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Development and Validation of an Evaluation Instrument for the Industrial Field Practice Program in Informatics Engineering at Universitas Putra Indonesia YPTK Padang

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ABSTRACT

Industrial Field Practice (PLI) is essential in vocational education, bridging academic learning with real-world industry experience. However, evaluating its effectiveness often lacks standardized and validated instruments, particularly in Informatics Engineering programs. This study aims to develop and validate an evaluation instrument for the PLI Program at Universitas Putra Indonesia YPTK Padang. The instrument was constructed using Stake's Countenance Evaluation Model, which includes three components: antecedents, transactions, and outcomes. A total of 80 items were initially developed through literature review and expert consultation. Content validation was conducted using the Aiken's V formula, involving three experts in vocational education evaluation. Items with V > 0.8 were considered valid. Of the 80 items developed, 70 met the content validity criteria and were deemed valid, while 10 required revision based on expert feedback. Valid items measured aspects such as student readiness, supervision quality, task relevance, use of technology, work ethics, technical skills, soft skills, and final project outcomes. Each item was aligned with industrial expectations and educational standards. The results demonstrate that the developed instrument has strong content validity and provides a comprehensive framework for evaluating PLI implementation. It supports quality assurance and continuous improvement in vocational education. The instrument can be adapted by other institutions for similar programs in different fields.

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1. INTRODUCTION

Vocational higher education plays a strategic role in preparing a skilled, work-ready workforce to meet industrial demands (Ghufron & M., 2018). In the field of Informatics Engineering, the rapid evolution of technology requires graduates who are not only technically proficient but also possess adaptive and collaborative skills (Flowriza et al., 2021). This context necessitates an educational approach that moves beyond theoretical knowledge to include mastery of practical competencies and a deep understanding of the technology industry's ecosystem.

To meet this need, the Industrial Field Practice (PLI) program is an integral component of the technical education curriculum, designed to function as a critical bridge between academic theory and real-world industrial environments (Perdana et al., 2019; Qolik et al., 2021). The program is structured to ensure that students can effectively apply the technical knowledge and skills learned in the classroom to authentic workplace settings.

The PLI program aims to cultivate well-rounded professionals. It serves as a vital platform for students not only to apply their academic knowledge but also to gain direct experience with workplace culture, professional ethics, and the development of essential soft skills. These non-technical competencies, including communication, time management, teamwork, and problem-solving, are considered crucial for success in the modern workforce (Uyuni et al., 2020).

Despite the program's importance, a significant gap exists in its evaluation process. The effectiveness of PLI programs is often assessed in a manner that is merely administrative, descriptive, or subjective, relying on narrative reports rather than standardized and validated instruments (Nurhamidah & D., 2021). This lack of rigorously tested evaluation tools means that the true impact of the PLI on student competencies and workforce readiness cannot be accurately measured (Ghufron & M., 2018; Prilatama et al., 2022).

This highlights a critical need for a comprehensive evaluation instrument tailored to the specific demands of Informatics Engineering. Such an instrument must be capable of assessing both technical dimensions—such as programming, software proficiency, and project management—and non-technical dimensions like work ethic, communication, and teamwork (Kumalasari et al., 2023; Sudarmaji et al., 2021). The development of a valid and reliable instrument is essential for ensuring the evaluation process is objective and provides a true measure of student learning outcomes (Khairani et al., 2022).

To provide a structured and thorough evaluation, this study adopts Stake's Countenance Evaluation Model as its theoretical framework. This model is centred on three core components: antecedents (program planning and prerequisites), transactions (the implementation process and interactions), and outcomes (the results and impacts of the program).

The Stake's Countenance model was specifically chosen for its comprehensive approach, which allows for a holistic assessment of the PLI program. By examining the program from its initial planning stages through its execution and culminating in its effects on students, the model facilitates a systematic and multi-faceted evaluation that surpasses mere formality and provides a foundation for continuous improvement (Munandar et al., 2023).

