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Strengthening Digital Data-Based Asset Management Systems to Support School Accountability

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Abstract– This community service activity aims to strengthen the asset management system at YP Unila High School through the implementation of a simple yet effective digital-based database. Initial observations identified key issues such as scattered asset records, data inconsistencies, and minimal handover documentation, which could potentially reduce the accountability and efficiency of school governance. Interventions included designing a Microsoft Excel-based database template, providing technical training, and assisting with implementation through the initial data entry stage. Pre-posttest results for 15 participants (staff) showed an average score increase of 17 points, indicating the training's effectiveness in enhancing human resource capacity. The evaluation also revealed a reduction in asset naming variations, increased inventory code consistency, and the emergence of a data-driven work culture. Further discussion, referring to academic literature, confirmed that asset digitization not only simplifies administrative processes but also strengthens the principles of good governance through transparency and accountability. This program can be replicated in other schools using a phased approach and developed into a web-based system for more comprehensive and sustainable data integration. This activity contributes both theoretically by offering a replicable digital asset management model for schools and practically by strengthening accountability, human resource capacity, and data-driven governance using accessible technology.

Keywords: Asset Management; Digitalization; Accountability, Data; Management Information System.

1. INTRODUCTION

The development of digital technology has brought fundamental changes to various sectors, including education. Digital transformation is no longer a strategic necessity for improving the governance and quality of educational services, focusing solely on literacy and learning innovation, but also encompasses managerial aspects, particularly school asset management, which is a crucial part of the education management system (Ribhan et al., 2024). Without a sound management system, the risk of loss, budget waste, and weak accountability increases. Therefore, implementing effective and transparent asset management is a manifestation of the principle of good governance in education. In a digital context, technology-based asset management is a strategic solution for improving the efficiency and accountability of educational institutions. Digital asset management systems enable integrated asset recording, tracking, and maintenance, thus supporting a more informative audit and decision-making process (Ahmad, 2023).

SMA YP Unila is a private high school located on Jl. Jenderal Suprapto No. 88, Enggal Village, Enggal District, Bandar Lampung City, Lampung Province. Founded on July 18, 1981, under the auspices of the Lampung University Development Foundation, this school has been accredited A based on BAN-SM Decree No. 1334 / BAN-SM / SK / 2020. The school, which stands on an area of 7,000 m², has a total of 1,142 students and diverse and high-value assets, and faces complex asset management challenges. The diversity and large number of school

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inventories require an orderly and digitalized management system to ensure the effectiveness, efficiency, and transparency of the governance of educational facilities and infrastructure.

Although YP Unila High School has adequate educational facilities and infrastructure, asset management within the school environment still faces various challenges. Observations and discussions with the school revealed that asset recording and monitoring have not been systematically documented, resulting in frequent data inconsistencies, particularly when management changes occur. The lack of a centralized database system leads to data discrepancies between units and periods, while the absence of a centralized database system Standard Operating Procedure. The lack of Standard Operating Procedures (SOPs) governing asset governance makes the management process dependent on individual habits. This situation has the potential to lead to reporting discrepancies and asset loss. Furthermore, the use of software like Microsoft Excel is suboptimal, even though this application could be a practical solution for supporting efficient and integrated digital recording, labeling, and management of asset data.

The implementation of digitalization in asset management has been proven to significantly improve recording accuracy and operational efficiency in various educational institutions. Electronic Asset Inventory and Management System in School (e-AIMSS) encourages resource optimization and productivity in educational organizations through a more structured and transparent asset recording process(Ahmad, 2023). A case study in the Gananda Central School District showed an increase in inventory accuracy of up to 99% and a reduction in audit time of more than 75% after implementing an asset-based system barcode (Gananda Central School District, 2022). Similar results were demonstrated by the DeKalb County School District, which reported an increase in asset recording accuracy above 95% and significant efficiencies in reporting and audit readiness after adopting Frontline Asset Management (Frontline Education, 2021).

At the college level, the implementation University of Baguio Research and Property Inventory System (UBRPIS) also showed a 50% increase in data input speed and 93% accuracy compared to the manual system (University of Baguio, 2020). In addition, the whitepaper report by Timly Software AG (2023) confirmed that implementing digital asset tracking in UK schools increased accuracy by 97–99% and reduced audit time by 60–70%. Overall, these findings confirm that digitizing asset management significantly contributes to increased efficiency, data accuracy, and effectiveness of educational asset governance (Ahmad, 2023; Frontline Education, 2021; Gananda Central School District, 2022; Timly Software AG, 2023; University of Baguio, 2020).

