Volume 10 Number 3, December 2025, pp. 536~546
P-ISSN:2477-7935
E-ISSN: 2548-6225
DOI: 10.59052/edufisika.v10i3.50165

ASSESSING THE SERVICES OF PHYSICS EDUCATION LABORATORY THROUGH CIPP-SERVQUAL

Zahriah[1], Juniar Afrida[1], Adinda Fahira[1]
[1] Universitas Islam Negeri Ar-Raniry, Banda Aceh, Indonesia
Corresponding author email: juniarafrida@ar-raniry.ac.id

Article Info
Received: 24 Nov 2025
Accepted: 16 Dec 2025
Publication: 26 Dec 2025

Abstract :
This research aims to scrutinize the quality of service program at the Physics Education Laboratory, Faculty of Tarbiyah and Teacher Training, UIN Ar-Raniry, Banda Aceh, using a double CIPP-SERVQUAL integrated framework, which combines adopted frameworks to identify comprehensive points from both managerial and user perspectives. A mixed-methods design, including questionnaires, observations, interviews, and document analysis, was used to collect data from students, lecturers, laboratory assistants, and laboratory coordinators. The assessment included the Context, Input, Process, and Product of the CIPP model, combined with six SERVQUAL dimensions: tangibles, reliability, responsiveness, assurance, empathy, and information systems. The outcomes showed that the Context, Process, and Product modules were "Very Good," reflecting internal consistency between laboratory services and academic demand, rational operational management, and impacts on student competencies, particularly in comprehensive application and experimental manipulation. The Input element was "Good," indicating constraints due to manual documentation and a resource upgrade. The originality of this research lies in combining the CIPP and SERVQUAL models to simultaneously measure internal management efficiency and the perceived quality of service from the user's point of view in a physics education laboratory. The results suggest that improving digital documentation systems, preventive maintenance, and technical response is an important strategy to increase the quality of laboratory services, thereby supporting sustainable learning in higher education.

Keywords: CIPP Model, Physics Education Laboratory, SERVQUAL

INTRODUCTION

Laboratory experiments are instrumental in learning physics, allowing students to bridge theoretical knowledge and experimental practice and to participate in tasks. Through laboratory work, students validate physical laws and nurture attitudes necessary for scientific thinking: accuracy, critical thinking, and analytical reasoning. A functioning environment will enable abstract ideas to become observable phenomena and improve students' conceptual understanding and elementary practicum skills

(Napirah et al., 2023; Purwati et al., 2025; Rahmania et al., 2021; Setiawan et al., 2023). Therefore, the quality of laboratory services is an important factor that directly affects the efficiency of education in physics specialties.

Despite the critical concern about laboratories, a considerable number of tertiary institutions continue to face challenges in providing satisfactory laboratory services. Common challenges to be found in these studies include inadequate facilities, a shortage of recent equipment, a lack of maintenance, and poor administrative record-keeping systems (Jahja et al., 2025; Nahdiyaturrahmah et al., 2020). Frequently, these constraints result in inefficient practicum deployment, restricted access to laboratory equipment, and lower student satisfaction. Furthermore, most of the current research focuses on physical infrastructure and equipment availability, among others, while issues related to quality of service, efficiency in management processes, and digital-based documentation systems are poorly understood, particularly within the framework of physics education laboratories.

In physics education, laboratories are characterized as physical places for experimentation and as learning environments that encompass students, teachers, monitors, and coordinators. The relationship among these stakeholders is key to the efficiency, safety, and durability of laboratory services. However, the previous studies have mostly investigated single perspectives (e.g., student satisfaction or facility adequacy), and such investigations have never considered both managerial evaluation and user perception in a holistic analysis framework at the same time (Arsyad et al., 2023; Jarnawi et al., 2022). This suggests a gap in research around comprehensive measurement of laboratory services but one that includes not only internal management processes, but also the service quality as experienced by the users.