Therefore, this study aims to develop and validate a comprehensive evaluation instrument for the Industrial Field Practice (PLI) Program in the Informatics Engineering Education Study Program at Universitas Putra Indonesia YPTK Padang. The instrument was constructed based on indicators relevant to the information technology industry and validated by experts in vocational education using Aiken's V technique to establish strong content validity.

The expected outcome of this research is a valid, reliable, and practical evaluation tool that can be used by supervising lecturers, educational institutions, and industry partners to assess the success of the PLI program. By creating this instrument, the study not only contributes a tool for program evaluation but also promotes an enhancement in the quality of PLI implementation, thereby supporting the broader vocational education system in Indonesia by aligning it with real industry needs and technological progress (Kurniawati et al., 2019).

2. METHODS

This study uses a quantitative approach focused on the development and validation of an evaluation instrument for the Industrial Field Practice (PLI) Program in the Informatics Engineering Education Study Program at Universitas Putra Indonesia YPTK Padang. The research process was designed systematically through several key stages: initial instrument development, validation by vocational education evaluation experts, an instrument trial with students and supervising lecturers, and data analysis to determine the validity level of the instrument (Suryana & Ismi, 2019).

The research approach used is quantitative, aimed at testing the content validity of the evaluation instrument through statistical analysis. The research process includes several key stages: initial instrument development, validation by vocational education evaluation experts, instrument trial with students and supervising lecturers, and data analysis to determine the validity and reliability levels of the instrument. Each stage, from instrument drafting to validation, is conducted systematically to produce a relevant and reliable measurement tool for evaluating the effectiveness of the PLI program (Jalinus et al., 2021).

The participants in this study consisted of experts in vocational education and program evaluation who were involved in the instrument validation process. These experts provided critical feedback to refine the instrument, focusing on the relevance, accuracy, and scope of the indicators used. Additionally, students from the Informatics Engineering Education Study Program who had completed the Industrial Field Practice (PLI) were selected as participants in the instrument trial to measure its effectiveness in a real-world context. This sample was purposively selected to include individuals with diverse academic backgrounds and technical skills relevant to the information technology field (Sari et al., 2021).

The instrument development began with a literature review to identify key indicators that need to be evaluated in the Industrial Field Practice (PLI) program within the field of Informatics Engineering. This review included an analysis of existing evaluation instruments as well as consultations with experts from both industry and academia to ensure that the developed instrument accurately reflects the real needs of the information technology sector. Subsequently, an initial draft of the instrument was created in the form of a questionnaire consisting of several statements aimed at assessing technical competencies, soft skills, and theoretical knowledge relevant to the implementation of the PLI program.

Data were collected through the distribution of questionnaires to selected participants. To ensure content validity, the collected data were analyzed using the Aiken's V statistical technique, which measures the level of expert agreement on the relevance of each item in the instrument. This analysis helped identify valid items as well as those that needed to be revised or removed. The final outcome of this study is a validated evaluation instrument ready to be used for assessing the effectiveness of the Industrial Field Practice (PLI) program implementation in the Informatics Engineering Education Study Program. This research also contributes to improving the quality of vocational education by providing a reliable, industry-based program evaluation framework (Barbosa & Cansino, 2022).

2.1. Sample Preparation

This study employs a quantitative research design to assess the validity of the evaluation instrument for the Industrial Field Practice (PLI) program in the Informatics Engineering Education Study Program.The research process includes stages of instrument development, expert validation, instrument trial, and statistical analysis to determine the validity level of the developed instrument.

2.2. Participants

This study involved participants from higher education institutions offering vocational and technical programs, with a focus on vocational education evaluation.

The participants were evaluation experts, namely professionals in technical and vocational education, including lecturers and professors from the Faculty of Engineering at Universitas Negeri Padang with expertise in evaluating technical or vocational education programs.