Information technology-based school asset management has been proven to improve work efficiency and accuracy in data processing, while minimizing the risk of loss and recording errors (Asyhari et al., 2022; Priatna et al., 2021; Saragih et al., 2021). Asset management training supported by software such as Microsoft Excel can strengthen staff competencies in managing asset data systematically and accurately (Waluyo et al., 2020; Yuningsih et al., 2024). Therefore, the development and training of a digital-based asset management system at SMA YP Unila is a strategic step to improve accountability, operational efficiency, and support the sustainability of modern and professional educational governance.

This community service activity aims to assist SMA YP Unila in optimizing its digital-based asset management system to improve the accountability and efficiency of school infrastructure management. Through this activity, the community service team strives to increase the capacity of school staff in systematic and accountable asset management, developing a simple digital asset recording system using spreadsheet applications such as Microsoft Excel or Google Sheets, and providing assistance in the implementation and initial evaluation of the system. This activity also encourages the formation of an orderly and data-driven work culture in school asset management. The benefits of this activity are expected to be widely felt, both by partners, the community service team, and the development of science and technology. For SMA YP Unila, this activity provides increased human resource competency, a more organized and documented asset recording system, and increased accountability in reporting to foundations and stakeholders. For the community service team, this activity provides a means of applying knowledge in a real context while strengthening collaboration between universities and secondary schools. As for the development of science, this activity contributes to the

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presentation of a simple yet effective digital-based educational asset management model that can be replicated in various secondary education institutions in Indonesia.

2. IMPLEMENTATION METHOD

2.1 Methods and Stages of Activities

This activity is a collaboration between a community service team from the university and its partner, SMA YP Unila. The community service team consists of lecturers in accounting and information systems who are responsible for preparing training materials and designing a digital asset database system, with the support of students in documentation, technical assistance, and initial data input. On the partner side, involvement includes the principal as a policy maker and administrative support provider, the vice principal for infrastructure and administrative staff as field implementers, and asset management staff as the main training participants and system users. The activity was carried out at SMA YP Unila, located at Jl. Jenderal Suprapto No. 88, Enggal, Bandar Lampung, is an institution with complete infrastructure and a large student population, thus requiring a modern and digitalized asset management system to improve administrative efficiency and transparency.

This community service activity was implemented using a participatory-collaborative approach that emphasized the active involvement of partners at every stage of implementation. This approach aims to foster a sense of ownership of the program's outcomes and ensure the sustainability of the implementation of a digital-based asset management system post-activity. The activity began with observation and needs identification through field visits and interviews with school officials to map actual conditions, obstacles, and potential for developing an asset management system. Based on the analysis, the community service team designed a digital-based asset database system. Microsoft Excel or Google Spreadsheet is adapted to the characteristics of the school so that it is easy to use, flexible, and can be managed independently.

Next, training and technical outreach were conducted for school asset management staff on system introduction, asset recording and classification procedures, labeling, and the use of basic spreadsheet functions. Following the training, the team provided implementation assistance and initial data entry, with the school beginning to implement the system in its daily operations with direct guidance from the service team. The next stage included initial monitoring and evaluation to assess the consistency of system use, data completeness, and training effectiveness. Evaluation results were used to refine the system before its ongoing implementation. Dissemination of activity results was carried out through reports, scientific publications, and documentation to broaden the impact and serve as a reference for other educational institutions in implementing simple and effective digital asset management. The following is a diagram of the stages of the method used:

2.2 Implementation of Activities

The implementation of these activities includes needs analysis, system design, training, and field implementation support. Partners play a strategic role as both primary stakeholders and end users of the system, including providing data, participating in training, and maintaining the system to ensure its continued functionality.

1. **Needs Analysis**
   Identification and analysis of partner needs includes field observations, interviews, or simple surveys to explore key issues, local potential, and competencies that need to be improved.
2. **Program Planning**
   Develop a community service program plan that includes objectives, implementation strategies, methods, and a budget plan based on the findings of the needs analysis. This stage also includes the preparation of a formal proposal to obtain funding approval or institutional support.
3. **Preparation of Community Service Instruments**

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Preparation of all required instruments (training modules, teaching materials, evaluation forms, and activity implementation administration templates), including logistics such as equipment, training media, and technical coordination.

