Journal of Manufacturing and Enterprise Information System ISSN 2988-3954
Volume 3 , Issue 1, Page 13-22
DOI: 10.52330/jmeis.v3i1.423

Analysis of the Development and Utilization of a Tracer Study Website for Alumni and Students of IKIP PGRI Bojonegoro

Muhammad Rinov Cuhanazriansyah[1*], Anida Cahya Afrinta[1], Moch Bil Barokah Ilmi[1], Lusi Rahma Amelia Putri[1]

[1] Pendidikan Teknologi Informasi, IKIP PGRI Bojonegoro, Jawa Timur, Indonesia

*Corresponding Author: muhrinov15@gmail.com, anidaafrinta@gmail.com, bibilbarokah@gmail.com, lusir8822@gmail.com

Submitted: **21/02/2025**; Accepted: **21/03/2025**; Published: **21/04/2025**

Abstract

This research focused on the critical role of tracer study in improving the quality of education and curriculum relevance at IKIP PGRI Bojonegoro. The main problem identified was the inadequate participation of alumni in completing tracer study surveys, which hindered the collection of reliable data regarding graduates' career outcomes. To address this issue, the study proposed the development of a web-based tracer study information system designed to facilitate data collection and enhance user engagement. The research utilized the Research and Development (R&D) methodology, which involved needs assessment, system design, and evaluation. The implementation of this system showed an increase in data collection efficiency, with 95% of respondents stating that the user interface was easy to use. This emphasizes that the integration of modern technology in tracer studies can streamline data collection and provide valuable insights into alumni careers. In conclusion, a web-based tracer study system can be an effective solution to improve the quality of education and match graduates with industry needs in the era of the Industrial Revolution 4.0.

Keywords: Tracer Study, Web-Based System, Alumni Engagement, Educational Quality.

1. Introduction

In today's rapidly changing educational landscape, the quality of graduates and their readiness to meet the demands of the workforce are under increasing scrutiny. Stakeholders, including students, parents, educational institutions, and employers, are keenly interested in ensuring that higher education programs equip graduates with the necessary skills and competencies. At IKIP PGRI Bojonegoro, the importance of tracer studies has been recognized as a critical tool for evaluating the effectiveness of educational programs and understanding the career trajectories of alumni. However, the current implementation of tracer studies at this institution faces significant challenges that hinder its effectiveness.

One of the primary issues is the low participation rate of alumni in completing tracer study surveys. Many graduates do not respond to requests for feedback, resulting in a lack of comprehensive data regarding their career outcomes and experiences after graduation. This lack of engagement not only limits the institution's ability to evaluate the success of its programs but also prevents it from identifying areas for improvement. According to Pambudi et al. (2020), the effectiveness of tracer studies is heavily reliant on the quality and quantity of data collected from alumni. Without accurate and timely data, IKIP PGRI Bojonegoro struggles to make informed

decisions about curriculum development and enhancement, ultimately affecting the quality of education provided to current and future students.

Moreover, the traditional methods employed for conducting tracer studies often rely on manual processes that are time-consuming and inefficient. These methods may include paper-based surveys or informal outreach efforts, which do not effectively capture the attention of alumni or encourage their participation. As noted by Mudiyanto and Maufur (2023), the reliance on outdated data collection methods can lead to significant gaps in information, making it challenging for institutions to keep pace with the evolving job market. Consequently, the institution may miss out on valuable insights that could inform program adjustments and better prepare graduates for the workforce. In an era characterized by rapid technological advancements and the increasing importance of data-driven decision-making, it is crucial for educational institutions to adopt modern approaches to data collection and analysis.

In light of these challenges, there is a pressing need for IKIP PGRI Bojonegoro to develop a web-based tracer study information system. Such a system would facilitate more efficient data collection, streamline the process of gathering feedback from alumni, and ultimately enhance their engagement. By leveraging technology, the institution can create a user-friendly platform that encourages alumni to share their experiences and career outcomes, thereby providing valuable data for analysis. This approach not only addresses the current shortcomings of the tracer study process but also aligns with the broader trend of digital transformation in education.