2.3. Development of Indicators

The development of indicators in this study refers to Stake's Countenance evaluation model, which focuses the evaluation on three main components: antecedents (prerequisites), transactions (processes), and outcomes (results). This model was chosen because it provides a comprehensive perspective on the implementation of the Industrial Field Practice (PLI) program in the Informatics Engineering Education Study Program(Munandar et al., 2023).

A. Antecedents Component (Prerequisites/Planning)

Indicators at this stage are used to evaluate the readiness of the institution and students prior to the implementation of the PLI program, including:

1) Availability of technical guidelines for PLI implementation
2) Socialization and briefing of students
3) Establishment of relevant industry partners
4) Preparedness of administrative documents (assignment letters, cooperation contracts)
5) Initial competencies of students to be placed

B. Transactions Components (Execution Process)

These indicators reflect the program implementation in the field and the interactions among the involved actors:

1) Active participation of students in technical tasks
2) Alignment of industry tasks with the expertise area of Informatics Engineering
3) Guidance from industry supervisors and academic advisors
4) Application of work ethics and culture in the industrial environment
5) Use of current tools or technologies (coding platforms, IT software, etc.)
6) Problem-solving and teamwork during industrial activities

C. Outcomes Components (Results/Achievements)

These indicators are used to assess the outcomes and impacts of the PLI implementation on students, including:

1) Improvement of students' technical competencies (technology mastery, digital skills)
2) Development of soft skills (communication, responsibility, workplace adaptability)
3) Alignment of the final report outcomes with academic and industry standards
4) Performance evaluation by industry partners (PLI host organizations)
5) Students' reflection and satisfaction regarding their PLI experience

The development of indicators was conducted through a literature review, curriculum analysis, and input from evaluation experts and practitioners in the information technology industry. The instrument blueprint was formulated based on Stake's three components and then validated by experts using the Aiken's V technique (Elham Niromand et al., 2024)

Table 1. Evaluation Instrument Blueprint for the Industrial Field Practice Program

Stake's Components	Aspects Evaluated	Instrument Indicators
Antecedents	Availability of PLI Implementation Guidelines	Availability of PLI guideline documents
Antecedents	Socialization and briefing of students	Students participate in briefing activities
Antecedents	Selection of relevant industry partners	Industry partners relevant to the field of Informatics
Antecedents	Administration and assignment documents	Assignment letters and MoUs are available
Antecedents	Initial competencies of students	Students possess basic technical skills

Transactions	Students' involvement in technical tasks	Students complete the assigned tasks
Transactions	Alignment of industry tasks with the study program competencies	Field tasks align with the study program curriculum
Transactions	Guidance from the industry supervisor	Students are supervised by the industry supervisor
Transactions	Guidance from the academic supervisor	Students receive guidance from the academic supervisor
Transactions	Application of work ethics and culture	Students demonstrate a professional work attitude
Transactions	Utilization of up-to-date tools and technologies	Students use the latest IT devices
Outcomes	Enhancement of students' technical skills	An improvement in technical skills has occurred
Outcomes	Development of soft skills	Students' soft skills improve throughout the PLI program
Outcomes	The quality of students' final project reports	The final report is prepared according to the guidelines
Outcomes	Performance assessment by industry partners	The industry supervisor gives a positive assessment
Outcomes	Students' reflections and satisfaction regarding the PLI program	Students feel satisfied and have grown after completing the PLI

2.4. Data Analysis Techniques

The draft instrument was validated by three experts through the completion of validation sheets. Aiken's V technique was used to calculate the validity index for each item, with a value of ≥ 0.8 considered substantially valid. The expert validation data were analyzed using the Aiken's V formula with the following criteria:

$V=n(c-1)\sum s$

with:

- s = score given by the validator minus the lowest possible score
- n = number of validators
- c = number of rating categories

The Aiken's V value ranges from 0 to 1. A value above 0.8 is considered to indicate a high level of validity. Items with an Aiken's V value below 0.8 were revised or eliminated based on the validators' suggestions. The final instrument consists of items that meet the content validity criteria.