4. **Implementation of Training**
   Training or mentoring activities are conducted according to a pre-determined schedule and materials. Participants receive hands-on practice and simulations on the use of specific tools or methods (e.g., Microsoft Excel).
5. **Monitoring and Evaluation**
   Monitoring and evaluation of program implementation includes measuring learning outcomes, participant feedback, and observing the achievement of program objectives. Evaluation is conducted using quantitative and/or qualitative methods.
6. **Follow-up**
   Follow-up activities such as system improvements, additional mentoring, or documentation of good practices that have occurred in the field are crucial to ensuring the sustainability of program outcomes.
7. **Dissemination of Results**
   Disseminating the results of activities through various media, such as final reports, popular scientific articles, video documentation, or publications at seminars/exhibitions, to expand the impact, inspiration, and potential replication of the program in other locations.

2.3 Evaluation Program and Sustainability

The program evaluation was conducted to assess the effectiveness of training and mentoring in improving staff competency and strengthening accountability for school asset management. The evaluation included measuring indicators such as improved technical skills, consistent asset recording, and the effectiveness of spreadsheet features using pre-test, post-test, observation, and analysis of implementation results. Participant feedback is used as the basis for improving the mentoring system and methods. The evaluation results are compiled into a final report containing achievements, findings, and recommendations for further development.

The program's sustainability is ensured through the integration of activity results into the school's operational system by making the asset database template a standard operating procedure in the administration and infrastructure departments. Schools are expected to ensure the availability of supporting equipment and conduct regular evaluations of the implemented system. The ongoing involvement of the principal, vice principal, and asset management staff is crucial in strengthening ownership and commitment to the consistent and sustainable implementation of the digital asset management system.

2.4 Theoretical Study

Asset management is the process of managing a group of assets throughout their life cycle to ensure optimal returns and ensure compliance with applicable service and safety standards (Schneider et al., 2006). Asset management has evolved into a structured approach to efficiently managing physical assets such as buildings and equipment, from operation to disposal, emphasizing the strategic value of assets to the organization (Alkhard, 2024).

In the context of asset management, databases play a crucial role as structured storage systems that contain asset information, such as identity, location, condition, and maintenance history. Databases are typically used by one or more applications through a database management system (DBMS) to maintain data integration, consistency, and security through access control mechanisms and entry validation (Taipalus, 2024; Coronel & Morris, 2019).

One of the most widely used software tools for data management is Microsoft Excel, which provides data retrieval, filtering, and visualization features and supports the development of users' analytical skills (Support Microsoft, 2021). Excel proficiency is recognized as a key skill required for data entry workers and professional job seekers (prakerja.go.id, 2021; Kemnaker, 2021). Various training programs focused on improving Microsoft Excel competency have been shown to have a positive impact on increasing work efficiency, productivity, accuracy, and workforce competitiveness (Priatna et al., 2021; Saragih et al., 2021; Wali & Mukhtar, 2020;

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Waluyo et al., 2020; Yuningsih et al., 2024; Yusri et al., 2020). Furthermore, competency development in data and asset management needs to be directed toward technical and professional skills-based learning as a basis for updating the educational curriculum and training for asset management personnel (Munn et al., 2021).

3. RESULTS AND DISCUSSION

3.1. Community Service Results

3.1.1. Observation and Identification

Initial observations indicate that asset management at YP Unila High School is still manual and scattered across multiple files without a standard format. Inventory recording is inconsistent across rooms, some assets are unlabeled, and photo documentation is not systematically organized. The handover procedure for room managers also lacks clear administrative standards. Furthermore, variations in item naming hamper the asset data consolidation process. This situation creates the risk of duplication, misclassification, and reporting delays. Nevertheless, support from school leadership, the availability of computer equipment, and operator readiness are crucial for system improvement. Based on the discussion, it was agreed that the main needs include a simple database design, a consistent numbering and labeling system, and an easy-to-implement data update flow.

Figure 1. Asset Observation at YP UNILA High School

3.1.2. Asset Management Database System Design

In response to partner needs, the team developed a Microsoft Excel-based database system based on simplicity, efficiency, and ease of use. The data structure was designed to include inventory codes, standard asset names, categories, locations, acquisition years, asset values, conditions, and depreciation status. To ensure data accuracy, the system is equipped with features like data validation, a dropdown menu, and automatic warnings against duplicate inventory codes. Additionally, a reference sheet containing a dictionary of item names, a list of rooms with standard codes, and a guide to naming asset photos is provided. This design was developed based on the school's actual needs and received feedback from partners before implementation. The final design then served as the basis for implementing a digital asset management system that is expected to improve administrative efficiency, data accuracy, and asset management accountability at SMA YP Unila.