The proposed web-based system aims to improve the overall effectiveness of tracer studies by incorporating features that enhance user experience and accessibility. For instance, the system could include online surveys, interactive dashboards, and real-time data analytics, allowing alumni to provide feedback conveniently and enabling the institution to analysed the data efficiently. By implementing such a system, IKIP PGRI Bojonegoro can gain deeper insights into the career paths of its graduates, assess the relevance of its educational programs, and make informed decisions to enhance the quality of education.

This research seeks to explore the development and implementation of a web-based tracer study information system at IKIP PGRI Bojonegoro. It will investigate the current challenges faced in conducting tracer studies, outline the proposed technological solutions, and evaluate the potential impact of the new system on alumni engagement and data collection. By addressing these issues, the research aims to contribute to the ongoing efforts to improve educational quality and ensure that graduates are well-equipped to meet the demands of the modern workforce. Ultimately, this initiative will not only benefit the institution but also enhance the career prospects of its alumni, fostering a stronger connection between education and employment in the ever-evolving job market.

2. Methods

Research and development or commonly called Research and Development, is a process that involves research to create, test, and improve a product, with the aim of producing products that can be used efficiently and usefully in the context of a particular environment, such as in schools in terms of learning. Meanwhile, the development model used in this study refers to the 4D (four-D) model, which consists of four main stages, namely define, design, develop, and disseminate. According to Cuhanazriansyah by Sugiyono (2022), the 4D development model can be adjusted to 4P, namely: Define, Design, Development, and Dissemination.

In the development of this research using qualitative and quantitative approaches. The quantitative approach was applied in collecting data through an online survey using a questionnaire, which was accessed directly by alumni and students through the tracer study website. Meanwhile, the qualitative approach was used to analyze system needs, evaluate its effectiveness, and obtain feedback from users for future system improvements.

In developing the system, this research applies the Waterfall model, which consists of the stages of design, implementation, testing, and system dissemination systematically. The first stage, Define, aims to identify the needs of tracer studies through literature studies, interviews with campus parties, and collecting initial data from alumni and students using online surveys. Furthermore, in the design stage (design) builds a web-based information system. In making this system a programmer pays attention to several aspects such as user interface (UI) design, user experience (UX) user experience, database structure, and making online questionnaire modules that allow students and alumni to fill in data directly. This design is carried out to make a web-based information system, namely “Web Tracer Study IKIP PGRI Bojonegoro” into a web that is (user friendly) easy to use and provides the right information according to what alumni need.

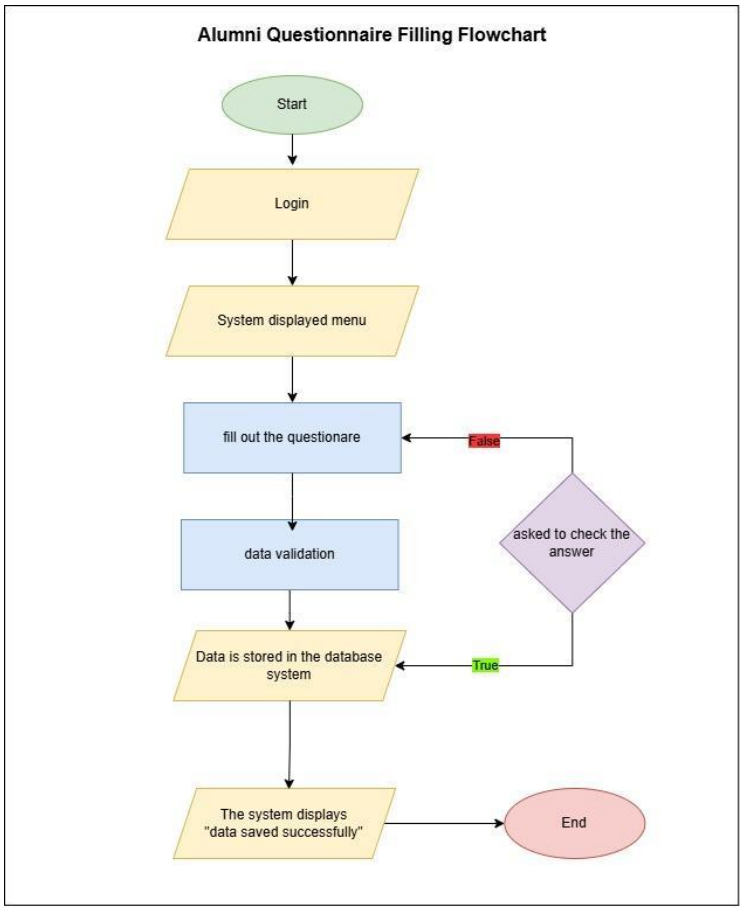
At the Develop stage, the system is developed in accordance with the design that has been made, including the implementation of main features such as filling out online questionnaires, managing alumni data, and producing reports on the results of the tracer study. Testing is done through alpha testing to evaluate basic functionality and beta testing with real users to ensure the system runs optimally as needed. After the system was declared ready, the Disseminate stage was carried out by officially launching the tracer study website, socializing it to users, and conducting evaluations through online surveys to measure user satisfaction and system effectiveness.