3. FINDINGS AND CONCLUSION

The developed evaluation instrument consists of 80 items referring to the three main components of Stake's Countenance evaluation model: Antecedents, Transactions, and Outcomes. This instrument is designed to measure the effectiveness of the Industrial Field Practice (PLI) Program based on program readiness, field implementation, and the outcomes achieved by students. Content validity testing was conducted by three vocational education evaluation experts using Aiken's V technique, aiming to assess the extent to which each item is relevant to the measured aspects. The instrument design for the preparation phase (Antecedents) is presented in Table 2.

Table 2. Preparation Phase Evaluation Instrument

No	Steps	Criteria	Instrument Indicators	Item Numbers	Totals
1	Preparation (Antecedents)	PLI Guidelines	Availability of implementation guideline documents	1,2,3,4	4
		Student Debriefing	Socialization and briefing activities before PLI	5,6,7,8	4
		Administration	Completeness of assignment letter and MoU with industry	9,10,11,12	4
		Partner Selection	Suitability of industrial fields with study program competencies	13,14,15,16	4
		Initial Competency	Students' mastery of the basics of technical competence	17,18,19,20	4

The next phase focuses on the implementation of PLI activities in the industry, covering the process, supervision, and application of work ethics. The detailed indicators for this phase are presented in Table 3.

Table 3. Implementation Phase Evaluation Instrument

No	Steps	Criteria	Instrument Indicators	Item Numbers	Totals
2	Process (Transactions)	Field Assignments	Active participation of students in industrial technical tasks	21,22,23,24,25,26,27,28	8
		Industrial Supervision	Guidance and monitoring from industry supervisors	29,30,31,32,33,34,35,36	8
		Lecturer Supervision	Mentoring and monitoring from the field supervisor	37,38,39,40,41,42,43,44	8
		Use of Technology	Utilization of software, tools, and ICT devices in the field	45,46,47,48,49,50,51,52	8
		Work Ethics	Implementation of discipline, responsibility and professional attitude	53,54,55,56,57,58,59,60	8

The final phase is the evaluation of the outcomes, which focuses on the competency achievements of students after participating in the PLI program. This assessment is intended to ensure that the results of the PLI reflect prevailing industry competency standards. The detailed indicators used are presented in Table 4.

Table 4. Outcome Phase of The Evaluation Instrument

No	Steps	Criteria	Instrument Indicators	Item Numbers	Totals
3	Learning Outcome (Outcomes)	Technical Competency	Improvement of technical skills in IT	61,62,63,64	4
		Soft Skills	Development of communication, teamwork and problem-solving skills	65,66,67,68	4
		Final report	Conformity of the content and structure of the final report according to the guidelines	69,70,71,72	4
		Industry Assessment	Student performance assessment by industry partners	73,74,75,76	4
		Student Reflection	Student satisfaction and awareness of PLI experience	77,78,79,80	4

Based on the data analysis of the validity test for the PLI Program evaluation questionnaire, out of a total of 80 statement items tested, 70 were found to be valid, while the remaining 10 were invalid and required revision.

Table 5. Instrument Validity Result

Level of Significance	Valid/Invalid	Item Numbers	Totals
r_{count}> 0,444	Valid	1,2,3,4,5,8,9,10,11,12,13,14,15,16,17,19,20,21,22,23,24,25,26,27,28, 29,30,31,32,33,34,35,36,37,38,39, 40,41,42,43,46,47,48,49,50,51,53, 54,56,57,58,59,60,61,62,64,65,66, 67,69,70,71,73,74,75,76,77,78,79, 80	70
r_{count}< 0,444	Invalid	6,7,18,44,45,52,55,63,69,72	10

The results of the validity test indicate that the majority of the developed instrument items possess high content validity, demonstrating that the evaluation indicators used appropriately represent the key aspects of PLI implementation (Diana et al., 2020). In the Antecedents component, the high validity reflects that administrative readiness and guidelines were identified by experts as critical. However, expert feedback led to the revision of items 6 and 7 regarding "Student Debriefing." The feedback noted that "the indicator for participation in the briefing needs to be clarified to measure effectiveness, not just attendance." Item 18 on "Initial Competency" was also deemed invalid because, according to the experts, "measuring students' initial technical competency is more objectively done through prerequisite assessment, not a perception questionnaire."