To fill this void, organized evaluation frameworks are necessary. This model, the CIPP model (Context, Input, Process, Product), introduced by Stufflebeam, offers a structured way to evaluate educational programs by analyzing the relevance of program goals and objectives to the adequacy of the resources utilized in implementing the program. Furthermore Kurniawati (2021), Mukhlisin et al. (2023), Nukhbatillah et al. (2024) stated that another one is the context-input-process-product approach, which Stufflebeam put forward for analyzing process quality. Although the CIPP model is successful in determining programmatic and managerial aspects, it does not explicitly assess users' perceptions of service quality. On the contrary, Parasuraman et al. (1988) The SERVQUAL model consists of components that focus on the user's perceptions across six dimensions: tangibility, reliability, responsiveness, assurance, empathy, and information system. SERVQUAL has been universally adopted to assess educational service quality, but many use it as a singular model, and it cannot fully interpret the basic management conditions that affect future service performance (Afrida et al., 2025; Shi & Shang, 2020).

This CIPP and SERVQUAL approach, along with its resultant grounded theory, provides an innovative multi-stakeholder evaluation framework to compare internal managerial assessment with external user perception. While there have been some studies using CIPP or SERVQUAL alone, the research that comprehensively combines these two models to assess physics education laboratory services is scarce (Ardhiarisca et al., 2023; Girsang & Saragih, 2019; Irvani et al., 2024; Syukhri, 2018). In addition, a few studies specifically address information systems in laboratory services evaluations, given the increasing importance of digital documentation and inventory management in higher education in the 21st century.

Against this background, the current study seeks to assess service quality at the Physics Education Laboratory using a proposed integrated CIPP-SERVQUAL model. This research interest study uses several data sources (questionnaires, observations, interviews, and document analysis), including data from students, lecturers, laboratory assistants, and coordinators. The triad approach facilitates the reliability and validity of the findings, in addition to developing women's full context regarding the quality of laboratory service.

The originality of this work lies in its integrative evaluation, which simultaneously considers managerial effectiveness (CIPP) and user-perceived service quality (SERVQUAL) in the context of a physics education laboratory, with a particular focus on information systems and digital documentation. Results will inform techniques to enhance lab management and service delivery, both at the institutional level and through evidence-based strategies for digitalization, prevention, maintenance, and technical response. This work can also be used as a model for other higher-educational institutions interested in

improving the quality, sustainability, and effectiveness of physics education laboratory resources that support modern learning needs.

RESEARCH METHOD

Research Design

Method This was a mixed-methods study with a descriptive-evaluative approach that adopted the CIPP model (Context, Input, Process, Product) and the SERVQUAL model. This method was employed to gather information on the quality of physics instruction and laboratory services from two angles: manager and user satisfaction. The evaluation of lab implementation for four aspects (context, input, process, and product) was based on the CIPP model developed by (Nugroho et al., 2021; Suryadin et al., 2022; Umam & Saripah, 2018).

However, the SERVQUAL model was used to assess users' perceptions and expectations of service quality across six primary dimensions: tangibility, reliability, responsiveness, assurance, empathy, and Information System. The inclusion of these two models provides an overall view of how effectively the laboratory is being managed (management effectiveness) and of user satisfaction with the services provided.

Research Target/Subject

Subjects: The main groups of subjects involved in laboratory work were C (students), A (lecturers), and T (laboratory assistants). The first cluster comprised students in the Physics Education Study Program who were involved in practicum sessions and research. The second group was composed of teachers who served as mentors and tutors, teaching lab courses by accompanying students through practicum activities. The third category, including laboratory technicians and coordinators, managed the operation and maintenance of equipment and the overall administration of the laboratory. 30 students, 5 lecturers, and 8 laboratory assistants served as the sample in this study. The purposive sampling technique was used to recruit research participants who were directly associated with and relevant to the administration, structure, and management of the physics education lab. Furthermore, the head of the laboratory and laboratory technicians were included in in-depth interviews as key informants to increase qualitative information and a better understanding of management and service processes at the level of the laboratory.

Research Procedure

Our research protocol followed a process aligned with the CIPP model, yielding four significant steps. Context Evaluation dealt with the relevance of the laboratory objectives and facilities as perceivable to the vision, mission, and learning requirements of the institution. In the Input Evaluation, the existence and appropriateness of human resources, facilities, equipment, policies, and strategic management plans to underpin laboratory work were assessed. Process Evaluation assessed the practicum activities, management approaches, equipment maintenance systems, and coordination with stakeholders concerned. Finally, the Product Evaluation step examined how laboratory implementation outcomes and impacts contributed to learning goals and lab quality.

