory and practice (Gault et al,2010), and helps in improving various skills like logical thinking and decision making which in a way empowers students to dissect, analyze and resolve complex issues (Turan et al., 2019). The development of such skills enhances the professional growth and experience of students. Hence, internship programs are a tool for making students experience practical work(Pianda et al., 2024). As In today's competitive Engineering landscape, company's need graduates who have the required practical knowledge and skills and are deployable form day one (Pang et al., 2019), internships act as a way to develop such graduates. Internship programs enable students to get trained and help companies save their training and supervision cost (Hurst & Good, 2010). Internships also help the students in gaining practical experience, enhancing their resumes(Anjum, 2020) and building professional relationships (Karakiraz et al., 2021). The internships in professional courses are project-based, wherein students work on a project during their internship. The students become familiar with the corporate culture, structure, behaviour and practices, which helps in developing their skills and make them more employable (Johari et al., 2002). Internships are designed in a way to offer the knowledge in actual workplace setting providing the deep real-world experiences (Johari & Bradshaw, 2008). However, Khalil (2015) in his study found that the interns completing a Engineering internship program reported lower satisfaction in four impact areas of internship viz. "adaptability to the workplace, teamwork, professionalism and computer & communication skills". (Koc et al., 2014) mentions that 18.3% of the interns did not intend to work in the industry sector of their internship in their study on tourism. Moreover, the study reports lack of efficiency in planning, implementing and controlling internship activities implying the need to ensure that the internship programs reflect students' expectations(Cannon & Arnold, 1998) Despite the value , internship programs offers to the students, employing organizations and institutions, they come with problems (Chen et al., 2011) hindering their effectiveness (Alpert et al., 2009) resulting in non-achievement of the desired outcomes

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(Hartt & Rossett, 2000) .To get the desired outcomes from internships, it is required to focus attention on learner-centered, and project-based learning as a framework for the success of internships in developing the interns professionally. Simply put, if internships are not carefully thought out , planned and assessed consistently, the experiences will be very disappointing(Collins, 2002) leading to poor or no professional development (Jenkins, 2001)and turns the students away from industry (Fox,2001).

Internship programmes are integral part of any professional curriculum. The background of internship programmes for the professional development of can be traced back to the early 1990s (Weible, 2009). A study by Gault et al.(2010) mentions internships as temporary work arrangements providing on-the-job experience focusing on education rather than employment. However, recently internships have been recognized as an opportunity for the students to gain employment (de Grunwald, 2012).Professional programmes like MBA aim to promote employability of young learners. The curriculum is designed in such a way that students are imparted with theoretical knowledge of Engineering and economics.They are also provided exposure to multi discipline courses to have a broad range. Internship programs in these programs provides opportunity to practice theoretical concepts and get first time exposure to the professional field of work. These are project-based learning experiences that enable students with opportunities to be engaged with corporations and with due diligence make a decision that is research based. Internship is critical in learning practical ways of functioning in corporate, interacting with people, know the work culture, follow systematic way to approach problem solving and gears them to be employable .Projects have become an integral part of internships in higher educational institutes, specifically professional education graduates are expected to work on an industry problem to provide a technical solution and document the same in terms of a project, offering experiential learning opportunities which help bridge the gap between theory and practice. Project-based internship (PBI) programs integrate academic learning with real-world applications, allowing students to develop critical skills and competencies. PBI stems from learner-centred, open-ended environments and PBL approaches which involve problem solving at its core. Learner-centred education is defined as “The process of reshaping or reorganizing experiences in a way that deepens their meaning and enhances one’s capacity to guide future experiences.”(“Democracy and Education 1916, by John Dewey,” 2008). PBI form a structured component of the curriculum to provide a temporary hands-on corporate experience to the students in a related field of study. They provide an opportunity to the students to apply the classroom knowledge in a real-world setting, Research shows that PBIs are pivotal in enhancing both technical and soft skills, improving communication and teamworking abilities of students significantly and also help in their network development (Gault, Leach and Duey, 2010). Students who work on projects during their internships are more likely to receive pre-placement offers or employment opportunities (Bell, 2010; Callanan & Benzing, 2004; Karakiraz et al., 2021) as project-based learning allows students to take ownership of their learning leading to increased engagement in internships (Blumenfeld et al., 1991) and develops them professionally. Professional development (PD) is considered as developing competencies and acquiring certain skills(Dyson & Brice, 2016; Spendelow & Butler, 2015) , constructing a professional identity (Körkkö et al., 2016) and developing a person to meet the demands to take on various professional roles and maintain professional status(Fisher et al., 2010). According to (Frederiksen, 2016). PD programs are designed to equip people with the required tools and information they need to work effectively in a dynamic workplace. However, project based learnings has its own lacunae like requirement of significant time and effort(Belland et al., 2006) , complexity in performance assessment of students(Barron & Darling-Hammond, 2008) and a sudden increase of autonomy which students are not used to handle(Larmer et al., 2015)). Despite completing PBIs, only 46.59% of students possessing an MBA degree in India are employable or are good to hire (INDIA SKILLS REPORT, 2021). On a global scale, only 48% of employers in the United Kingdom consider graduates to possess the requisite skills, whereas this proportion increases to 63% among those who have undertaken a PBI (ISE, 2018). This underscores the potential value of enhancing internship programs. Nevertheless, an important question arises: if students are completing PBIs, why do employers continue to regard them as insufficiently employable?Does PBI help develop students professionally? Which factors influence professional development plays a crucial role in equipping students in professional courses with the skills and competencies necessary for career success. Several researchers have highlighted the importance of integrating professional development into academic curricula as measure to give practical exposure and enhance employability by providing them opportunities to navigate in complex work environments (Jackson, 2016). Such practical oriented curriculum will ensure not only technical skill acquisition but also the development of soft skills such as communication, teamwork, and leadership.

