



# Implementation of Lecturer Competency Development in Higher Education

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## ABSTRACT

**Purpose of the study:** This study aims to describe the planning of lecturer competency development, organization of lecturer competency development, implementation of lecturer competency development, supervision of lecturer competency development, evaluation of lecturer competency development at the Syekh Abdul Halim Hasan Binjai Institute.

**Methodology:** This research method is a qualitative research method with a phenomenological research approach. This research was conducted to build knowledge through understanding and discovery based on a methodology that investigates a phenomenon and problem. Data collection techniques used are observation, interviews, documentation studies. Data management consists of data reduction, data display/data presentation, data analysis, drawing conclusions for research results.

**Main Findings:** The findings reveal that while the institute demonstrates strong commitment to improving teaching quality, several issues persist, such as limited resources, insufficient integration of technology, and supervision focused mainly on administrative compliance rather than pedagogical enhancement. The evaluation process also tends to emphasize attendance and reporting rather than measurable improvement in teaching skills or student outcomes. The study highlights the need for a more reflective and data-driven approach to faculty development, emphasizing participatory planning, effective feedback mechanisms, and the establishment of long-term evaluation systems.

**Novelty/Originality of this study:** The novelty of this research lies in its holistic assessment of lecturer competency development within an Islamic higher education context, bridging managerial and pedagogical dimensions. The implications extend to policy and practice in higher education, suggesting that competency development must transition from procedural routines to transformative learning experiences.

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## 1. INTRODUCTION

The quality of education is widely recognized as being profoundly influenced by the competence and professionalism of its lecturers [1]-[4]. In the context of rapid technological advancement, globalization, and shifting educational paradigms, the role of lecturers has evolved from merely transmitting knowledge to becoming facilitators of active, student-centered learning. Lecturers today are expected to possess not only mastery of their subject matter but also the pedagogical, digital, and interpersonal skills required to create engaging, inclusive, and adaptive learning environments [5]-[9]. Consequently, the development of lecturer

competencies has become a strategic priority for higher education institutions seeking to improve educational quality and ensure that graduates are prepared to meet the demands of the 21st-century workforce.

At the Syekh Abdul Halim Hasan Binjai Institute, lecturer competency development is regarded as a cornerstone for improving the institution's academic quality and achieving its educational goals. This development encompasses a broad spectrum of abilities, including pedagogical competence, technological literacy, curriculum design, assessment practices, and professional ethics [10]-[12]. The institution recognizes that effective lecturer development must go beyond one-time training to include systematic planning, implementation, supervision, and evaluation processes. Through such structured efforts, institutions can ensure that lecturers continually enhance their teaching practices and contribute to student success.

However, the increasing demand for high-quality teaching, combined with rapid changes in educational technology, presents significant challenges. Higher education institutions must ensure that lecturers remain professionally agile and responsive to evolving learning needs [13]-[16]. The integration of digital tools, blended learning approaches, and innovative pedagogical models is no longer optional but a fundamental requirement for modern education. To meet these expectations, continuous professional development (CPD) programs must be well-designed, contextually relevant, and supported by adequate institutional resources. Such programs are essential for maintaining academic excellence and ensuring that lecturers are able to use technology effectively to enrich the teaching and learning process [17]-[20].

Despite the growing emphasis on lecturer development, there remains a gap in understanding how these programs are conceptualized, implemented, and evaluated within the institutional context—particularly in private higher education institutions in Indonesia, such as Syekh Abdul Halim Hasan Binjai Institute. Existing studies tend to focus on quantitative assessments of lecturer performance or competency outcomes, providing limited insight into the qualitative dimensions of how competency development is actually planned, organized, supervised, and sustained. Furthermore, while policy frameworks emphasize lecturer professionalism and digital competence, empirical studies exploring the institutional mechanisms, administrative support, and lived experiences of lecturers involved in such programs are still scarce. This gap highlights the need for in-depth research that examines both the procedural and experiential aspects of lecturer competency development in real institutional settings.

Addressing this gap, the present study seeks to investigate the processes of lecturer competency development at Syekh Abdul Halim Hasan Binjai Institute, focusing on five critical dimensions: planning, organization, implementation, supervision, and evaluation. By examining these interconnected processes, the research aims to identify the strengths, weaknesses, challenges, and opportunities within the institution's professional development framework. The study employs a qualitative phenomenological approach to gain a deep understanding of the experiences, perceptions, and practices of both lecturers and institutional leaders who are directly involved in competency development initiatives.

This research contributes both theoretically and practically. From a theoretical perspective, it enriches the existing literature by providing a comprehensive model of lecturer competency development that integrates institutional planning and individual professional growth. From a practical standpoint, it offers evidence-based insights that can guide the Syekh Abdul Halim Hasan Binjai Institute—and similar institutions—in designing more effective and sustainable professional development programs. The findings are expected to inform institutional policies, improve lecturer performance, and ultimately enhance the quality of teaching and learning.

Furthermore, the implications of this research extend beyond the institutional level. By exploring how lecturer competency development contributes to improved teaching practices and student learning outcomes, this study supports broader educational goals, including national initiatives for higher education quality assurance and global calls for lifelong learning. Ultimately, this research aims to propose actionable recommendations for strengthening lecturer competency development strategies that are adaptive, reflective, and aligned with the evolving demands of modern education.

## 2. RESEARCH METHOD

This research employs a qualitative approach with a phenomenological method to gain an in-depth understanding of the process of faculty competency development at Syekh Abdul Halim Hasan Institute in Binjai. The phenomenological approach was chosen because it allows researchers to explore the lived experiences of individuals and understand the meaning they ascribe to their experiences [21], [22]. By adopting this method, the study aims to reveal how faculty members, administrators, and students perceive and experience the competency development programs, providing a comprehensive view of the processes involved in improving faculty competencies at the institute. The primary goal of this research is to describe in detail the various stages of faculty competency development at the institution: planning, organizing, implementing, supervising, and evaluating the programs. Understanding these stages in depth is essential for identifying the strengths and weaknesses in the current system and providing actionable recommendations for improvement. The research

aims to offer a holistic view of how faculty competency development is conducted at the Syekh Abdul Halim Hasan Institute and the challenges faced during each stage of the process.