Furthermore, following the CIPP model analysis, this research introduced the SERVQUAL measurement concurrently to provide quantitative data on users' service quality perceptions. To gather information, questionnaires were administered, direct observations were conducted, and interviews with key informants were conducted. The findings were subsequently triangulated across multiple sources to verify their accuracy, reliability, and validity.

Instruments and Data Collection Techniques

Instruments for this study were purposefully prepared to obtain quantitative and qualitative data and aligned with the integrated CIPP SERVQUAL evaluation model. The quantitative tool was a 30-item questionnaire with six dimensions based on the SERVQUAL model: tangibility, reliability, responsiveness, assurance, empathy, and information systems, applied on a five-point scale from very poor to very good. Students, lecturers, and laboratory assistants used this questionnaire to express their point of view on the perceived quality of the service provided by laboratories. The qualitative tools

comprised an observation checklist, a semi-structured interview guide, and a documentation review checklist. Fieldnotes observed about the laboratory condition on hygiene, availability and operating tools and materials, adequateness of facilities, daily management, and Implementation of practices K3. Semi-structured interviews were conducted with laboratory coordinators, lecturers, and assistants to discuss laboratory systems, problems faced, and ways to improve service. Table 1 summarizes the findings for each research question.

Table 1. Instrument grid based on the CIPP model

No	Evaluation Component	Evaluation Focus	Technique	Data Source	Instrument
1	Context	Identification of needs and relevance of laboratory facilities to learning	Questionnaire	Students, Lecturers, Laboratory Assistants	Satisfaction questionnaire
		Alignment of laboratory objectives with institutional vision and mission	Observation, document study, interview	Laboratory Coordinator, Assistants	Observation sheet, documents, interview guide
		Institutional context (internal policies and external regulations)	Document study	Head of Laboratory	Policy documents
		Laboratory support for research development	Document study	Students, Lecturers	Research-related documents
2	Input	Resource analysis (budget, facilities, infrastructure, human resources)	Observation, document study, interview	Laboratory Coordinator, Assistants	Observation sheet, documents, interview guide
		Policy analysis and compliance with national/international standards	Document study, interview	Laboratory Coordinator, Assistants	Documents, interview guide
		Program planning and laboratory development strategy	Document study, interview	Laboratory Coordinator, Assistants	Strategic planning documents
		Strengths and weaknesses of resources and policies (triangulation)	Observation, document study, interview	Laboratory Coordinator, Assistants	Observation sheet, documents, interview guide
3	Process	Monitoring of laboratory implementation (scheduling, daily management, maintenance)	Observation, document study	Laboratory Coordinator, Assistants	Observation sheet, documents
		Identification of management constraints	Observation, interview	Laboratory Coordinator, Assistants	Observation sheet, interview guide
		Stakeholder involvement in laboratory utilization	Interview	Students, Lecturers, Assistants	Interview guide
		Recommendations for process improvement (triangulation)	Observation, document study, interview	Coordinators, Assistants, Students, Lecturers	Observation sheet, documents, interview guide

4	Product	Short-term outputs: adequacy of facilities and services	Questionnaire	Students, Lecturers	Service evaluation questionnaire
		Long-term outcomes: impact on student competency	Document study	Students	Learning outcome records
		Success indicators: comparison with institutional and governmental regulations	Document study	Head and Coordinator of Laboratory	Regulatory documents
		Overall contribution to learning quality	Questionnaire, document study	Students, Lecturers, Laboratory Heads	Questionnaire and documents

Data collection comprised several phases. Questionnaires were first handed out to measure perceived service quality quantitatively. Second, direct observations took place during the practicum to register actual lab settings and management. Third, semi-structured interviews were conducted to generate qualitative information that complemented and helped explain the findings from the questionnaires. Document analysis was also implemented to explore the alignment of laboratory practice with institutional policy and regulatory requirements. All aspects of Research Ethics were strictly followed, including informed consent, confidentiality, and voluntary participation by all respondents.

Data Analysis Technique

Quantitative, descriptive, and qualitative interpretive methods were used to analyze the data collected. Descriptive percentage statistics were employed to analyze quantitative data derived from the questionnaire responses, indicating how well or poorly the SERVQUAL indicators have been used in the provision of services. The categories for scoring were defined as follows:

Table 2. Criteria for service quality interpretation

Score Range (%)	Category	Interpretation
81 – 100	Very Good	Indicates that the laboratory service quality is excellent and meets or exceeds user expectations in all SERVQUAL dimensions.
61 – 80	Good	Reflects satisfactory service quality, with minor aspects needing improvement.
41 – 60	Fair	Shows that the service quality is moderate, with several weaknesses requiring managerial attention.
21 – 40	Poor	Suggests that service quality is below the expected standard and that significant improvements are needed.
0 – 20	Very Poor	Demonstrates that the service quality is unsatisfactory and fails to meet user expectations.