II. Literature Review and Hypothesis Development

A. PD (Professional Development)

The Thesaurus explains, professional development as “activities to enhance professional career growth.” Such activities contribute to improving employability and the capacity to navigate complex workplace environments (Jackson, 2016). Professional development encompasses not only the acquisition of technical competencies but also the cultivation of soft skills, including communication, teamwork, and leadership. In fact, students require and should be equipped with not only domain-specific knowledge but also transferable skills. This can be planned by placing students in working environments through internships, industry projects, and career-orientated workshops in order to link theory to practice (Tymon, 2013).Moreover, employability skills, such as problem-solving and adaptability, are increasingly sought by

employers. According to a study by Andrews and Higson (2008), graduates often lack these crucial skills, leading to a mismatch between employer expectations and student preparedness, as they often struggle with applying theoretical knowledge in practical real-world problems, a gap that can hinder their professional growth (Tomlinson, 2008). Jackson (2016) suggests integrating career planning modules within professional courses, which could help students develop personalized career trajectories. Additionally, partnerships with industries can offer students exposure to real-world challenges, thereby enhancing their problem-solving and critical-thinking skills (Holmes, 2013).

B. PBI (Project Base Internship)

Numerous researchers agree that internships act as a platform for students where they can apply their theoretical knowledge to the real-world situations(Sahrir et al., 2016). The Experiential Learning Theory (ELT) (Kolb & Kolb, 2012) help explain the value of internships, as it places experience at the centre of the learning process and defines learning as "the major process of human adaptation involving the whole person". To improve learning, the students should be engaged in a process that includes regular feedback on their learning effectiveness. The Kolb's learning cycle from experience, share, process, generalize and then to apply clearly indicates the expectations from internships, wherein a student is expected to do internship (experience), share observations /reactions with the mentor(share) , analyse the experience (process) , connect the same with real world examples further in the internship (Generalize) and then (Apply) the learnings at their workplace. The process involves "two dialectically related modes of grasping and transforming experience- Concrete experience/ Abstract conceptualization and reflective observation/Active experimentation", which help develop many skills like problem-solving (Molseed et al.,2003), communication skills, creative skills and job-related technical skills(Knemeyer & Murphy, 2002) and increase their employment readiness. Sanahuja Vélez & Ribes-Giner (2015) in their study found three-fold benefits for the students, related to employment opportunities, skills, competence development and effects on career exploration. Students who participate in meaningful internship program, work on a project for problem solving and perform as per the organization's expectation is more likely to get a pre-placement offer (Zhao & Liden, 2010),earn more on an average (Gault et al., 2000)and improve future prospects (Gault et al., 2000, 2010) . This implies the existence of a multifaceted relationship between PBI and PD as they provide an opportunity to students to apply their classroom learning to real world scenarios, enabling students by not only developing their professional competencies (Rima et al., 2014; Eckersley et al. 2018) and professional identity (Hartescu, 2020; Wang, 2023) but also providing the chances of immediate career opportunities (Anjum, 2020) depending upon their performance.