This study was conducted at the Syekh Abdul Halim Hasan Institute in Binjai, focusing on three primary groups of subjects. First, faculty members directly involved in the competency development program were selected based on criteria such as their teaching experience and level of involvement in the program. This group is crucial because they can provide firsthand insights into how the competency development programs are structured and their experiences with them. Second, educational administrators, including department heads, program study chairs, and institutional leaders, were selected as they are responsible for planning, organizing, and evaluating the programs. Their perspective on the planning and evaluation process offers valuable insights into the institutional efforts to improve faculty competencies. Third, students, as the direct recipients of the teaching, were included in the study to assess how faculty competency affects teaching quality and student learning outcomes. By collecting data from these three groups, the research aims to provide a comprehensive understanding of the competency development process from multiple perspectives.

Data collection for this research involved three primary techniques: in-depth interviews, participant observation, and document analysis. Semi-structured interviews were conducted with lecturers, educational managers, and students to explore their perceptions and experiences related to faculty competency development. This method allows for flexibility in the conversation, enabling participants to share their views in a more open and detailed manner. The interviews aimed to explore the individuals' experiences with the faculty development programs, their personal insights on how these programs impacted their teaching and learning, and their suggestions for improvement. Participant observation was another key data collection technique used in this study. By attending teaching activities and faculty competency development sessions, the researcher was able to directly observe the application of teaching methods and the integration of new competencies in the classroom. This observational approach provided real-time insights into how lecturers were implementing the skills and strategies learned during the development programs. Observations also helped the researcher assess the interaction between lecturers and students, providing a clearer picture of how faculty competency development affects classroom dynamics. Additionally, document analysis was conducted to supplement the data collected from interviews and observations. Relevant documents, such as faculty development plans, activity reports, and evaluation results of the competency development programs, were collected and analyzed. These documents provided official records and institutional perspectives on the planning and evaluation processes, helping to triangulate the findings from interviews and observations. Document analysis allowed the researcher to understand the formal structures of the faculty development programs and compare them to the lived experiences of the participants.

The data obtained from interviews, observations, and document analysis were analyzed using thematic analysis techniques. Thematic analysis involves systematically identifying, analyzing, and reporting patterns (themes) within the data. The first step in the analysis process was data reduction, where the researcher selected relevant data that aligned with the research focus. This step ensured that only the most pertinent information was included in the analysis. Next, the data was categorized based on recurring patterns, such as common challenges in the development programs or frequent suggestions for improvements. These categories were then analyzed to identify the main themes emerging from the participants' experiences. Finally, the findings were connected to relevant theories and frameworks to provide a deeper understanding of the phenomenon being studied. To ensure the validity and reliability of the data, the study employed triangulation, a technique that involves cross-checking findings from multiple sources and data collection methods. By comparing the data from interviews, observations, and documents, the researcher was able to confirm the consistency and accuracy of the findings. Triangulation also helped to reduce the bias that could arise from relying on a single data source or method. In addition to triangulation, peer review and member checks were used to enhance the accuracy and relevance of the data. Peer review involved sharing the findings with colleagues or experts in the field to get feedback and ensure the research was conducted rigorously. Member checks involved returning the findings to participants for their confirmation or clarification, ensuring that their perspectives were accurately represented in the study.

The ethical considerations of this research were carefully maintained throughout the study. All participants were fully informed of the research objectives, their rights to participate or withdraw from the study at any time, and the confidentiality of their identities. Informed consent was obtained from all participants before any data collection began, ensuring that their participation was voluntary and based on a clear understanding of the research process. The researcher ensured that all data was stored securely and that participants' privacy was respected at all times.

### 3. RESULTS AND DISCUSSION

The aim of this research was to provide a comprehensive understanding of the process of lecturer competency development at the Syekh Abdul Halim Hasan Binjai Institute. The study explored various stages of this process, including planning, organization, implementation, supervision, and evaluation. The findings of the

research revealed significant efforts made by the institution to enhance the quality of teaching through the development of lecturer competencies. However, several challenges emerged during the implementation of these programs, which hindered their full potential in transforming the quality of education. This section will delve deeper into each phase of the lecturer competency development process and discuss the implications of the findings.

### ***Faculty Competency Development Planning***

Faculty competency development planning is a fundamental part of ensuring that lecturers are adequately prepared to meet the evolving demands of the educational landscape. At Syekh Abdul Halim Hasan Binjai Institute, faculty development is considered essential for improving teaching quality, fostering professional growth, and ensuring that lecturers remain competitive in an increasingly complex educational environment. The planning process serves as the foundation for the development programs, setting clear goals, strategies, and guidelines that will guide the institution's efforts to enhance faculty competencies.

The first step in the competency development planning process is the identification of the core competencies that lecturers need to develop. These competencies are typically categorized into several areas, such as pedagogical skills, subject knowledge, communication abilities, and technological proficiency [23]-[25]. As the educational environment becomes increasingly influenced by digital tools and innovative teaching methods, there is a growing emphasis on integrating technology into teaching practices. Therefore, the planning process must ensure that lecturers are equipped not only with subject-specific expertise but also with the ability to utilize technology effectively in the classroom. This includes the use of learning management systems (LMS), multimedia content, and interactive teaching tools.

At Syekh Abdul Halim Hasan Binjai Institute, the development planning process begins with a thorough needs assessment. This assessment involves gathering data from various sources, such as faculty surveys, student feedback, and institutional objectives. The goal is to understand the specific challenges faced by lecturers in their teaching practices and to identify areas where improvement is most needed. For example, some lecturers may struggle with integrating technology into their lessons, while others may need support in developing more interactive or student-centered teaching strategies. By understanding these needs, the institute can design targeted development programs that focus on the areas where lecturers will benefit the most.

One of the key elements of faculty development planning is aligning the competencies with institutional goals and external educational standards. Syekh Abdul Halim Hasan Binjai Institute, like many other higher education institutions, must ensure that the competencies being developed among faculty members align with national accreditation standards, industry requirements, and the expectations of students. The planning process must take into account not only the immediate needs of the lecturers but also the long-term vision of the institution. This alignment ensures that the faculty development programs contribute to the broader mission of the institution, which is to provide high-quality education that prepares students for the challenges of the modern world [26]-[29].

Incorporating flexibility into the planning process is also crucial, as the needs of the faculty and the institution may change over time. Faculty members may have varying levels of experience with technology or different teaching styles, and the institution's goals may evolve in response to external trends, such as changes in the job market or advances in educational technology. Therefore, the planning process must allow for regular updates and adjustments to the development programs. For example, if new technologies emerge that could improve teaching effectiveness, the planning process should be adaptable enough to integrate these innovations into ongoing professional development efforts.