Table 2 presents the interpretation criteria for the SERVQUAL-based service quality scores used in this study. Each percentage range represents a specific qualitative category describing the perceived level of laboratory service performance, from *Very Poor* to *Very Good*. These criteria guided the quantitative analysis in determining the overall quality level of the Physics Education Laboratory services.

RESULTS AND DISCUSSION

This study evaluated the quality of laboratory management using the CIPP model (Context, Input, Process, and Product) and the SERVQUAL service quality framework. Data were obtained from questionnaires administered to coordinators, laboratory assistants, lecturers, and students, and triangulated with observations and interviews.

Context Evaluation

To assess the suitability of laboratory services for learning needs, coordinators and assistants assessed six SERVQUAL dimensions, including tangible, reliability, responsiveness, assurance, empathy, and information systems, as presented in Table 3.

Table 3. Context evaluation results

SERVQUAL Aspect	Coordinator (%)	Assistant (%)	Category
Tangible	100	85	Very Good
Reliability	100	90	Very Good
Responsiveness	100	80	Very Good
Assurance	100	95	Very Good
Empathy	100	90	Very Good
Information System	100	95	Very Good

As can be seen in Table 3, the findings suggest the great importance of laboratory infrastructure and services to academic interests. The 3 coordinators rated all dimensions at 100%, but the assistants' responders rated "responsiveness" lower (80%) and highlighted that technical service responsiveness should be enhanced. These results are consistent with the indication that laboratory service should provide an accessible, safe, and supportive science learning environment (Laili et al., 2025; Muhlis et al., 2025). Furthermore, the discrepancy in perception between coordinators and assistants indicates that increased transparency of real operational hindrances at the technical level necessitates improved organization and workload allocation among laboratory staff.

Input Evaluation

To evaluate the readiness of laboratory resources to support physics education, an assessment was conducted focusing on four key components: facilities, human resources, policies, and information systems, as presented in Table 4.

Table 4. Input evaluation of laboratory management components

Component	Key Findings	Quality Level
Facilities	Adequate, but some equipment requires upgrading	Good
Human Resources	Competent but needs regular technical training	Good
SOP & Policies	Aligned with national standards (SN-Dikti, BAN-PT, ISO), but implementation consistency varies	Good
Information System	Documentation is still predominantly manual	Fair

The area of laboratory management classified under the input component and its sector is shown in Table 4: infrastructure, human resources, and policy compliance are “Good,” while none have yet reached “Fair” for the existence of an information system. This suggests that the laboratory is suitably equipped and staffed, while the absence of computerized record-keeping may negatively impact the quantification of stocks or the scheduling of maintenance. Furthermore, the results emphasize the need for organized and regular training programs to maintain a consistent level of performance among lab

assistants. It is therefore strategically imperative to increase investment in digital information systems and capacity building to improve service readiness and sustainability.

Process Evaluation

To assess the effectiveness of laboratory operations in supporting learning activities, the performance of laboratory management was evaluated from four perspectives: coordinators, laboratory assistants, lecturers, and students, as presented in Table 5.

Table 5. Process evaluation of laboratory operation and maintenance

Respondent	Score Range (%)	Category
Coordinator	100	Very Good
Laboratory Assistants	80-97	Very Good
Students	84-93	Very Good
Lecturers	84-98	Very Good

As shown in Table 5, Very Good was reported for the laboratory operational and maintenance activities by all respondent categories. Nevertheless, the lower ratings from students and assistants suggest that tool readiness and technical service response should be further developed. (Data have been verified to demonstrate that, while the process controls are well-delivered by the coordinating party, practitioners instead experience delays in operations via equipment failure and extensive diagnosing.) For that reason, it is necessary to have a faster technical response system and preventive maintenance measures to ensure service quality.

Product Evaluation

To determine the impact of laboratory services on student learning outcomes and competency achievement, a product evaluation was conducted using outcome-based questionnaires and document analysis, as shown in Table 6.