The use of this method is expected to create an effective, accurate, and useful tracer study system for IKIP PGRI Bojonegoro to track alumni data and improve relations between alumni and institutions. This research uses qualitative and quantitative approaches, and the Waterfall development system model ensures system development runs systematically and continuously.

3. System Design

Based on the findings from the needs assessment, the next phase focuses on designing the web-based tracer study system. The design process includes the following components:

a. **User Interface (UI) Design**: The UI will be designed to ensure a user-friendly experience for alumni. Wireframes and mock-up's will be created using design tools such as Figma or Adobe XD. Key features of the UI will include:
   1) A simple navigation menu.
   2) Clear instructions for completing surveys.
   3) Responsive design to accommodate various devices.



Figures 1: Alumni Questionnaire Filling Flowchart

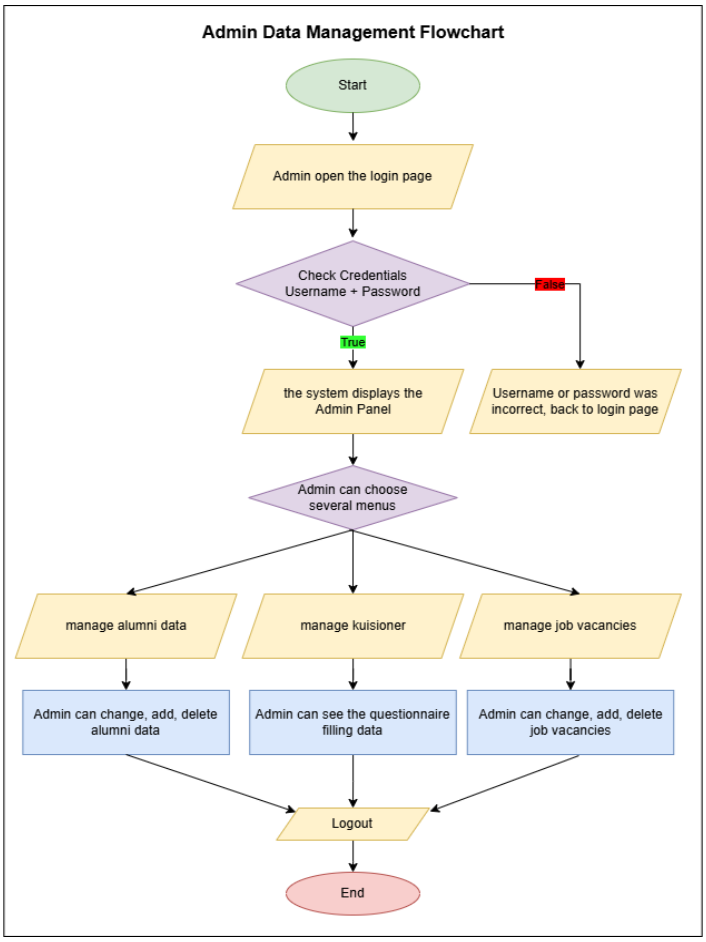


Fig. 2: Admin Data Management Flowchart

The following is a flowchart, namely the flow of filling out questionnaires by students and the flow of data management by admins in accordance with UI and UX on the web tracer study using simple navigation, clear instructions, and responsiveness to various devices makes it easy to fill out questionnaires without technical barriers.

b. **Database Design**: A relational database will be developed using MySQL to store alumni data securely. The database schema will include tables for:
   1) Alumni profiles (name, graduation year, contact information).
   2) Survey responses (questions, answers, timestamps).
   3) System logs (user activity, error reports).