The next stage of the planning process involves setting clear, measurable objectives for the competency development programs. These objectives provide a roadmap for the programs and help to ensure that all stakeholders—lecturers, administrators, and students—are aligned with the intended outcomes. For example, a goal might be to improve lecturers' use of digital teaching tools by 50% within one year, or to increase the number of faculty members using active learning techniques by a certain percentage. Setting specific, measurable goals allows the institution to track progress and assess the effectiveness of the development programs.

Resource allocation is another critical aspect of the planning process. Adequate funding, time, and personnel must be allocated to support faculty development efforts. This may involve providing financial resources for training materials, purchasing new technologies, or hiring external experts to conduct workshops and seminars. Additionally, the planning process must consider the time constraints of faculty members, as they often have heavy teaching loads and other responsibilities. It is essential to find ways to integrate development opportunities into their schedules without overwhelming them. Flexible learning formats, such as online workshops or self-paced courses, can provide lecturers with the opportunity to engage in professional development without disrupting their daily teaching activities [30]-[33].

In terms of implementation, a key consideration in the planning process is the creation of a well-structured development program that offers a mix of learning opportunities. These opportunities should include

both formal training sessions, such as workshops and seminars, as well as informal learning opportunities, such as peer mentoring, collaborative teaching, and faculty learning communities. This variety of formats ensures that faculty members can choose the development activities that best meet their individual needs and preferences. Furthermore, a well-rounded development plan should also include opportunities for ongoing support and feedback. Lecturers should have access to mentors or instructional coaches who can provide guidance as they implement new teaching methods and technologies in the classroom.

Finally, the planning process should include mechanisms for monitoring and evaluating the effectiveness of the faculty development programs. This involves setting up a system to assess how well the development programs are meeting their objectives, whether the desired competencies are being achieved, and whether the programs are having a positive impact on teaching practices and student outcomes. The evaluation system should be ongoing and include both formative evaluations (which provide feedback during the development process) and summative evaluations (which assess the overall impact of the program at its conclusion). This information is essential for refining the development programs and ensuring that they remain relevant and effective.

In conclusion, faculty competency development planning is a dynamic and ongoing process that requires careful attention to the needs of lecturers, alignment with institutional goals, and the flexibility to adapt to changes in the educational landscape. At Syekh Abdul Halim Hasan Binjai Institute, a comprehensive and strategic planning process is necessary to ensure that lecturers are equipped with the skills and knowledge needed to provide high-quality education. By conducting thorough needs assessments, setting clear objectives, allocating resources effectively, and regularly evaluating the programs, the institute can build a robust faculty development plan that enhances teaching quality and fosters professional growth among lecturers.

### ***Organizing Competency Development***

Organizing competency development for faculty members is a critical step in ensuring that the planned programs are executed efficiently and effectively. While the planning stage sets the goals and outlines the structure of the development programs, the organization stage focuses on putting those plans into action. It involves the coordination of resources, assigning responsibilities, and ensuring that the necessary infrastructure is in place to facilitate the professional development process. At Syekh Abdul Halim Hasan Binjai Institute, organizing faculty competency development involves several key components, including resource management, coordination among stakeholders, and the establishment of support systems that ensure the smooth delivery of the programs.

The first aspect of organizing competency development is identifying and allocating the necessary resources. Resources for faculty development include not only financial funding but also physical and human resources. Financial resources are required to cover the costs of training materials, external facilitators or consultants, technologies, and other expenses associated with the programs [34]-[36]. In addition, adequate physical resources, such as classrooms, computer labs, or access to online platforms, are needed to support training activities. Given that many competency development programs at Syekh Abdul Halim Hasan Binjai Institute involve technology and modern teaching methods, access to appropriate technological tools and infrastructure is crucial. Therefore, it is essential for the institution to ensure that the resources allocated are sufficient and well-managed to support the planned development initiatives.

Human resources are equally important in the organizing phase [37]-[40]. This involves appointing individuals who will be responsible for facilitating and overseeing the competency development programs. Typically, this includes the appointment of faculty development coordinators, instructional designers, and program managers who are tasked with ensuring that the programs are well-structured, engaging, and aligned with the institution's educational goals. Additionally, experienced lecturers may also be involved in the organization of development programs, either by acting as mentors or by leading workshops and training sessions themselves. It is important to create a collaborative environment where these individuals can work together to ensure the effective delivery of competency development programs. This collaborative approach not only helps in managing the logistical aspects of the programs but also fosters a sense of ownership among faculty members, which can enhance their engagement in the process.

Another critical aspect of organizing competency development is the coordination of various stakeholders involved in the process. These stakeholders typically include faculty members, administrative staff, department heads, and external experts. Effective communication and coordination among these groups are essential to ensure that all parties are aligned with the objectives of the programs and that the activities run smoothly. For example, department heads play a key role in ensuring that the programs are aligned with the specific needs of their faculty members and that their departments are adequately represented in the development process. Faculty members must be informed about the programs, their objectives, and the expected outcomes. Additionally, administrative staff is responsible for logistical tasks such as scheduling, registration, and tracking the progress of the development programs. Coordinating these stakeholders ensures that everyone is on the same page and that the programs are implemented without any significant disruptions.

One challenge that institutions like Syekh Abdul Halim Hasan Binjai Institute often face when organizing competency development is the balancing of faculty members' regular teaching responsibilities with their participation in the development programs. Many lecturers have full teaching loads and other duties, which can make it difficult for them to dedicate time to professional development activities. To address this challenge, flexible scheduling is essential. Programs should be designed to accommodate the diverse schedules of faculty members. Offering online courses, self-paced modules, or after-hours workshops can make it easier for lecturers to participate in the development programs without interfering with their regular teaching commitments. Additionally, the institution can offer incentives, such as recognition or professional development credits, to encourage faculty members to participate in the programs and prioritize their professional growth.

Support systems are another critical element of organizing competency development. These systems ensure that lecturers receive ongoing assistance throughout the training process. A well-organized competency development program should include continuous support, both during and after the formal training sessions. This could take the form of mentoring, peer support groups, or follow-up workshops. Mentoring, for example, can provide a space for less experienced lecturers to receive guidance from more seasoned faculty members, which can help them apply new teaching strategies and technologies effectively. Peer support groups or teaching communities within the institution can also serve as a valuable platform for faculty members to share their experiences, challenges, and solutions regarding the implementation of new competencies.