H1 : Project-based internships have a positive impact on the professional development of the students.

C. SPK (Students' Prior Knowledge)

For securing the said internship as the first step, a student needs to perform well to get selected and then at the organization as well. At the selection stage, role of placement team in conducting pre-placement activities which includes supporting pre-placement talks, clarity on the placement procedures, evaluation criteria presume importance(Jain et al., 2023). Sukumawati (2023) in her study found that the project-based learnings interact with student's prior knowledge to enhance their ability to apply the in-class theoretical learnings to real world scenarios. The author also found that students with strong knowledge base are better equipped in leveraging their existing understanding in professional environments, as prior knowledge activates students' mental schemas which facilitate the comprehension and retention of new information (Belouiza et al. 2024).

H2: Students' prior knowledge mediates the relationship between project-based internships and professional development.

D. (FMQ) Feedback and Mentorship Quality

Several researchers have found that internships are a win-win for both students and employing organizations, as internships help students by enabling them acquire cutting edge industry skills and organizations by making them available with low-cost labour Also, providing feedback and right mentoring goes a long way in enhancing students' professional development during internships. Constructive feedback helps interns to understand their strengths and refine their skills to enhance performance (Kalsoom et al, 2019). Effective mentorship provide psycho-social and career development support to interns by providing timely feedback and guidance which impacts their professional development (McDonald & Wilson-Mah 2022 ; Lamanauskas et al. 2016).

H3 : Feedback and mentorship quality mediates the relationship between project-based internships and professional development.

E. Industry Type (IT)

The type of industry in which an internship is experienced by a student significantly moderates the professional development outcomes as the experiences, challenges and learning opportunities varies with the type of industry. Internships in big and stable organizations offer more exposure in terms of problem solving opportunities, and team work etc (Ali & Khushi, 2018 ; Walo, 2000). Industries in early stage of their life cycle often expose students with opportunities to engage in more innovative environments (Feldmann, 2015), wheareas mature industries tend to focus more on refining skills and competencies.(Walo,2000). The location of industry also play a major role , as internship experiences in urban areas provide more exposure to cutting -edge practices as compared to small

industries or industries in rural areas (Urinov & Adizova, 2021).

H4. Industry type moderates the relationship between project-based internships and feedback and mentorship quality.

H5. Industry type moderates the relationship between feedback and mentorship quality and professional development of students

F. WPC (Workplace culture)

Workplace culture also play a key role in internship learning and professional development by creating an environment in which students can apply the academic knowledge earned. Effective workplace culture includes strong mentorship which is crucial for enhancing internship learnings and directly impacts the development of professional skills (Metso & Kianto, 2014). Students with prior knowledge and experience are more equipped to understand workplace pedagogies, which helps them to maximize their learnings during internships (choy, 2010). Moreover, effective mentorship requires cultural sensitivity and strong communication skills, which are often nurtured in a supportive workplace culture. Training programs that emphasize these skills can lead to sustained improvements in workplace culture and professional development (Latham et al., 2011).

H6: Workplace culture moderates the relationship between students' prior knowledge and their professional development.

H7: Workplace culture moderates the relationship between project-based internships and students' prior knowledge.

H8. Workplace culture moderates the relationship between project-based internships and feedback and mentorship quality.

H9: Workplace culture moderates the relationship between feedback and mentorship quality and professional development of students

The proposed conceptual framework is depicted in the figure 1.