Table 6. Product evaluation of learning outcomes and competency achievement

Learning Impact	Result
Conceptual understanding	Very Good
Experimental skills and safety	Very Good
Accuracy of learning procedures	Good
Efficiency of technical support	Good

As shown in Table 6, laboratory work has a strong positive influence on learning, especially on conceptual understanding and scientific skills. We found that with appropriate support, students could conduct safe and reliable experiments. However, the effectiveness of technical support should be enhanced to avoid delays for practical classes. These findings demonstrate that laboratory services in this context are well aligned with learning goals and play a substantial role in the development of physics education competencies.

Synthesis of CIPP Evaluation Results

To provide a comprehensive view of the laboratory service evaluation findings, the results from the Context, Input, Process, and Product components were synthesized. This synthesis aims to highlight overall service quality and identify priority areas for improvement, as shown in Table 7.

Table 7. Synthesis of CIPP evaluation results and implications

CIPP Component	Result	Implication
Context	Very Good	Strong relevance to learning needs
Input	Good	Needs digital enhancement
Process	Very Good	Effective learning support
Product	Very Good	High contribution to learning quality

As seen by Table 7, the laboratory services are ranked with to "Very good" in Context; Process and Product of learning, such that they are highly related to learning objectives, efficient functioning practices, and have a high level contribution by developing student competencies. The level of Input, however, is only at the "Good" because of the disadvantage in digitization form of administration and transactional records. This discovery exposes a missing link in the management of the laboratory system where infrastructure and human resources may well be adequate but relevant information systems have not been maximally harnessed for efficiency and sustainability.

The general assessment indicates that the Physics Education Laboratory serves quality and facility sufficiency to support user's learning activities. The combination of the CIPP and SERVQUAL models gives a more in-depth perspective connecting internal managerial effectiveness to users perceptions as such were not attempted by other studies that generally used these models discretely (Lianawati et al., 2025). The results of the context evaluation categorize all SERVQUAL dimensions as "Very Good," with Coordinators giving uniformly high scores and laboratory assistants deducting slightly more points from responsiveness. This discrepancy reflects an operational technical implementation gap and indicates that the service quality problems are better appreciated by the laboratory staff who work there on a daily basis. The results of the study corroborated earlier studies that highlight coordinating and distributing workload in the laboratory management process (Pradidarma, 2019; Rahmadhani et al., 2022).

Facilities, human resources, and policy alignment were rated "Good". The information system dimension was the lowest with a rating of "Fair" in the Input component. This suggests a significant gap in digitalization, particularly in inventory management, maintenance tracking, and administrative documentation. Such problems are also found in other studies of educational laboratories; limited implementation of a digital management system can impact the efficiency and delay decision-making (Irwandani et al., 2024; Mahdalena et al., 2024). The conclusion drawn from this discovery is that improvement in laboratory service quality cannot be achieved solely by enriching physical facilities, but it should also be accompanied by strengthening digital infrastructure and continuous enhancement of technical skills to support data-driven management.

The Process evaluation passed at the "Very Good" level across all respondent groups, but lower ratings from students and laboratory assistants indicated ongoing challenges with equipment preparation and slow technology response. This reflects a series of donut holes in lab practice – we have the protocols, but they aren't always accompanied by rapid troubleshooting and preventive maintenance mechanisms. These results tie in nicely with past research that underscores the necessity of efficient technical support and prompt maintenance for laboratories to work sustainably (Novitasari et al., 2024; Samputri, 2025). This, in practical terms, means that protocols that ensure uniform response times for calls for assistance and scheduled maintenance work will need to be implemented if practicum practice is not to be disrupted.

Results of the product evaluation reveal that performance on the student achievement tests in conceptual understanding and experimental skills has a strong positive effect, as evidenced by a "Very Good" rating. However, the effectiveness of support was slightly lower than its efficiency counterpart, indicating potential room for improvement if operational barriers were also reduced. To this point, it is also consistent with previous inferences that the well-managed laboratory leads to students having high analytical, procedural, and experimental skills (Hakim et al., 2024; Silaen, 2023). This suggests that enhancing input and process qualities may serve as indirect drivers of long-term learning outcomes and the attainment of competencies.