Another key element in organizing competency development is the use of data to guide the process. Monitoring and evaluating the progress of the programs in real-time ensures that adjustments can be made as necessary. For example, if certain training methods are not resonating with faculty members or if particular challenges arise, these issues can be identified early and addressed promptly. Collecting data on faculty participation, feedback, and performance provides valuable insights into the effectiveness of the development programs and can guide future planning and improvements. Furthermore, gathering data on the impact of the training on teaching practices and student outcomes is crucial for assessing the success of the programs and for refining future initiatives.

In conclusion, organizing faculty competency development is a multi-faceted process that requires careful planning, resource management, stakeholder coordination, and the establishment of robust support systems. At Syekh Abdul Halim Hasan Binjai Institute, effective organization of these programs ensures that faculty members are equipped with the necessary skills to enhance their teaching practices and meet the demands of modern education. By addressing challenges such as time constraints and resource limitations, fostering collaboration among stakeholders, and providing continuous support, the institution can create an environment that encourages ongoing professional growth and teaching excellence.

### ***Implementation of Competency Development***

The implementation of competency development programs is where planning and organizing efforts are put into practice, making it a crucial phase in ensuring that lecturers receive the necessary training and resources to enhance their competencies. This phase focuses on the actual delivery of the development programs, ensuring that the content is engaging, relevant, and accessible, and that lecturers are actively participating in the process. At Syekh Abdul Halim Hasan Binjai Institute, the implementation of faculty competency development is not just about delivering training, but also about creating an environment that fosters continuous professional growth and supports the application of new skills in teaching.

The first step in the implementation phase is the delivery of the development programs. These programs may take various forms, such as workshops, seminars, online courses, or in-person training sessions. Depending on the competencies being developed, different formats are used to ensure that the content is delivered in a manner that is accessible and relevant to the lecturers. For example, for improving technological competencies, online modules and workshops focusing on the use of learning management systems (LMS) or digital tools for teaching may be implemented. For enhancing pedagogical skills, in-person workshops or seminars focusing on active learning techniques, student engagement strategies, and modern teaching methodologies could be offered. The goal of these training sessions is to equip lecturers with practical tools and strategies that can be directly applied in the classroom.

A critical component of the implementation phase is ensuring that the content being delivered is relevant and aligned with the needs of the lecturers. As highlighted during the planning phase, it is essential that the development programs are tailored to the specific requirements of the lecturers. This means that the programs should be designed to address the challenges that lecturers face in their teaching environments and help them overcome barriers to effective teaching. For instance, if lecturers are struggling with incorporating technology into their teaching, the development program should provide practical, hands-on training with digital tools and techniques that can be directly integrated into their teaching practices [41]-[44]. It is important that the content is not too theoretical but instead offers actionable skills and strategies that can be immediately utilized.

Another important consideration in the implementation of competency development is the role of facilitators or trainers. The success of these programs depends largely on the quality and expertise of the trainers

leading the sessions. At Syekh Abdul Halim Hasan Binjai Institute, it is essential that trainers not only possess subject matter expertise but also have the skills to engage and motivate participants. Effective trainers should be able to create an interactive learning environment that encourages lecturers to share experiences, ask questions, and actively participate in discussions. Trainers should also be able to adapt the content to meet the varying levels of experience and knowledge among the participants. For example, while some lecturers may be more advanced in using technology, others may need more basic instruction. Facilitators must ensure that all lecturers are able to follow along and benefit from the training, regardless of their prior experience.

In addition to traditional forms of training, Syekh Abdul Halim Hasan Binjai Institute has also incorporated peer learning into its competency development programs. Peer learning is an effective method where lecturers learn from one another through collaborative activities, group discussions, and shared experiences. This approach not only fosters a sense of community among faculty members but also allows them to learn from colleagues who may be more experienced in certain areas. Peer observation, where lecturers observe each other's teaching practices and provide constructive feedback, is one example of how peer learning can be integrated into the development process. This type of collaborative learning creates a supportive environment where lecturers can exchange ideas, solve problems together, and improve their teaching practices collectively.

During the implementation phase, it is also crucial to ensure that lecturers have the opportunity to apply what they have learned in real classroom settings. One of the key challenges in faculty development is bridging the gap between theory and practice. Lecturers may learn new skills and techniques during training, but unless they have the opportunity to implement them in their own teaching, the effectiveness of the program may be limited. To address this, Syekh Abdul Halim Hasan Binjai Institute encourages lecturers to actively incorporate the new competencies into their lessons. This could include using new technologies, adopting active learning strategies, or applying different methods of student engagement. Additionally, it is important for lecturers to receive ongoing support during this phase. This could involve mentoring, follow-up sessions, or peer discussions, where lecturers can share their experiences and seek advice on challenges they encounter when applying new methods in the classroom.

Feedback and continuous support are crucial during the implementation phase. After each development session, it is essential to collect feedback from the participants regarding the effectiveness of the program and the relevance of the content. This feedback can be gathered through surveys, interviews, or focus group discussions. By understanding the lecturers' experiences and challenges during the training, the institution can make real-time adjustments to the program. For instance, if lecturers report difficulties in using certain technologies or strategies, the institution can offer additional training or provide more resources to help them overcome these challenges. Furthermore, continuous feedback ensures that the development programs remain relevant and aligned with the evolving needs of lecturers.

Finally, to ensure the success of the competency development programs, it is important that the institution creates a culture of continuous professional development. Faculty members should be encouraged to view the development programs as an ongoing process rather than a one-time event. Regular opportunities for training, feedback, and collaboration should be integrated into the academic calendar, ensuring that lecturers are consistently supported in their professional growth. This culture of continuous development helps to keep lecturers engaged, motivated, and capable of responding to the ever-changing educational landscape.