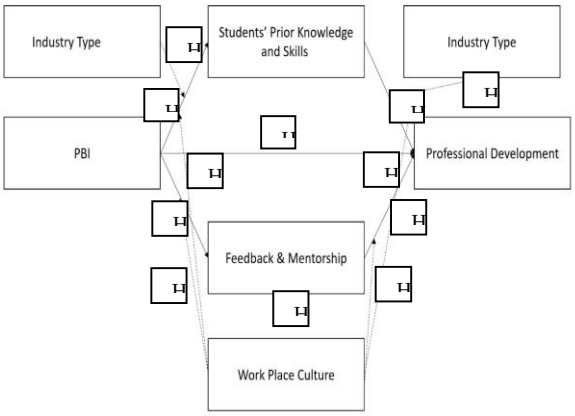

Fig. 1. Conceptual Framework
(The proposed model is prepared based on the above literature review)

III. RESEARCH METHODOLOGY

The study utilises quantitative methods to test the proposed hypothesis. This study has adopted a cross-sectional survey design for collecting data from students pursuing engineering education and are in their final year internships. The primary source of data collection was survey questionnaire covering the constructs related to PD, PBI, WPC, IT, SPE. The following six sections make up the structured questionnaire technique: I. Demographic information; II. Reasons for participating in the internship; The third through sixth sections consist of 35 closed-ended questions designed to evaluate data pertaining to professional and personal development and skill enhancement. A 5-point Likert scale was used to evaluate each questionnaire variable. A score of 1 indicates strong disagreement, 2 indicates disagree, 3 indicates neutral, 4 indicates agree, and 5 indicates strongly agree.

Sample

The target population for this study comprised engineering students who had completed internships through project-based learning. The sample was selected to ensure diversity and enhance the generalizability of the findings. Using a stratified sampling approach, 279 respondents were chosen. The demographic characteristics of the sample are presented in Table I.

The population included in this study was taken from India, whereby students pursuing a Engineering program were targeted. The rationale behind choosing this group over the entire population was that its members are more likely to be equipped with management, Engineering and entrepreneurial knowledge in comparison to students from other disciplines (Dao et al., 2021). An internet survey was used to distribute the questionnaires. The questionnaire reliability and validity were examined. In addition to that, basic information was also asked, age, gender, and Level of Education, and additional changes

were made. For measuring the PBI, PD, WPC, SPE, IT, constructs were identified from the existing literature. PD was measured using the constructs from the scale by Nghia et al. (2019) which was developed for evaluating internship-related learning outcomes. Narayanan & Oak (2006) in their study identified the "determinants of Internship effectiveness" and developed a model on three important aspects viz. antecedents, processes and outcomes.

IV. DATA ANALYSIS

The proposed model was tested using Smart PLS4 software for PLS-SEM, which is ideal for intricate models that include mediation and moderation. To put it simply, PLS has a more intuitive graphical user interface than competing path modeling products like AMOS. In order to evaluate the suggested model, the research employed structural equation modeling (SEM) and partial least squares (PLS). Inter-construct relationships are investigated using PLS-SEM (Shmueli et al., 2019). With smart PLS software, you can use PLS-SEM without worrying about whether or not your data is normal. In addition, the tests for PBI, PD, WPC, IT, and SPE were evaluated with PLS according to the criteria proposed by Sarstedt et al. (2019): Cronbach's alpha (Ca ≥ 0.70), composite reliability (Cra ≥ 0.70), average variance extracted (AVE ≥ 0.50), and discriminant validity (HTMT). In addition, the model used the Stone-Geisse metric to quantify the predictive relevance (Q2) and the coefficient of determination (R2).

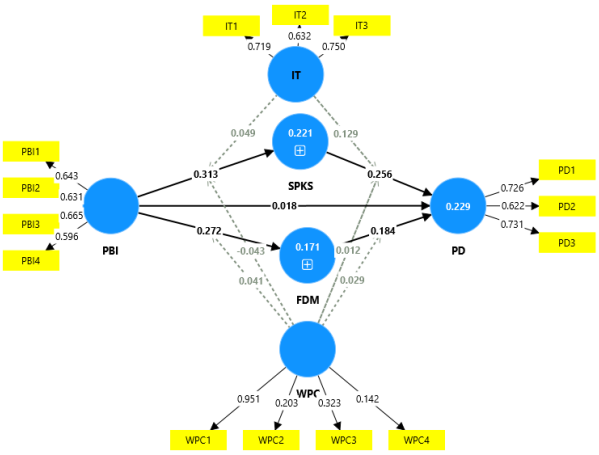

Fig. 2. Analytical Model

Results Results are presented below for discussion

Aged, gender, marital status, and the educational background are some of the items shown by the researcher in Table I. Most of the respondents lie in the age group between 18 - 25 years (38.71%) and 26-33 years (61.29%). Moving on, 63.08% percent of the respondents were female; 70.26% of them were single; 35.13% of grad students.Table I discusses demographics of the survey