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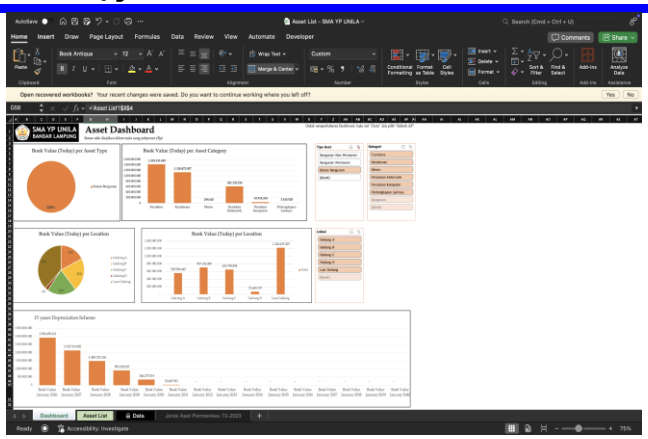

Figure 2. Excel-based Asset Management Dashboard

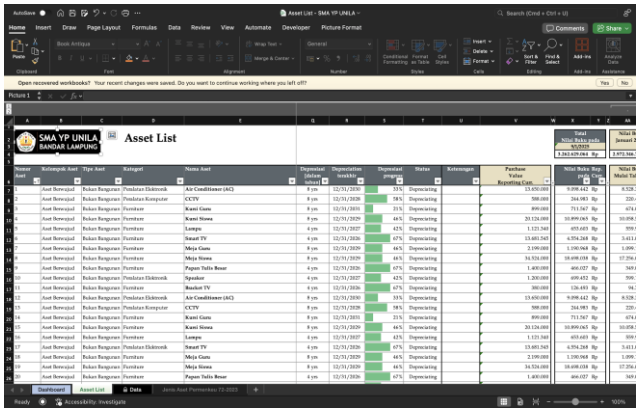

Figure 3. Asset List Data Input Table

3.1.3. Workshop and Training

The training consisted of two main sessions focused on improving school operators' competency in Microsoft Excel-based asset management. The first session covered basic asset management concepts, the benefits of orderly record keeping, and the structure of database templates. The second session was a full-fledged hands-on session, covering creating new entries, using filters and data validation, and consolidating old files. An andragogical approach was implemented through case simulations and hands-on exercises, supported by video tutorials and Excel cheat sheets, and functions. The training results showed an increase in participants' understanding of asset data naming and recapitulation standards, as well as the development of operator communication mechanisms for handling technical issues.

Figure 4. Workshop and Digital-Based Asset Management Training

3.1.4. Implementation Assistance and Initial Data Entry

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This is done to ensure the system's continuous implementation by mapping legacy data to standard columns, cleaning up duplication, and labeling inventory. Operators photograph priority assets (ICT and classroom furniture) according to guidelines.*file name and* attaching inventory labels generated from printed templates. To maintain quality, a two-stage validation process is implemented self-check by the operator and a spot check by the support team. Several system improvements were implemented, such as the addition of a "Serial Number" column, validation of the person in charge of the room, and conditional formatting for damaged assets. As a result, the database is filled, asset recaps can be generated automatically, and operators begin implementing routine data updates to maintain administrative order.

3.1.5. Monitoring and Evaluation

The initial evaluation assessed two aspects: (a) increasing human resource capacity through a simple *pre–post test*, and (b) quality/*consistency* use of databases through observation of processes and data *review*. *Pre–post test* was given to 15 participants with 20 mixed questions (concepts and short cases). The evaluation results showed a significant increase in the competence of all participants, with an average score *pre-test* 68 in becomes *post-test* 85, indicating the effectiveness of the training materials and mentoring in accelerating the learning curve, particularly in template filling skills, filter/validation usage, and inventory numbering consistency. Data quality also showed improvement through uniformity of asset naming and conformity of physical labels. Based on these results, the school and team agreed on baseline operational: data updates are carried out monthly by the room operator, recaps per semester are reported to the management.

3.1.6. Intellectual Property

As an output, an Excel-based School Asset Management Dashboard Template was developed that has received Intellectual Property Rights (IPR) protection. This achievement demonstrates the activity's success in generating simple yet academically valuable innovations, supporting transparency in school administration, and has the potential to be replicated in other educational institutions.