Aggregating the four CIPP components shows that the main research gap would be in Input, in particular, digitalization and system integration within laboratory management. Despite previous research that has predominantly focused on the adequacy of infrastructure or the satisfaction of users, this study provides a new perspective on the literature, in that it illustrates how deficiencies in input systems can limit otherwise effective performance across context, process, and product dimensions. The primary contribution of our study is the combined use of the CIPP–SERVQUAL framework to explore not only current performance but also structural gaps that impact service persistence. Future research is advised to explore digital laboratory management systems, self-updating inventory control, and virtual lab integration across institutions through comparative or longitudinal study designs as a first step

toward tactically generating best practices to support the continued long-term success of increased lab efficiency and student learning outcomes.

CONCLUSION

The evaluation of the Physics Education Laboratory services using the integrated CIPP–SERVQUAL framework demonstrates that the laboratory effectively supports the learning process. The Context, Process, and Product components received "Very Good" ratings, indicating well-aligned infrastructure with academic needs, effective operational implementation, and positive contributions to student competency, particularly in conceptual understanding and experimental skills. The Input component was rated "Good," highlighting the need for improved digital documentation and resource upgrades to enhance efficiency and sustainability. Recommendations from this study include strengthening digital systems, implementing preventive maintenance, improving technical response times, and conducting future research to explore the impact of digital systems, virtual laboratories, and cross-institutional best practices on laboratory service quality and student learning outcomes.

ACKNOWLEDGMENTS

The authors wish to thank the Faculty and Union workers of the Physics Education Laboratory, Tarbiyah, and Teacher Training at Universitas Islam Negeri Ar-Raniry Banda Aceh for their support in this study. The authors are grateful to the students, teachers, and lab monitors who participated in the surveys, interviews, and observations, making this study feasible with their precious insights. The authors verify that all the people acknowledged have been given permission to be listed, and are not directly responsible for the content or conclusions of this work.

REFERENCES

Afrida, J., Zahriah, Meutiawati, I., & Rahmati. (2025). Kepuasan mahasiswa terhadap layanan laboratorium pendidikan fisika: studi evaluatif dengan model SERVQUAL di UIN Ar-Raniry. *Jurnal Seumike Scientific*, *1*(2), 149–158. https://bansigom.org/jurnal_seumike/index.php/jurnal/article/view/69

Ardhiarisca, O., Aisyah, S., & Harkat, A. (2023). Analisis kepuasan mahasiswa terhadap pelayanan laboratorium di program studi akuntansi sektor publik. *Liabilities Jurnal Pendidikan Akuntansi*, *6*(1), 41–50. https://doi.org/10.30596/liabilities.v6i1.14593

Arsyad, W. O. S., Wero, L. O., Sarman, & Arsyad, L. O. M. N. (2023). Pengelolaan layanan laboratorium terpadu unit fisika dalam menunjang kinerja dan kepuasan mahasiswa Universitas Haluoleo tahun akademik 2022.2. *Community Development Journal*, *4*(2), 2445–2451. https://doi.org/10.31004/cdj.v4i2.14462

Girsang, R. M., & Saragih, L. (2019). Analisa kualitas pelayanan terhadap kepuasan mahasiswa menggunakan laboratorium komputer Universitas Simalungun. *JESYA: Jurnal Ekonomi & Ekonomi Syariah*, *2*(1), 136–144. https://doi.org/10.36778/jesya.v2i1.44

Hakim, L., Arsana, M. P., Tuju, F., Febrianto, Y., Rahman, S., Alfanaar, R., Fatiqin, A., Suprayogi, T., & Decenly. (2024). Pelatihan dan pendampingan mahasiswa fakultas mipa universitas palangka raya dalam peningkatan keterampilan laboratorium. *SERVIZIO ALLA COMUNITA: Jurnal Pengabdian Masyarakat*, *1*(1), 23–27. https://doi.org/10.52760/6wbc7n67

Irvani, A. I., Sriyati, S., Nahadi, Sinaga, P., & Henukh, A. (2024). Evaluasi Program perkuliahan fisika kuantum dengan virtual lab menggunakan model CIPP. *Jurnal Pendidikan MIPA*, *14*(2), 511–520. https:/doi.org/10.37630/jpm.v14i2.1603

Irwandani, Solviana, M. D., & Novitasari, A. (2024). Peran teknologi dalam manajemen inventarisasi laboratorium di SMP dan SMA: systematic literature review dengan metode