TABLE I
DEMOGRAPHICS RESULTS

Age	Frequency	Percentage	Educational Qualification	Frequency	Percentage
18-25	108	38.71	Graduate	98	35.13
26-33	171	61.29	Post Graduate	181	64.87
Gender			Marital Status		
Male	103	36.91%	Married	83	29.74%
			Unmarried	196	70.26%
Female	176	63.08%			

Measurement model assessment

Construct measurement computation was reviewed based on the model proposed by Hair et al., (2017) and Shmueli et al., (2019) and recommendations itself as shown in Table II. The factor loadings are consistently high than the usual value of 0.708; only three factors were deleted (Hair & Alamer, 2022). Thus, CR-Reliability index is high and these were further confirmed by Rho-A and Cronbach's alpha that were in the range between 0.70 (Hair et al., 2022). The construct validity is built on the bmaasis of these adequate factor loading (F.L) explaining around 80% of the Variance (Hair et al., 2022). Convergent validity was followed by construct, the factors' average extracted variances (AVE) are over the 50% level (Hair et al., 2022). Table II presents Reliability results

TABLE II
RELIABILITY RESULTS

	Cronbach's alpha	Rrho_A	CR	AVE
FDM	0.877	0.889	0.909	0.627
IT	0.950	0.952	0.968	0.909
PBI	0.940	0.946	0.957	0.848
PD	0.915	0.918	0.937	0.715
SPKS	0.917	0.926	0.937	0.750
WPC	0.936	0.940	0.954	0.839

Source: Author's Creation

TABLE III HTMT
"DISCRIMINANT VALIDITY" IS DEFINED BY THE HTMT RATIO, WHICH STANDS FOR HETROTRAIT-MONOTRAIT. THE HTMT FOR EVERY UNIT IN TABLE III WAS SIGNIFICANTLY LOWER THAN THE CUTOFF OF 0.85.

	FDM	IT	PBI	PD	SPKS	WPC	WPC x FDM	WPC x PBI	WPC x SPKS	IT x PBI	IT x SPKS
FDM											
IT	0.405										
PBI	0.451	0.414									
PD	0.472	0.469	0.653								
SPKS	0.376	0.725	0.398	0.465							
WPC	0.466	0.384	0.335	0.359	0.331						
WPC x FDM	0.621	0.514	0.471	0.660	0.412	0.473					
WPC x PBI	0.369	0.489	0.582	0.681	0.731	0.647	0.511				
WPC x SPKS	0.423	0.561	0.552	0.477	0.398	0.551	0.532	0.602			
IT x PBI	0.410	0.611	0.512	0.711	0.621	0.712	0.422	0.511	0.460		
IT x SPKS	0.523	0.631	0.314	0.333	0.721	0.725	0.811	0.782	0.801	0.771	

Structural Model Assessment:

The relationship between the hypotheses and their ability to predict outcomes was examined (Table V) (Hair et al., 2017). To obtain the required P-values, the bootstrapping technique verified the research hypotheses with 10,000 bootstraps without sign change (Hair et al., 2020). Inner VIF values were utilized to handle multicollinearity problems, with a maximum threshold set at 3.33 (Sarstedt et al., 2019). All path correlations are statistically significant, according to Table IV. IT was an influential predictor of PD ($\beta = 0.395$, $p < 0.001$) supporting H5. The second considerable predictor identified was FDM ($\beta = 0.285$, $p < 0.001$), backup H2. SPKS significantly impacts PD ($\beta = 0.125$, $p < 0.05$), supporting H3. PBI favors SPKS with a beta coefficient of 0.242 and a significance level below 0.05, thereby supporting hypothesis H4. Further, IT has a significant impact on the SPKS constructs AT $\beta = 0.421$, $p < 0.001$), PBI $\beta = 0.332$, $p < 0.001$), and PD ($\beta = 0.431$, $p < 0.001$), confirming H1a, bc.