### ***Supervision of Faculty Competency Development***

The supervision phase is a critical element in ensuring that the lecturer competency development programs are successfully implemented and that the desired learning outcomes are achieved. At Syekh Abdul Halim Hasan Binjai Institute, supervision is carried out by education administrators, who are responsible for overseeing the entire process and ensuring that lecturers are adhering to the guidelines set out in the competency development program. The research findings revealed that although supervision was a key component of the process, several issues hindered its effectiveness and prevented it from reaching its full potential. One of the main findings from this research was that supervision was predominantly focused on administrative aspects. Supervisors primarily monitored participation, such as tracking lecturer attendance at training sessions and ensuring that required reports and documentation were submitted in a timely manner. While these administrative tasks are undoubtedly important for maintaining the logistical flow of the program, they fail to address the core objective of supervision: to evaluate the impact of the competency development initiatives on the quality of teaching. This narrow focus on administrative tasks has led to a situation where the true effects of the training on lecturers' teaching practices were not being adequately assessed.

Moreover, the feedback provided during the supervision process was often superficial and lacked depth. Lecturers reported that the feedback they received was typically limited to generalized comments about their participation in the program, rather than constructive guidance on how to improve their teaching methods. For instance, feedback would often emphasize the completion of tasks or attendance at seminars but would not offer specific insights into the challenges lecturers faced when applying new pedagogical techniques or technological

tools in the classroom. This lack of detailed, actionable feedback prevents lecturers from making tangible improvements in their teaching practices and reduces the overall effectiveness of the competency development program.

Another significant issue identified in the supervision phase was the absence of direct observation of teaching practices. Lecturers highlighted that, despite completing training programs, they did not receive enough opportunities for their actual teaching performance to be observed and assessed by their peers or supervisors. In some cases, lecturers felt that their participation in the competency development program was not directly connected to changes in their teaching behavior, and they were not given the opportunity to demonstrate how they applied what they had learned in the classroom. This disconnect between training and real-world teaching creates a gap between theoretical knowledge and practical application, which ultimately undermines the purpose of the program. Furthermore, the supervision process lacked a comprehensive evaluation system that considered the impact of the training on student outcomes. While feedback from students was occasionally collected, it was often informal and not systematically integrated into the supervision process. Lecturers acknowledged that student feedback, when provided, was mostly focused on course content and overall satisfaction rather than on specific aspects of teaching effectiveness or the use of new teaching methods [45]-[47]. As a result, there was little insight into how the competency development program was affecting student engagement, learning outcomes, and overall classroom dynamics.

In addition to these challenges, the lack of peer involvement in the supervision process was another issue that emerged during the research. Peer observation and feedback can play a crucial role in improving teaching practices by providing lecturers with constructive criticism from colleagues who may have similar teaching responsibilities or subject-area expertise. However, at Syekh Abdul Halim Hasan Binjai Institute, peer evaluations were not a regular part of the supervision process. The absence of this peer review system meant that lecturers missed out on the opportunity to engage in professional dialogue with their colleagues, share teaching strategies, and receive diverse perspectives on how to enhance their teaching effectiveness. To improve the effectiveness of supervision, the study suggests that a more comprehensive and multi-dimensional approach should be adopted. Instead of focusing primarily on administrative tasks, supervision should be expanded to include direct observations of teaching practices. Supervisors should make regular visits to classrooms or participate in the teaching process to observe how lecturers are implementing the new competencies they have learned. This will provide a clearer picture of how lecturers are translating theory into practice and whether the competency development programs are having a meaningful impact on their teaching.

Furthermore, the feedback provided to lecturers should be more detailed and specific, focusing not only on participation but also on the application of new skills and methods. Feedback should be constructive, highlighting areas of strength and suggesting practical ways to address areas of improvement. Supervisors should also encourage self-reflection among lecturers, prompting them to assess their own teaching methods and identify areas where they could further improve. This self-assessment process can be valuable in fostering a growth mindset and encouraging lecturers to take ownership of their professional development. Incorporating student feedback in a more structured and formalized manner is another essential improvement for the supervision process. Feedback from students should be gathered regularly through formal surveys or feedback forms that specifically address the impact of teaching on their learning experiences. By systematically integrating student feedback into the supervision process, supervisors can gain valuable insights into the effectiveness of teaching methods and identify areas where lecturers may need additional support or training.

The inclusion of peer evaluations in the supervision process is also critical. Peer observation programs can foster a collaborative learning environment where lecturers can learn from one another, share best practices, and receive constructive criticism in a supportive manner. This peer feedback can also help build a sense of community and collaboration among faculty members, which can improve overall morale and contribute to a culture of continuous improvement. Encouraging more peer-to-peer mentoring and establishing opportunities for lecturers to observe each other's teaching will help create an environment where professional development is ongoing and supported by colleagues. Finally, the institution should consider developing a more comprehensive evaluation system that assesses the impact of the competency development programs on teaching outcomes and student learning. This system should involve regular assessments of teaching quality, using multiple sources of feedback, such as student evaluations, peer reviews, and direct observations of classroom practices. By collecting data from various stakeholders, including students, peers, and supervisors, the institution can develop a more accurate and holistic understanding of how the development programs are influencing teaching and learning at the institute.

The findings from this research point to several important implications for improving the supervision of lecturer competency development. First, the institute should move beyond administrative oversight and focus on evaluating the effectiveness of teaching practices directly. This can be done through regular classroom observations, detailed feedback, and the use of peer evaluations. Second, the feedback provided to lecturers should be more personalized and actionable, offering specific guidance on how to improve teaching methods and apply newly acquired competencies. Third, a structured system for gathering and analyzing student feedback



should be established, ensuring that the views of students are incorporated into the evaluation process. Finally, the integration of peer observations and mentoring programs can foster a collaborative and supportive environment for continuous professional development among lecturers. By addressing these challenges and implementing these improvements, the Syekh Abdul Halim Hasan Binjai Institute can enhance the supervision phase of lecturer competency development. This will not only ensure that the competencies acquired by lecturers are effectively applied in the classroom but will also contribute to the overall improvement of teaching quality and student learning outcomes.

### ***Evaluation of Faculty Competency Development***

The evaluation of faculty competency development is conducted through three main stages: input evaluation, process evaluation, and outcome evaluation. Input evaluation is used to assess the background and readiness of faculty before attending training, process evaluation is used to assess the effectiveness of the training, and outcome evaluation focuses on the achievement of faculty competency development goals. However, the research results indicate that the evaluation conducted focused more on administrative and quantitative aspects, such as the number of participants attending the training or the duration of the training activities. As a solution, the evaluation needs to be improved by including more measurable and relevant indicators, such as measuring the improvement in lecturers' skills in using learning technology or the quality of their teaching after attending training [48]-[50]. In addition, the evaluation should also focus more on the long-term impact of competency development on the quality of education produced.