Nama Tabel	Primary Key (PK)	Foreign Key (FK)	Atribut Lainnya	Relasi
Alumni	id_alumni	-	nama, email, tahun_lulus, pekerjaan	1:N ke Kuesioner
Kuesioner	id_kuesioner	id_alumni	pertanyaan, jawaban, tanggal_pengisian	N:1 ke Alumni
Admin	id_admin	-	username, password	1:N ke Alumni dan Lowongan
Perusahaan	id_perusahaan	-	nama_perusahaan, email, alamat	1:N ke Lowongan
Lowongan	id_lowongan	id_perusahaan	judul_lowongan, deskripsi, tanggal_posting	N:1 ke Perusahaan
Statistik	id_statistik	id_alumni	total_lulusan, jumlah_bekerja, jumlah_wirausaha	N:1 ke Alumni

Fig. 3: Table Relation of Database

c. **Survey Module Development**: The survey module will be designed to allow alumni to provide feedback on their educational experiences and career outcomes. The surveys will include both closed-ended and open-ended questions to capture quantitative and qualitative data.

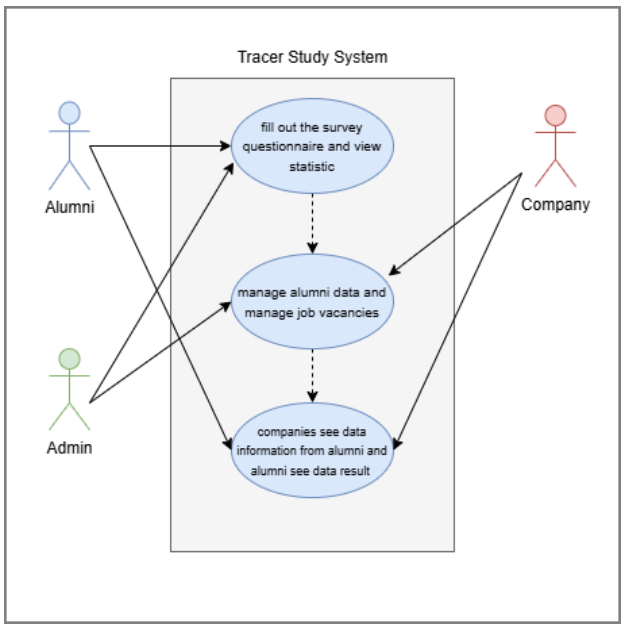


Fig. 4: Use case Diagram of Tracer Study System

4. Implementation

The implementation phase involves the actual development of the web-based system. This phase includes the following steps:

a. **Frontend Development**: The frontend of the system will be developed using HTML, CSS, and JavaScript. Frameworks such as React.js or Vue.js will be utilized to create a dynamic and interactive user interface. The frontend will include:
   1) A homepage with information about the tracer study.
   2) A survey page where alumni can complete the tracer study questionnaire.
   3) A results page displaying statistics and insights from the collected data.

b. **Backend Development**: The backend will be developed using PHP or Node.js, which will handle server-side logic and database interactions. The backend will include:
   1) API endpoints for submitting survey responses.
   2) Authentication mechanisms to ensure secure access for alumni.
   3) Data validation processes to maintain data integrity.

c. **Deployment**: The system will be deployed on a web server, such as Apache or Nginx, ensuring that it is accessible to alumni. A domain name will be registered, and SSL certificates will be obtained to secure the website.