TABLE IV
STRUCTURAL MODEL EVALUATION

	Original sample	Sample mean	STDEV	2.50%	97.50%	T statistics	P values
FDM -> PD	0.285	0.285	0.042	0.203	0.369	6.746	0
IT -> PD	0.395	0.396	0.041	0.311	0.473	9.623	0
IT -> SPKS	0.421	0.422	0.038	0.345	0.493	11.068	0
PBI -> FDM	0.431	0.432	0.043	0.351	0.507	10.866	0
PBI -> PD	0.332	0.333	0.039	0.254	0.404	8.584	0
PBI -> SPKS	0.242	0.243	0.043	0.158	0.328	5.659	0

SPKS -> PD	0.125	0.125	0.041	0.047	0.207	3.076	0.002
WPC -> FDM	0.193	0.195	0.022	0.114	0.351	5.472	0
WPC -> PD	0.224	0.218	0.031	0.142	0.451	7.861	0.001
WPC -> SPKS	0.128	0.312	0.034	0.254	0.404	8.584	0
WPC x FDM -> PD	0.207	0.203	0.036	0.217	0.422	7.886	0
WPC x PBI -> FDM	0.234	0.322	0.043	0.317	0.337	8.114	0
WPC x PBI -> SPKS	0.137	0.371	0.049	0.286	0.389	8.714	0
WPC x SPKS -> PD	0.104	0.335	0.037	0.219	0.298	6.241	0
IT x PBI -> SPKS	0.138	0.227	0.022	0.228	0.451	5.429	0
IT x SPKS -> PD	0.451	0.219	0.32	0.274	0.441	5.274	0

Source: Authors' creation

TABLE V
HYPOTHESES RESULTS

	T statistics	P values	Significant
FDM -> PD	5.672	0.000	Yes
IT -> PD	6.746	0.000	Yes
IT -> SPKS	9.623	0.000	Yes
PBI -> FDM	11.068	0.000	Yes
PBI -> PD	5.201	0.000	Yes
PBI -> SPKS	8.954	0.000	Yes
SPKS -> PD	10.866	0.000	Yes
WPC -> FDM	8.584	0.000	Yes
WPC -> PD	4.011	0.000	Yes
WPC -> SPKS	5.659	0.000	Yes
WPC x FDM -> PD	2.895	0.004	Yes
WPC x PBI -> FDM	3.076	0.002	Yes
WPC x PBI -> SPKS	2.987	0.001	Yes
WPC x SPKS -> PD	3.578	0.000	Yes
IT x PBI -> SPKS	4.410	0.000	Yes
IT x SPKS -> PD	4.702	0.000	Yes

V. FINDINGS

The findings of the paper highlight the crucial impact of structured internships on improving students' readiness for professional environments, supported by a varied sample of engineering students. The most advanced techniques of PLS-SEM were used to assess such constructs as Professional Development (PD), Project-Based Learning (PBI), Work Related Competencies (WPC), and these constructs revealed high reliability and validity. Specifically, project-based internships were found to positively influence the professional development of students. This relationship was significantly mediated by students' prior knowledge and the quality of feedback and mentorship they received. Additionally, both industry type and workplace culture played moderating roles, shaping the strength and direction of key relationships in the model. These findings highlight the contextual and experiential nuances that influence internship effectiveness.

To truly harness the power of project-based internships, educators must go beyond placement logistics. By preparing students cognitively, selecting the right industry contexts, and ensuring quality mentorship, they can transform internships into deep learning experiences.

The results of the study suggest that practicing internships which are well designed bridge the gap between the theoretical approaches learnt in classrooms, and the practical implementation in the corporate world through the skills and experiences that most employers appreciate from the students they take in. In addition to these, ethical scrutiny was performed in the study ensuring that informed consent and confidentiality were adhered to strengthen the credibility of the findings. The article emphasizes how important it is to have effective internship implementation into the curriculum in order for students to apply what they have learned in theory into practice.

In short study implies that Internships work best when students are well-prepared, mentored, and placed in nurturing environments. Educators and institutions play a pivotal role in shaping these conditions — before, during, and after internships. One-size-fits-all approaches to internships are ineffective — tailoring by industry type and culture enhances developmental outcomes.