PRISMA. *ORYZA: Jurnal Pendidikan Biologi*, *13*(2), 275–285. https:/doi.org/10.33627/oz.v13i2.2768

Jahja, S. R., Hasili, A. S., Faizah, A. U., & Yunus, F. A. M. (2025). Optimalisasi penerapan program kesehatan dan keselamatan kerja (K3) di Laboratorium Kimia dan Mikrobiologi Poltekkes Kemenkes Gorontalo. *Jurnal Keselamatan Kesehatan Kerja Dan Lingkungan (JK3L)*, *06*(1), 94–107. https:/doi.org/10.25077/jk3l.6.1.94-107.2025

Jarnawi, M., Syamsuriwal, & Tadeko, N. (2022). Pengembangan instrumen monitoring dan evaluasi layanan praktikum di Laboratorium Fisika FKIP Universitas Tadulako. *Jurnal Kreatif Online (JKO)*, *10*(3), 99–105. https:/doi.org/10.22487/jko.v10i3.2987

Kurniawati, E. W. (2021). Evaluasi Program pendidikan perspektif model CIPP (context, input, process, product). *GHAITSA : Islamic Education Journal*, *1*(2), 19–25. https://doi.org/10.62159/ghaitsa.v5i3.168

Laili.S, A. A. N., Andini, A. D., Sativa, O., & Magaretta, D. O. (2025). Strategi manajemen laboratorium IPA dalam meningkatkan kualitas praktikum peserta didik di sekolah menengah. *Jurnal Kolaborasi: Sains dan Ilmu Terapan*, *3*(2), 66–73. https://doi.org/10.69688/juksit.v3i2.75

Lianawati, A., Nursalim, M., Hariastuti, R. T., Mufidah, E. F., & Dianasari, A. (2025). Transformation of guidance and counselling programs in vocational schools: integrated evaluation using the CIPP model. *G-COUNS: Jurnal Bimbingan dan Konseling*, *9*(3), 1899–1907. https://doi.org/10.31316/g-couns.v9i3.7456

Mahdalena, Yasir, M., & Idwan, H. (2024). Rancang bangun sistem informasi pencatatan alat laboratorium IPA di SMA Negeri 1 Mutiara, Kabupaten Pidie. *J-MASIF: Jurnal Manajemen Sistem Informasi*, *3*(2), 71–81. https:/doi.org/10.59431/jmasif.v3i2.467

Muhlis, A. N., Kholifah, K. P., & Nuha, Z. Z. (2025). Analisis literatur tentang strategi manajemen laboratorium IPA dalam meningkatkan kualitas praktikum di SMA. *Pentagon : Jurnal Matematika dan Ilmu Pengetahuan Alam*, *3*(2), 87–99. https:/doi.org/10.62383/pentagon.v3i2.526

Mukhlisin, L., Martiana, D. S., Armandio, M. D., & Herwina, W. (2023). Application of the CIPP (context, input, process, product) evaluation model to the Tasikmalaya City Amanah Community Work Training Center Training Program. *CERMIN : JURNAL PENELITIAN*, *7*(1), 11–21. https://doi.org/10.36841/cermin_unars.v7i1.2802

Nahdiyaturrahmah, Pujani, N. M., & Selamet, K. (2020). Pengelolaan laboratorium ilmu pengetahuan alam (IPA) SMP Negeri 2 Singaraja. *Jurnal Pendidikan Dan Pembelajaran Sains Indonesia (JPPSI)*, *3*(3), 118–129. https://doi.org/10.23887/jppsi.v3i2.29592

Napirah, M., Sahara, L., M, H., & Alkamalia, W. (2023). Penyuluhan peran ilmu fisika dalam kehidupan dan pengenalan laboratorium virtual fisika pada siswa madrasah aliyah. *Amal Ilmiah : Jurnal Pengabdian Kepada Masyarakat*, *5*(1), 113–120. https://doi.org/10.36709/amalilmiah.v5i1.126

Novitasari, A., Nurjanah, S., & Solviana, M. D. (2024). Analisis manajemen laboratorium biologi di sekolah menengah atas di Kota Bandar Lampung. *Lensa (Lentera Sains): Jurnal Pendidikan IPA*, *14*(2), 69–74. https://doi.org/10.24929/lensa.v14i2.469