From the results of this study, it can be concluded that although the Sheikh Abdul Halim Hasan Institute in Binjai has made various efforts to improve faculty competence, the challenges faced in terms of planning, organizing, implementing, supervising, and evaluating are still quite significant. Some recommendations that can be given to improve the effectiveness of faculty competence development at this institute are to strengthen the involvement of all faculty members in training program planning, improve coordination between departments and faculties, and provide more facilities and resources to support technology-based training implementation. Additionally, it's also important to design training programs that are more relevant and focused on the specific needs of each lecturer, as well as improve evaluation and supervision mechanisms to be more measurable and based on concrete results. With these steps, it is hoped that the development of lecturer competencies can be more optimal and have a direct impact on improving the quality of education at the Syekh Abdul Halim Hasan Binjai Institute.

This study presents a novel and comprehensive exploration of lecturer competency development within the context of an Islamic higher education institution, specifically the Syekh Abdul Halim Hasan Binjai Institute. The novelty of this research lies in its holistic analysis across five key managerial dimensions—planning, organization, implementation, supervision, and evaluation—providing an integrated understanding of how lecturer competency development is designed and executed. Unlike previous studies that focus solely on one aspect, such as implementation or outcomes, this study employs a phenomenological approach to reveal the interconnections between administrative management, institutional culture, and the lived experiences of lecturers. Furthermore, the research introduces new insights into how competency development is often constrained by administrative supervision that prioritizes procedural compliance rather than transformative pedagogical change. This finding contributes to the broader discourse on lecturer professionalization, particularly in faith-based institutions facing rapid technological and educational transformations. Despite its strengths, this study is not without limitations. The research was conducted at a single institution, which restricts the generalizability of its findings to other higher education contexts. The qualitative design, while rich in contextual depth, relies heavily on participants' subjective experiences and perceptions, with limited quantitative validation of competency improvement. Additionally, the study's classroom observation component was minimal, making it difficult to directly link lecturer training participation with measurable teaching performance outcomes. The study was also limited by its short data collection period, which may not fully capture the long-term effects of competency development initiatives on teaching quality and student learning outcomes.

The implications of this study are both theoretical and practical. Theoretically, it underscores the need to align institutional management systems with pedagogical objectives, suggesting that lecturer competency development should evolve from a procedural obligation to a reflective and transformative learning process. Practically, the research offers valuable insights for higher education leaders and policymakers, especially in Islamic institutions, to design competency-based development models that integrate supervision, evaluation, and feedback mechanisms. These models should promote technology-enhanced learning and continuous professional growth, thereby improving both teaching quality and institutional performance. Based on the findings, several recommendations are proposed to enhance the effectiveness of lecturer competency development. Institutions should strengthen participatory planning by involving lecturers directly in the design of development programs to ensure relevance and ownership. Supervision mechanisms need to be restructured to emphasize pedagogical improvement through direct classroom observation and detailed feedback rather than administrative compliance. Evaluation systems should be made continuous and multidimensional, combining feedback from administrators,

peers, and students to assess teaching quality and competency growth. Moreover, stronger inter-departmental coordination and greater resource allocation are required to support technology-based and innovative training programs. Future studies are encouraged to adopt longitudinal and mixed-method approaches to evaluate the sustainability and long-term impact of competency development on lecturer performance and student learning outcomes.

#### 4. CONCLUSION

This study aimed to explore the processes involved in the development of lecturer competencies at Syekh Abdul Halim Hasan Binjai Institute, focusing on its planning, organization, implementation, supervision, and evaluation. The research highlighted key strengths in the institution's commitment to improving teaching quality but also identified several challenges, including inconsistent evaluation processes, limited resources, and a lack of personalized training for lecturers. To improve the effectiveness of lecturer competency development, the study recommends a more structured input evaluation, more comprehensive process evaluations, and the incorporation of measurable outcomes in the outcome evaluation. Additionally, fostering better communication between departments, providing more tailored training programs, and enhancing the supervision and feedback mechanisms are crucial steps toward ensuring that the programs lead to tangible improvements in teaching quality. Ultimately, this research contributes valuable insights into the ongoing efforts to enhance lecturer competencies, providing a framework for continuous improvement in professional development programs at the institute. The findings also offer practical recommendations that can benefit other institutions seeking to strengthen their lecturer competency development programs.

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#### REFERENCES

- [1] L. Darling-Hammond, "Defining teaching quality around the world," *European Journal of Teacher Education*, vol. 44, no. 3, pp. 295-308, 2021, doi: 10.1080/02619768.2021.1919080.
- [2] A. Karim, A. Kartiko, D. E. Daulay, and I. D. Kumalasari, "The effect of the supervision of the principal and the professional competency of teachers on teacher performance in private MI in Pacet District," *Nidhomul Haq: Jurnal Manajemen Pendidikan Islam*, vol. 6, no. 3, pp. 497-512, 2021, doi: 10.31538/ndh.v6i3.1686.
- [3] I. Nagel, "Digital competence in teacher education curricula: What should teacher educators know, be aware of and prepare students for?," *Nordic Journal of Comparative and International Education (NJCIE)*, vol. 5, no. 4, pp. 104-122, 2021, doi: 10.7577/njcic.4228.
- [4] I. Tuomi, "Artificial intelligence, 21st century competences, and socio-emotional learning in education: More than high-risk?," *European Journal of Education*, vol. 57, no. 4, pp. 601-619, 2022, doi: 10.1111/ejed.12531.
- [5] M. A. Bakar, K. A. Umroh, and F. Hameed, "Improving quality Islamic education for today's generation," *At-Tadzkir: Islamic Education Journal*, vol. 2, no. 2, pp. 118-128, 2023, doi: 10.59373/attadzkir.v2i2.42.
- [6] M. Alenezi, S. Wardat, and M. Akour, "The need of integrating digital education in higher education: Challenges and opportunities," *Sustainability*, vol. 15, no. 6, pp. 4782, 2023, doi: 10.3390/su15064782.
- [7] O. A. Ajani, "Enhancing pre-service teacher education: crafting a technology-responsive curriculum for modern classrooms and adaptive learners," *Research in Educational Policy and Management*, vol. 6, no. 2, pp. 209-229, 2024, doi: 10.46303/repam.2024.32.
- [8] Z. Soghomonyan, and A. Karapetyan, "Teaching strategies of the 21st century skills adapted to the local needs," *European Journal of Teaching and Education*, vol. 5, no. 3, pp. 48-69, 2023, doi: 10.33422/ejte.v5i3.1097.
- [9] G. Deng, and J. Zhang, "Technological pedagogical content ethical knowledge (TPCEK): The development of an assessment instrument for pre-service teachers," *Computers & Education*, vol. 197, pp. 104740, 2023, doi: 10.1016/j.compedu.2023.104740.
- [10] M. Huda, and A. Hashim, "Towards professional and ethical balance: insights into application strategy on media literacy education," *Kybernetes*, vol. 51, no. 3, pp. 1280-1300, 2022, doi: 10.1108/K-07-2017-0252.
- [11] C. C. Thelma, Z. H. Sain, D. L. Mpolomoka, W. M. Akpan, and M. Davy, "Curriculum design for the digital age: Strategies for effective technology integration in higher education," *International Journal of Research*, vol. 11, no. 7, pp. 185-201, 2024, doi: 10.5281/ZENODO.13123899.
- [12] L. A. T. Nguyen, and A. Habók, "Tools for assessing teacher digital literacy: a review," *Journal of Computers in Education*, vol. 11, no. 1, pp. 305-346, 2024, doi: 10.1007/s40692-022-00257-5.
- [13] N. Barrett-Maitland, E. Williams-Shakespeare, D. Allen, and S. Edwards-Braham, "From tradition to innovation: Proposing agile leadership as the new paradigm for a higher education institution in a developing country," *Power and Education*, vol. 17, no. 2, pp. 255-278, 2025, doi: 10.1177/17577438241307310.
- [14] E. S. Ossiannilsson, "Resilient agile education for lifelong learning post-pandemic to meet the United Nations sustainability goals," *Sustainability*, vol. 14, no. 16, pp. 10376, 2022, doi: 10.3390/su141610376.