VI. DISCUSSION

The discussion in this paper will underscore the mutual relationship between the applied aspects of the students' knowledge and skills gained at the university through internships (Anjum 2020). It should be noted that internships sharpen not only the technical capabilities of students but also their interpersonal abilities. Of great importance in fostering critical thinking, problem-solving abilities, and building a professional identity are internships. These opportunities allow students to channel theoretical knowledge into practical applications and thus enhance their employability and readiness for the workforce. However, the above text acknowledges most of the problems that go hand in hand with PBIs, such as time and effort, complexities in assessment, and existence of some

students who may not be able to cope with increased autonomy. Therefore, in addressing these issues, it is imperative for institutions to integrate structured internship programs into their curricula. This calls for adequate facilitation and ensuring that the internships are above the minimum set standards to improve their general effectiveness. Moreover, it gives directions for further research on the long-term influence of internships on careers, the contribution of mentorship in the process of internships, and the effectiveness of different kinds of internships in various academic disciplines. It places great emphasis on how careful and detailed planning and execution of internships will become integrable with the findings so far, to build a sturdy framework that betters the whole internship experience for students, teachers, and employers. Such a holistic approach equips students with the ability to navigate through the nuances of the professional world while also nurturing their overall development and excellence in executing their duties.

The paper presents valuable theoretical contributions to existing literature as it deepens the knowledge about the role of work-integrated education and project-based learning in the students' professional growth. First of all, the theory of experiential education, which argues that education is most effective if it involves actual experience, is fully supported by the research. It accurately shows the role of internships in the real world, extending theoretical knowledge beyond the classroom and illustrating the importance of experience in acquiring essential skills including but not limited to: problem solving, social interaction, and teamwork.

Secondly, the results highlight the necessity of enhancing teaching policies with career orientated values in education systems especially the excessive importance given to mastering technical abilities over the emerging attractive notions for graduates such as leadership skills. This is in line with the already existing issues of employability and employability in its broader sense, which is where graduates are expected to know not only the content of their degree, but also have other skills.

In addition, the research contributes to the current understanding of project-based learning by presenting evidence of how project-centered works can enhance learners' involvement and creates a desire to take more responsibility for their learning which in turn leads to improved results in terms of employability and job readiness. It is also clear from the paper that more studies can be directed towards understanding how internships relate to career development, that is why it is suggested that it is possible to look at the types of internships and how they are structured to the students and the effect they have on their careers. Theoretical implications stress a need to rethink education in holistic terms where experience and growth are central to the academic program.

The implication of this paper is that it is not enough for educational systems to avail students of available employers; there should be structured internship programs across all faculties that are in tandem with the employers' needs and sufficiently supervised. This approach greatly optimizes the prospects and objectives of the internship, therefore helping the students to get jobs easily. The project-based internships (PBIs) are also important because students get an opportunity to practice what they learn in class, equipping them with better problem solving and team working abilities. Giving ample internship practice together with mentoring can help an organization find its future leaders. Work based internships are encouraged based on the fact that students are able to search for and get work geared towards achieving their career objectives and putting classroom knowledge into practice. The practical consequences are intended to enhance the internship experience in a manner that creates value for students, educational institutions and companies together.

CONCLUSION

The article points out that internships especially project based internships (PBIs) are useful for transforming learning from theory to practice. This ensures that the students are able to think critically, solve problems and be employable when education institutions adopt experiential learning. The results indicate that there is need for regulated internship schemes which can be relevant for all the corporate challenges in the field. Coupled with this, there is need for education and industry as a whole in order to recognize and nurture the talent of both students and organisations thus allowing the two to seek their market. Also, it is equally important to note that a properly designed internship program helps students in their career progression because it gives them relevant skills necessary to thrive in the labor market. Above all, for internships to be beneficial for everyone involved, the emphasis must rather be on the need to develop and implement effective systems for the internship.

LIMITATIONS

In the study, a number of constraints are identified, which may have an impact on the extent to which the findings can be applied in a wider context. One limitation is that the findings may not be fully applicable since the focus was mainly on Engineering students who were enrolled in professional programs. There is the danger that students may overstate their competencies and the significance of their internship experiences in surveys that draw on decision-making recalibrated self-reports. That is, the surveys can be biased. Additionally, the study fails to consider how internship quality varies among industries, which could impact the results of professional growth.

Undergraduates and students from other disciplines should be included in future studies to better understand the student experience. How internships affect career paths in the long run might be better understood with the help of longitudinal studies. It would also be helpful to look at what aspects of internship programs are most important for helping participants build marketable skills. Lastly, to better understand how to maximize internships for student success, it would be beneficial to investigate the function of mentorship and support networks inside internships.

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