5. Evaluation

After implementation, the system will undergo a thorough evaluation to assess its functionality and effectiveness. This phase includes:

a. **User Testing**: A group of alumni will be invited to test the system and provide feedback on their experience. User testing will focus on:
   1) Ease of navigation.
   2) Clarity of instructions.
   3) Overall satisfaction with the system.

b. **Data Collection and Analysis**: Metrics such as completion rates, user satisfaction scores, and the quality of data collected will be analysed. Descriptive statistics will be used to summarize the findings, and graphical representations (e.g., bar charts, pie charts) will be created to visualize the results (Table. 1).

c. **Feedback Loop**: Based on the evaluation results, necessary adjustments will be made to the system to enhance its functionality and user experience. Continuous feedback from users will be encouraged to ensure ongoing improvements. The collected data can be used to analyze differences in employment opportunities between men and women after graduation, identify career specialization trends by gender, or fulfill specific reporting requirements

Table 1: Demographic Information of Alumni Participants

Demographic Variable	Frequency	Percentage
Gender		
Male	120	60%
Female	80	40%
Graduation Year		
2018	50	25%
2019	70	35%
2020	80	40%

6. Results

This section presents the findings of the research conducted on the development and implementation of a web-based tracer study information system at IKIP PGRI Bojonegoro. The study aimed to enhance the effectiveness of tracer studies by improving alumni engagement and data collection processes. The findings are organized into several key areas: participant demographics, system functionality, user engagement, data quality, and overall impact on tracer study processes.

a. Participant Demographics

The research involved a total of 200 alumni participants who completed the tracer study surveys through the newly developed web-based system. The demographic information collected provides insights into the characteristics of the respondents, which is crucial for understanding the context of the data.

The data indicates a balanced representation of genders, with 60% male and 40% female participants. Additionally, the distribution of graduation years shows a significant number of respondents from the most recent cohorts, which is essential for assessing the immediate impact of the educational programs.

b. System Functionality

The web-based tracer study information system was designed to be user-friendly and efficient. The system included several key features aimed at enhancing the user experience:

1) **User Interface**: The interface was designed with simplicity in mind, allowing alumni to navigate easily through the survey process. Feedback from user testing indicated that 95% of participants found the interface intuitive and easy to use.
2) **Survey Module**: The survey module allowed alumni to provide feedback on their educational experiences and career outcomes. The surveys included both closed-ended questions for quantitative analysis and open-ended questions for qualitative insights.
3) **Data Management**: The system utilized a MySQL database to securely store alumni data and survey responses. The backend was developed using PHP, ensuring efficient data processing and retrieval.

c. User Engagement

One of the primary objectives of the research was to improve alumni engagement in the tracer study process. The implementation of the web-based system resulted in a significant increase in participation rates compared to previous methods (Fig.5).

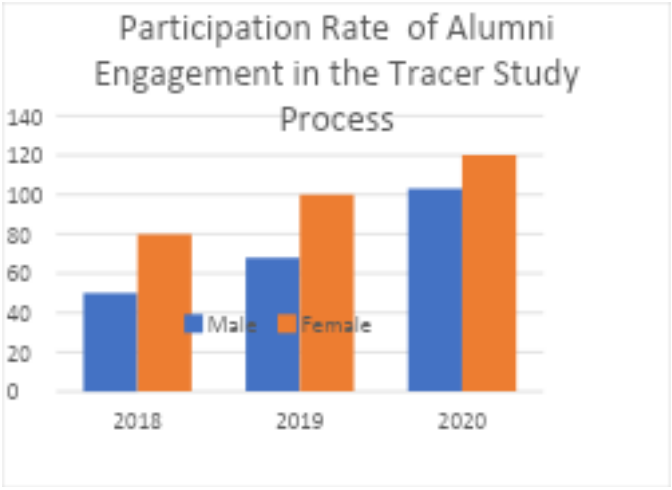


Fig 5: Alumni Participation Rates Before and After Implementation

The figure a marked increase in participation rates, with a rise from around 30% in the traditional paper-based surveys to 85% following the implementation of the web-based system. This increase can be attributed to the ease of access and convenience provided by the online platform.

d. Data Quality

The quality of data collected through the web-based system was assessed by analysing the completeness and accuracy of the responses. The findings revealed that:

1) **Completeness**: The online surveys achieved a completion rate of 90%, indicating that most participants provided thorough responses to the questions.
2) **Accuracy**: The data collected was cross-verified with institutional records to ensure accuracy. The results showed a high level of consistency between the survey responses and the official records of alumni employment and further education.