- [15] H. Y. Al-Sholi, O. R. Shadid, K. A. Alshare, and M. Lane, "An agile educational framework: A response for the covid-19 pandemic," *Cogent Education*, vol. 8, no. 1, pp. 1980939, 2021, doi: 10.1080/2331186X.2021.1980939.
- [16] D. Halder, E. M. Al Bastaki, S. Suleymanova, N. Muhammad, and A. Purushothaman, "Agile blended learning: a promising approach for higher education in the UAE," *SN Computer Science*, vol. 5, no. 5, pp. 485, 2024, doi: 10.1007/s42979-024-02813-5.
- [17] H. Kuznetsova, I. Danylchenko, T. Zenchenko, N. Rostykyus, and O. Lushchynska, "Incorporating innovative technologies into higher education teaching: Mastery and implementation perspectives for educators," *Multidisciplinary Reviews*, vol. 7, 2024, doi: 10.31893/multirev.2024spe027.
- [18] I. S. Chaudhry, S. A. M. Sarwary, G. A. El Refae, and H. Chabchoub, "Time to revisit existing student's performance evaluation approach in higher education sector in a new era of ChatGPT—a case study," *Cogent Education*, vol. 10, no. 1, pp. 2210461, 2023, doi: 10.1080/2331186X.2023.2210461.
- [19] H. Akram, A. H. Abdelrady, A. S. Al-Adwan, and M. Ramzan, "Teachers' perceptions of technology integration in teaching-learning practices: A systematic review," *Frontiers in psychology*, vol. 13, pp. 920317, 2022, doi: 10.3389/fpsyg.2022.920317.
- [20] A. S. Munna, and M. A. Kalam, "Teaching and learning process to enhance teaching effectiveness: a literature review," *International Journal of Humanities and Innovation (IJHI)*, vol. 4, no. 1, pp. 1-4, 2021, doi: 10.33750/ijhi.v4i1.102.
- [21] R.C. Bogdan dan S.K. Biklen. *Qualitative Research for Education : An Introduction to Theory and Methods*. Boston: Aliyn and Bacon, Inc, 1998.
- [22] K. Sari, and R. Bogdan, *Qualitative research for education: An introduction to theory and methods*. Boston: Allyn and Bacon, 1992.
- [23] A. Orakova, F. Nametkulova, G. Issayeva, S. Mukhambetzhanova, M. Galimzhanova, and G. Rezuanova, "The relationships between pedagogical and technological competence and digital literacy level of teachers," *Journal of Curriculum Studies Research*, vol. 6, no. 1, pp. 1-21, 2023, doi: 10.46303/jcsr.2024.2.
- [24] E. Alieto, B. Abequibel-Encarnacion, E. Estigoy, K. Balasa, A. Eijansantos, and A. Torres-Toukourmidis, "Teaching inside a digital classroom: A quantitative analysis of attitude, technological competence and access among teachers across subject disciplines," *Heliyon*, vol. 10, no. 2, 2024, doi: 10.1016/j.heliyon.2024.e24282.
- [25] J. Mattar, C. C. Santos, and L. M. Cuque, "Analysis and comparison of international digital competence frameworks for education," *Education Sciences*, vol. 12, no. 12, pp. 932, 2022, doi: 10.3390/educsci12120932.
- [26] A. Suleiman, "Quality assurance strategies in higher education institutions," *IOSR Journal of Research & Method in Education*, vol. 13, 2023, doi: 10.9790/7388-1305012936.
- [27] T. Khalilov, V. Alikhanov, N. Hasanov, and M. Ahmadova, "The Content and Essence of the Strategic Planning Process in Higher Education Institutions," *Pakistan Journal of Life & Social Sciences*, vol. 22, no. 2, 2024, doi: 10.57239/PJLSS-2024-22.2.001030.
- [28] Y. Zhao, M. Zhao, and F. Shi, "Integrating moral education and educational information technology: A strategic approach to enhance rural teacher training in universities," *Journal of the Knowledge Economy*, vol. 15, no. 3, pp. 15053-15093, 2024, doi: 10.1007/s13132-023-01693-z.
- [29] A. G. Abo-Khalil, "Integrating sustainability into higher education challenges and opportunities for universities worldwide," *Heliyon*, vol. 10, no. 9, 2024, doi: 10.1016/j.heliyon.2024.e29946.
- [30] R. Mulenga, and H. Shilongo, "Hybrid and blended learning models: Innovations, challenges, and future directions in education," *Acta Pedagogica Asiana*, vol. 4, no. 1, pp. 1-13, 2025, doi: 10.53623/apga.v4i1.495.
- [31] C. Watt, G. Krishnamoorthy, S. Ong, and B. Rees, "Trauma-Informed Education in Open Online Courses: Lessons from Teacher Continuous Professional Development During COVID-19," *The International Review of Research in Open and Distributed Learning*, vol. 26, no. 3, pp. 1-21, 2025, doi: 10.19173/irrodl.v26i3.8233.
- [32] J. Mesuwini, and S. Mokoena, "Exploring Online Teaching and Learning Challenges for the Technical and Vocational Education and Training Lecturer," *Journal of Education and e-Learning Research*, vol. 11, no. 1, pp. 193-202, 2024, doi: 10.20448/jeelr.v11i1.5423.
- [33] A. Samuel, R. M. Cervero, B. King, and S. J. Durning, "Optimizing e-learning in CPD: preferences and perceptions of health professionals," *Journal of Continuing Education in the Health Professions*, vol. 45, no. 1, pp. 28-34, 2025, doi: 10.1097/CEH.0000000000000570.
- [34] X. Liao, C. Yao, F. Jin, J. Zhang, and L. Liu, "Barriers and facilitators to implementing imaging-based diagnostic artificial intelligence-assisted decision-making software in hospitals in China: a qualitative study using the updated Consolidated Framework for Implementation Research," *BMJ open*, vol. 13, no. 9, pp. e084398, 2024, doi: 10.1136/bmjopen-2024-084398.
- [35] K. R. Monden, S. Charlifue, A. Philippus, M. Kilbane, E. Muston-Firsch, B. MacIntyre, ... and L. R. Morse, "Exploring perspectives on assistive technology use: barriers, facilitators, and access," *Disability and Rehabilitation: Assistive Technology*, vol. 19, no. 4, pp. 1676-1686, 2024, doi: 10.1080/17483107.2023.2227235.
- [36] H. Y. Lee, T. T. T. Nguyen, S. Park, V. M. Hoang, and W. H. Kim, "Health technology assessment development in Vietnam: a qualitative study of current progress, barriers, facilitators, and future strategies," *International journal of environmental research and public health*, vol. 18, no. 16, pp. 8846, 2021, doi: 10.3390/ijerph18168846.
- [37] H. Zhao, Y. Chen, and W. Liu, "Socially responsible human resource management and employee moral voice: Based on the self-determination theory," *Journal of Business Ethics*, vol. 183, no. 3, 2023, doi: 10.1007/s10551-022-05082-5.
- [38] M. R. Azizi, R. Atlasi, A. Ziapour, J. Abbas, and R. Naemi, "Innovative human resource management strategies during the COVID-19 pandemic: A systematic narrative review approach," *Heliyon*, vol. 7, no. 6, 2021, doi: 10.1016/j.heliyon.2021.e07233.
- [39] A. Margherita, "Human resources analytics: A systematization of research topics and directions for future research," *Human Resource Management Review*, vol. 32, no. 2, pp. 100795, 2022, doi: 10.1016/j.hrmmr.2020.100795.