Nugroho, F., Kushartanti, W., & Guntur, G. (2021). Evaluasi manajemen dan penanganan cedera muskuloskeletal di laboratorium klinik terapi fisik FIK UNY dengan model CIPP. *Jurnal Keolahragaan*, *9*(2), 268–278. https:/doi.org/10.21831/jk.v9i2.43139

Nukhbatillah, I. A., Setiawati, S., Hasanah, U., & Nurmalasari, N. (2024). Evaluasi Mutu pendidikan menggunakan pendekatan teori Stufflebeam. *Jurnal Global Futuristik: Kajian Ilmu Sosial Multidisipliner*, *2*(1), 34–43. https://doi.org/10.59996/globalistik.v2i1.352

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL a multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing, 64*(1), 12-40. https://doi.org/10.1016/0737-6782(88)90045-8

Pradidarma, A. B. (2019). Optimasi kinerja asisten laboratorium di Laboratorium Teknik Industri S-1 ITN Malang. *Jurnal Valtech*, *1*(2), 103–108. https://doi.org/10.36040/valtech.v1i2.741

Purwati, Darwis, R., & Natsir, N. A. (2025). Efektivitas laboratorium virtual IPA dalam meningkatkan keterampilan proses sains peserta didik kelas VII pada materi suhu dan kalor. *JPM: Jurnal Pendidikan MIPA*, *15*(1), 322–330. https:/doi.org/10.37630/jpm.v15i1.2574

Rahmadhani, A. A., Cahyani, V. P., Aristyawan, Mamlu'ah, N., Rahmawati, N. D., Andreyana, P., & Defika. (2022). Analisis pengelolaan laboratorium IPA di SMAN 1 Geger Madiun berdasarkan standar manajemen laboratorium. *Annual International Conference on Islamic Education for Students (AICOIES 2022)*, *Aicoies*, 351–360. https://doi.org/10.18326/aicoies.v1i1.289

Rahmania, S., Anggraeni, S., & Supriatno, B. (2021). Laboratory activity design: diagram vee approach on blood structure lesson. *BIODIK: Jurnal Ilmiah Pendidikan Biologi*, *7*(2), 179–195. https:/doi.org/10.22437/bio.v7i2.12997

Samputri, S. (2025). Kajian literatur: tinjauan sistem manajemen laboratorium IPA di SD, SMP, dan SMA. *Jambura Elementary Education Journal*, *6*(1), 46–62. https://doi.org/10.37411/jeej.v6i1.4070

Setiawan, A. A., Jumingin, Lumbantoruan, P., Rahmawati, Iswan, J., & Sihombong, S. C. (2023). Penyuluhan pengelolaan dan kesehatan, keselamatan kerja di Laboratorium IPA SMAN 6 Ogan Komering Ulu Sumatera Selatan. *Kemas Journal: Jurnal Pengabdian Masyarakat*, *1*(1), 18–26. https:/doi.org/10.31851/kemas.v1i1.11491

Shi, Z., & Shang, H. (2020). A review on quality of service and SERVQUAL. *International Conference on Human-Computer*, 188–204. https://doi.org/10.1007/978-3-030-50341-3

Silaen, S. (2023). Basic laboratory management training for institutions. *MOVE : Journal of Community Service and Engagement*, *02*(05), 140–145. https:/doi.org/10.54408/move.v2i5.184

Stufflebeam, D. L. (2003). *The CIPP model for evaluation*. Netherlands: Kluwer Academic Publishers.

Suryadin, A., Sari, W. P., & Nurfitriani. (2022). *Evaluasi program model CIPP (context, input, process, and product) antara teori dan praktiknya*. Yogyakarta: Samudra Biru.

Syukhri. (2018). Analisis kepuasan mahasiswa terhadap pelayanan laboratorium jaringan menggunakan pendekatan importance-performance analysis. *INVOTEK: Jurnal Inovasi Vokasional dan Teknologi*, *18*(2), 109–114. https://doi.org/10.24036/invotek.v18i2.417

Umam, K. A., & Saripah, I. (2018). Using the context, input, process and product (CIPP) model in the evaluation of training programs. *International Journal of Pedagogy and Teacher Education (IJPTE)*, *2*, 183–194. https:/doi.org/10.20961/ijpte.v2i0.26086