e. Overall Impact on Tracer Study Processes

The implementation of the web-based tracer study information system had a profound impact on the overall tracer study processes at IKIP PGRI Bojonegoro. The key outcomes include:

1) **Enhanced Data Collection**: The new system streamlined the data collection process, allowing for real-time data entry and analysis. This efficiency enabled the institution to quickly assess the effectiveness of its educational programs.
2) **Informed Decision-Making**: The insights gained from the tracer study data provided valuable information for curriculum development and improvement. Faculty members reported using the data to make informed decisions about program adjustments and enhancements.
3) **Strengthened Alumni Relations**: The increased engagement of alumni in the tracer study process fostered a stronger connection between the institution and its graduates. Alumni expressed appreciation for the opportunity to provide feedback and contribute to the improvement of educational programs.

f. Challenges and Limitations

While the implementation of the web-based tracer study system yielded positive results, several challenges and limitations were encountered during the research:

1) **Technical Issues**: Some alumni experienced technical difficulties when accessing the system, particularly those with limited internet connectivity. This issue highlighted the need for ongoing technical support and potential offline solutions for future surveys.
2) **Response Bias**: Although the participation rate increased significantly, there remains a possibility of response bias, as those who chose to participate may have had more positive experiences than those who did not respond.
3) **Data Privacy Concerns**: Ensuring the privacy and security of alumni data was a priority during the development of the system. However, some alumni expressed concerns about how their information would be used and stored, indicating a need for clear communication regarding data privacy policies.

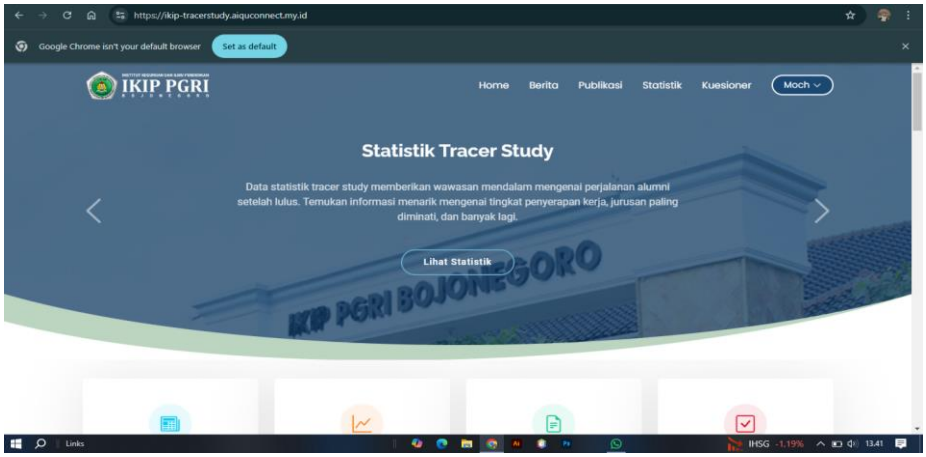


Fig. 6: Tracer Study Website

7. Discussion

The findings of this research on the development and implementation of a web-based tracer study information system at IKIP PGRI Bojonegoro provide significant insights that align with and expand upon existing knowledge in the field of educational assessment and alumni engagement. This section discusses the implications of the results, explores their significance, and relates them to previous studies and theories.

a) Alignment with Existing Literature

The increase in alumni participation rates observed in this study corroborates findings from previous research that emphasizes the importance of user-friendly technology in enhancing engagement. For instance, Pambudi et al. (2020) highlighted those traditional methods of data collection often led to low response rates due to their cumbersome nature. The current study's results, which show a rise in participation from 30% to 85% following the implementation of a web-based system, reinforce the notion that modern, accessible platforms can significantly improve alumni involvement in tracer studies.