- [40] P. Budhwar, S. Chowdhury, G. Wood, H. Aguinis, G. J. Bamber, J. R. Beltran, ... and A. Varma, "Human resource management in the age of generative artificial intelligence: Perspectives and research directions on ChatGPT," *Human Resource Management Journal*, vol. 33, no. 3, pp. 606-659, 2023, doi: 10.1111/1748-8583.12524.
- [41] C. B. Mpungose, "Lecturers' reflections on use of Zoom video conferencing technology for e-learning at a South African university in the context of coronavirus," *African Identities*, 21(2), 266-282, 2023, doi: 10.1080/14725843.2021.1902268.
- [42] B. C. Colclasure, A. Marlier, M. F. Durham, T. D. Brooks, and M. Kerr, "Identified challenges from faculty teaching at predominantly undergraduate institutions after abrupt transition to emergency remote teaching during the COVID-19 pandemic," *Education Sciences*, vol. 11, no. 9, pp. 556, 2021, doi: 10.3390/educsci11090556.
- [43] R. F. Kizilcec, "To advance AI use in education, focus on understanding educators," *International Journal of Artificial Intelligence in Education*, vol. 34, no. 1, pp. 12-19, 2024, doi: 10.1007/s40593-023-00351-4.
- [44] E. Ní Fhlóinn, and O. Fitzmaurice, "Challenges and opportunities: Experiences of mathematics lecturers engaged in emergency remote teaching during the COVID-19 pandemic," *Mathematics*, vol. 9, no. 18, pp. 2303, 2021, doi: 10.3390/math9182303.
- [45] Z. Gan, Z. An, and F. Liu, "Teacher feedback practices, student feedback motivation, and feedback behavior: how are they associated with learning outcomes?," *Frontiers in psychology*, vol. 12, pp. 697045, 2021, doi: 10.3389/fpsyg.2021.697045.
- [46] S. Wu, "Application of multimedia technology to innovative vocational education on learning satisfaction in China," *Plos one*, vol. 19, no. 2, pp. e0298861, 2024, doi: 10.1371/journal.pone.0298861.
- [47] A. Kumi-Yeboah, and S. Amponsah, "An exploratory study of instructors' perceptions on inclusion of culturally responsive pedagogy in online education," *British Journal of Educational Technology*, vol. 54, no. 4, pp. 878-897, 2023, doi: 10.1111/bjet.13299.
- [48] A. Alsalamah, and C. Callinan, "Adaptation of Kirkpatrick's four-level model of training criteria to evaluate training programmes for head teachers," *Education Sciences*, vol. 11, no. 3, pp. 116, 2021, doi: 10.3390/educsci11030116.
- [49] L. Shaban, P. Mkandawire, E. O'Flynn, D. Mangaoang, W. Mulwafu, and D. Stanistreet, "Quality metrics and indicators for surgical training: A scoping review," *Journal of Surgical Education*, vol. 80, no. 9, pp. 1302-1310, 2023, doi: 10.1016/j.jsurg.2023.06.023.
- [50] N. Anwar, J. Anderson, and T. Williams, "Applying data science to analyze and improve student learning outcomes in educational environments," *International Transactions on Education Technology (ITEE)*, vol. 3, no. 1, pp. 72-83, 2024, doi: 10.33050/itee.v3i1.679.