The Transactions component contained the highest number of revised items, indicating the complexity of the implementation process in the industry. Expert feedback was essential to refine the indicators in this area. Item 44 ("Lecturer Supervision") was considered invalid due to its overlap with industry supervision. One expert stated, "the roles of the academic advisor and the industry supervisor must have separate and clear indicators to avoid confusion in the assessment." Items 45 and 52 regarding "Use of Technology" were also invalid, with expert feedback emphasizing "the importance of measuring the ability to adapt to various tools, not the mastery of specific technologies that may be outdated." Meanwhile, item 55 on "Work Ethics" was considered too broad, and an expert recommended "breaking it down into more specific, observable behaviors, such as punctuality and initiative."

In the Outcomes component, nearly all items were found to be valid, suggesting that student learning outcomes are relatively easier to assess. The invalid items (63, 69, 72) received specific comments from the experts. For item 63 on the "Improvement of Technical Competency," feedback suggested that "skill improvement is better measured through a comparison of project results or performance assessment rather than a single questionnaire item." Items 69 and 72 regarding the "Final Report" were deemed redundant. Expert feedback indicated that "the assessment of the report's quality should be done holistically using a rubric, not through separate items asking similar questions."

Overall, the instrument has met the criteria for content validity and can be utilized for the systematic evaluation of PLI program implementation. The implications of this study extend beyond the specific context of the program at Universitas Putra Indonesia YPTK Padang. This validated instrument can be applied in broader contexts, serving as a foundational template or benchmark for other vocational institutions that want to develop or improve their evaluation tools. Other institutions can adapt the framework (Antecedents, Transactions, Outcomes) and adjust the indicators to align with their curriculum and industry partners, thereby building an internal quality assurance system for industry practices integrated into the curriculum (Kurniawati et al., 2019).

4. CONCLUSION

This study successfully developed and validated an evaluation instrument for the Industrial Field Practice (PLI) Program in the Informatics Engineering Education Study Program at Universitas Putra Indonesia YPTK Padang. Designed systematically using Stake's Countenance Evaluation Model, it covers program preparation, activity implementation, and student learning outcomes. The validation process, involving vocational education experts and employing Aiken's V formula, confirmed that the majority of the 80 instrument items were valid and accurately measured the dimensions of the PLI program. The findings indicate that the evaluation instrument possesses high content validity and provides a comprehensive framework for assessing PLI program effectiveness. It reflects the real needs of the information technology industry and the expected competencies of vocational education graduates, encompassing both technical abilities and behavioral skills. Therefore, this instrument is highly recommended for use by educators, program coordinators, and stakeholders as a valuable tool for quality assurance and program improvement initiatives. Specifically, other vocational institutions and industries can adapt this validated instrument as a foundational template to systematically evaluate their own industrial field practice programs, ensuring that their curricula align with industry demands and that graduates are well-prepared for the workforce. It can serve as a benchmark for developing internal quality assurance systems for industry practices integrated into curricula.

For future research, it is encouraged to further examine the construct validity and criterion-related validity of this instrument to ensure its robustness across various contexts. Researchers could also assess its reliability over time, potentially through longitudinal studies, to determine its consistency in measuring PLI program effectiveness. Furthermore, applying this instrument in broader institutional contexts, perhaps across different vocational disciplines beyond Informatics Engineering (e.g., mechanical engineering, electrical engineering, tourism), would enhance its generalizability and provide insights into its adaptability. Exploring the instrument's utility in different cultural or national vocational education systems could also yield valuable comparative data and refine its universal applicability.

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