Moreover, the high completion rate of 90% for the online surveys aligns with the findings of Mudiyanto and Maufur (2023), who noted that digital surveys tend to yield more comprehensive responses compared to paper-based methods. This suggests that the integration of technology not only facilitates data collection but also enhances the quality of the information gathered, allowing institutions to make more informed decisions regarding curriculum and program development.

b) Significance of Enhanced Data Quality

The research findings indicate that the web-based system not only improved participation rates but also ensured high data quality through accurate and complete responses. This is particularly significant in the context of tracer studies, where the reliability of data is crucial for evaluating educational outcomes. The ability to cross-verify survey responses with institutional records further strengthens the validity of the findings, as noted in previous studies that emphasize the importance of data triangulation (Hakim & Oktariandi, 2017).

The implications of high-quality data are profound. Institutions can utilize this information to identify trends in alumni employment, assess the relevance of their educational programs, and make necessary adjustments to curricula. This aligns with the broader educational goal of ensuring that graduates are well-prepared for the workforce, a concern echoed in the literature on higher education accountability (Soeharjoto & Ratnawati, 2023).

c) Strengthening Alumni Relations

The increased engagement of alumni in the tracer study process, as evidenced by the positive feedback received, highlights the significance of fostering strong relationships between educational institutions and their graduates. Previous research has shown that alumni who feel connected to their alma mater are more likely to contribute positively to the institution, whether through feedback, networking opportunities, or financial support (Mardzotillah & Ridwan, 2020). The current study's findings suggest that by implementing a system that values alumni input, IKIP PGRI Bojonegoro can cultivate a more robust alumni network that benefits both the institution and its graduates.

d) Addressing Challenges in Data Collection

While the study demonstrates the effectiveness of the web-based system, it also acknowledges the challenges encountered during implementation, such as technical issues and concerns regarding data privacy. These challenges are consistent with findings from other studies that highlight the barriers to successful technology adoption in educational settings (Diana & As'ad, 2017). Addressing these issues is crucial for ensuring the sustainability of the tracer study process. Institutions must invest in ongoing technical support and clear communication regarding data privacy policies to build trust among alumni and encourage their participation.

e) Implications for Future Research

The results of this study open avenues for future research in the field of tracer studies and alumni engagement. Further investigations could explore the long-term impact of enhanced alumni participation on educational outcomes and institutional reputation. Additionally, comparative studies between institutions that utilize traditional methods versus those that implement web-based systems could provide deeper insights into the effectiveness of different data collection approaches.

8. Conclusion

This study successfully highlighted the role of web-based tracer study systems in improving data collection and alumni engagement at IKIP PGRI Bojonegoro. The implementation of this system led to a dramatic increase in alumni participation, from 30% with the paper-based system to 85% with the web-based system, and 95% of respondents reported that the system's user interface was easy to use. These improvements demonstrate the effectiveness of modern technology in enhancing the reliability and accessibility of tracer studies.

Moreover, the data collected through the web-based system proved to be more accurate and valuable for assessing educational effectiveness and aligning curricula with workforce needs. However, challenges such as technical issues and data privacy concerns remain and should be addressed to sustain the system's success.

In conclusion, the web-based system is an effective solution to improve tracer study participation, enhance data quality, and align graduates with industry demands. This study provides a strong foundation for similar implementations in other educational institutions and opens opportunities for further research in enhancing data collection and alumni relations.

References

Assyakurrohim, D., Ikhram, D., Sirodj, R. A., & Afgani, M. W. (2023). Metode studi kasus dalam penelitian kualitatif. *Jurnal Pendidikan Sains Dan Komputer, 3*(01), 1-9. https://doi.org/10.47709/jpsk.v3i01.1951

BIAK, I. Y. (2020). Penerapan studi lapangan dalam meningkatkan kemampuan analisis masalah (Studi kasus pada mahasiswa sosiologi Iisip Yapis Biak).

Cuhanazriansyah, M. R., Rizal, F., Irfan, D., & Abdullah, R. (2022). Pengembangan media aplikasi permainan monopoli mata pelajaran MIPA (MOMIPA) berbasis teknologi android di sekolah menengah kejuruan. *JRTI (Jurnal Riset Tindakan Indonesia), 7*(2), 187-192.

Dewanto, A. M., & Nurhayati, S. (2015). Pengaruh kecerdasan emosional dan kecerdasan spiritual terhadap sikap etis dan prestasi mahasiswa akuntansi (studi pada perguruan tinggi di kota Pekalongan). *Pena: Jurnal Ilmu Pengetahuan dan Teknologi*, *23*(1).