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Pencipta
Nama : Luthfi Firdaus, Riadil Anhar dkk
Alamat : Jl. Wolter, Perumahan Dr. Zulfian Ali, Kemiling, Kota Bandar Lampung, Lampung, 35134
Kewarganegaraan : Indonesia

Pemegang Hak Cipta
Nama : Luthfi Firdaus, Riadil Anhar dkk
Alamat : Jl. Wolter, Perumahan Dr. Zulfian Ali, Kemiling, Kota Bandar Lampung, Lampung, 35134
Kewarganegaraan : Indonesia

Jenis Ciptaan : Program Komputer
Judul Ciptaan : Sistem Informasi Aset dan Dashboard Manajemen
Tanggal dan tempat diumumkan untuk pertama kali di wilayah Indonesia atau di luar wilayah Indonesia : 1 Agustus 2025, di Kota Bandar Lampung
Jangka waktu pelindungan : Berlaku selama 50 (lima puluh) tahun sejak Ciptaan tersebut pertama kali diumumkan.
Nomor Pencatatan : 000961635

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Agung Damarsasongko, SH.,MH.
NIP. 196912281994031001

Figure 5. Intellectual Property Rights Registration Letter - Asset Information System and Management Dashboard

3.2. Discussions

The implementation of a digital-based asset management system strengthening program at SMA YP Unila demonstrated that digitizing asset management is a strategic step in improving transparency, efficiency, and accountability in school governance. Initial observations confirmed that the main problems lie in irregular recording, scattered data, and minimal documentation of

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asset handovers, in line with Ogbuagu's (2023) findings regarding the weak financial stability of schools due to unorganized asset management. Through this activity, a digital-based database system was designed, a simple spreadsheet system that emphasizes numbering consistency, data validation, and ease of updating, in line with Ahmad's (2023) recommendation that an electronic inventory system can optimize school resources even when using basic software such as Excel.

The implementation of Excel-based templates has proven effective because they serve not only as a recording tool but also as a means of data analysis and validation, as stated by Microsoft Support (2021). The training results showed a significant improvement in the skills of school operators, with an average score increase of 17 points between pre-test and post-test, which illustrates improved skills in managing databases and understanding asset structures. These results align with research by Priatna et al. (2021) and Yuningsih et al. (2024), which confirmed the effectiveness of Excel training in improving participant competence and productivity. Furthermore, the use of a dictionary of terms and features dropdown has proven to reduce variations in asset naming and prevent data duplication, in accordance with the view of (Coronel & Morris, 2019) that data integration and consistency are the foundation of the sustainability of an organization's information system.

From the perspective of good governance, the implementation of this system strengthens the principles of accountability and transparency in educational asset management. Consistent with Alkhard (2024), digital data-based asset management not only resolves administrative issues but also supports strategic decision-making processes such as procurement planning, budgeting, and asset disposal. However, challenges remain in improving the incomplete visual documentation of legacy assets, necessitating regular internal audits to maintain data quality and sustainability. This aligns with the recommendation of Munn et al. (2021) that maintaining data quality is a critical component of a sustainable asset management cycle. Therefore, this activity not only results in a digital recording system but also builds a data-driven work culture that supports more modern and accountable school governance.

4. CONCLUSION

The community service program related to strengthening the digital data-based asset management system at SMA YP Unila has had a tangible impact on improving school asset governance. Through observation, design, training, and mentoring, this activity successfully identified core issues such as irregular recording and weak handover documentation, while also providing a solution in the form of a standardized and easy-to-use Excel-based asset database template. The contextual training provided significantly improved operator competency, as demonstrated by improved scores pre-post test with an average of 17 points. The implementation of the new system also demonstrated improved record-keeping consistency, reduced data duplication, and the emergence of a more orderly and accountable work culture. Overall, this activity not only strengthened the school's administrative aspects but also raised awareness of the importance of data-driven management as a foundation for institutional transparency and efficiency.

To ensure the sustainability of program results, schools need to develop and implement standard operating procedures (SOPs) for asset management that cover the entire asset management cycle, from recording to disposal. Periodic refresher training and routine internal audits are recommended to maintain data accuracy and completeness. Furthermore, documentation in the form of written guides and video tutorials is essential to anticipate personnel rotation and maintain competency continuity. In the long term, developing the system into a web-based platform can be considered to improve security, accessibility, and more comprehensive data integration with the school's administrative and financial systems. This activity contributes academically by providing empirical evidence that simple spreadsheet-based digital systems can effectively strengthen accountability and asset governance in educational institutions. Practically, it offers a scalable and replicable model for schools with limited resources, while fostering a sustainable data-driven work culture through participatory training and system standardization.

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