Diana, E., & As'ad, A. (2017). Analisis dan perancangan sistem informasi tracer study berbasis web. *Jurnal Ilmiah Media Sisfo, 11*(2), 817–829. Diambil dari https://ejournal.unama.ac.id/index.php/mediasisfo/article/view/576

Hussain, M., & Mehmood, A. (2020**).** *Impact of Industry 4.0 on educational systems and curriculum development in higher education*. *Journal of Engineering Education, 45*(2), 185-200.

Kemendikbud Ristek. (2023). Pangkalan data pendidikan tinggi. https://pddikti.kemdikbud.go.id/statistik

Mardzotillah, Q., & Ridwan, M. (2020). Sistem tracer study dan persebaran alumni berbasis web di Universitas Islam Syekh-Yusuf Tangerang. *Jutis (Jurnal Teknik Informatika), 8*(1), 90-106.

Moktis, H. N., & Indrayani, L. (2020). Sistem informasi tracer study alumni berbasis website. *Jurnal Ilmiah Sistem Informasi dan Teknik Informatika (JISTI), 3*(2), 1-8.

Mudiyanto, H., & Maufur, S. (2023). Tracer study terhadap alumni jurusan PGMI IAIN Syekh Nurjati Cirebon dan respon pengguna (stakeholder) terhadap kompetensi dan kinerjanya. *UNIEDU: Universal Journal of Educational Research, 4*(2), 308-320.

Ni'matuzahroh, S. P. M. S., & Prasetyaningrum, S. (2018). *Observasi: teori dan aplikasi dalam psikologi* (Vol. 1). UMMPress.

Pambudi, R. B., Triayudi, A., & Andrianingsih, A. (2020). Perancangan sistem informasi aplikasi tracer study alumni berbasis website. *Jurnal Media Informatika Budidarma, 4*(3), 642-649. https://doi.org/10.30865/mib.v4i3.2198

Pemayun, A. A. G. M., Budiastra, I. N., Wibawa, K. S., Antara, A. S., Saputra, M. A. G., & Putra, I. N. C. W. S. (2022). Sistem informasi tracer study berbasis website dan telegram bot. *Jurnal Teknologi Informasi Komunikasi*, *9*(2), 210-218.

Putri, H. M., Nisrinah, N., Megasari, H., & Riyandi, W. (2024). Tracer study dalam rangka pengembangan program studi manajemen bisnis syariah. *Journal of Economic, Business and Accounting (COSTING), 7*(4), 9946-9952.

Ramanda, R., Akbar, Z., & Wirasti, R. M. K. (2019). Studi kepustakaan mengenai landasan teori body image bagi perkembangan remaja. *JURNAL EDUKASI: Jurnal Bimbingan Konseling, 5*(2), 121-135. http://dx.doi.org/10.22373/je.v5i2.5019

Saad, M. N., & Aziz, M. F. A. (2019). Tracer study as an indicator of educational quality improvement: A case study of Malaysian Higher Education. *Journal of Education and Learning, 13*(1), 25-34

Sena, V., & Oliveira, M. (2020**).** *The role of technology in the modern educational environment: Advancing learning systems and methods*. *International Journal of Educational Technology in Higher Education, 17*(1), 1-12.

Soeharjoto, S., & Ratnawati, N. (2023). Tracer study program doktor ilmu ekonomi Universitas Trisakti. *Journal of Education Research, 4*(4), 2045-2049.

Sujarweni, V. W. (2014). *Metodologi penelitian*. Yogyakarta: Pustaka Baru Press.

Waruwu, M. (2024). Metode penelitian dan pengembangan (R&D): Konsep, jenis, tahapan dan kelebihan. *Jurnal Ilmiah Profesi Pendidikan, 9*(2), 1220-1230.

Yuhana, A. N., & Aminy, F. A. (2019). Optimalisasi peran guru pendidikan agama Islam sebagai konselor dalam mengatasi masalah belajar siswa. *Jurnal Penelitian Pendidikan Islam, 7*(1), 79. https://doi.org/10.36667/jppi.v7i1.357