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ENHANCING THE EFFICIENCY OF ACADEMIC TRANSCRIPT GENERATION: A CASE STUDY OF iREPORT DESIGNER AT POLITEKNIK SEBERANG PERAI

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Abstrak: *The increasing student enrolment at Politeknik Seberang Perai has intensified the need for an efficient, user-friendly, and cost-effective academic transcript generation system. To meet this demand, the Examination Unit has adopted iReport Designer, an open-source reporting tool that streamlines the process. With this tool, transcripts can be generated and printed instantly by entering a student's registration number, eliminating the need to navigate complex system menus. Its intuitive editing interface also enables easy modifications without the manual steps required in the Polytechnic Management Information System (SPMP). The use of a two-column transcript template further enhances cost-efficiency by reducing paper usage. Moreover, the system allows access to historical student records stored in the PMIS database, even if they are no longer available in SPMP. iReport Designer supports multi-database integration and is accessible by all Examination Unit staff, ensuring operational continuity. Overall, the implementation of iReport Designer has significantly improved the efficiency, accessibility, and cost-effectiveness of academic transcript generation. This study underscores the value of open-source tools in enhancing administrative processes in educational institutions.*

Keywords: *academic transcripts, iReport Designer, SPMP, PMIS database, reporting system, open-source too, two-column template*

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Introduction

Academic transcript generation is a critical administrative function in higher education institutions, serving as an official record of student achievements. As student enrolment continues to rise, examination units face increasing challenges in managing large volumes of transcripts efficiently. At Politeknik Seberang Perai, the Examination Unit is responsible for generating academic transcripts for over 600 students per semester, a process that has traditionally been managed using the Polytechnic Management Information System (SPMP). However, several constraints associated with SPMP—including time inefficiencies, limited template customization, and cost concerns—have necessitated the adoption of a more flexible and scalable reporting tool (Rahman et al., 2021).

To address these challenges, the Examination Unit has adopted Jaspersoft iReport Designer, an open-source reporting tool that enables greater control over report content and layout. iReport Designer is widely utilized across various industries for its capability to generate complex reports with high efficiency, making it a suitable alternative for academic transcript generation (Jaspersoft Community, 2022). The integration of iReport Designer with institutional databases, including legacy systems such as PMIS, facilitates seamless data retrieval, ensuring accessibility to both current and past student records (Ahmed & Sulaiman, 2020).

This study examines the implementation of Jaspersoft iReport Designer within the Examination Unit of Politeknik Seberang Perai, focusing on its impact in enhancing operational efficiency, reducing costs, and improving report customization. By assessing its functionalities, database integration capabilities, and usability, this paper aims to contribute to the ongoing discourse on digital transformation and administrative automation in higher education institutions.

Literature Review

Academic transcripts serve as essential official records of student achievements, providing documentation for employment, further studies, and professional certifications (Rahman et al., 2021). Efficient transcript management is critical to ensuring accuracy, accessibility, and timely processing, especially in institutions with high student enrolment. As higher education institutions transition toward digital transformation, the reliance on traditional or outdated systems poses significant administrative burdens, necessitating the adoption of automated and scalable reporting solutions (Kumar & Singh, 2019). Many polytechnics and universities utilize centralized Student Management Information Systems (SMIS), such as the Polytechnic Management Information System (SPMP), to store student data and automate administrative tasks. However, these systems often present several limitations, including rigid templates that limit customization to institutional needs (Hassan & Bakar, 2021), time inefficiencies in report processing, especially during peak periods (Lee & Tan, 2022), and high operational costs associated with maintaining proprietary software (Ahmed & Sulaiman, 2020). These challenges highlight the need for more flexible and scalable reporting tools that can integrate with institutional databases while improving processing speed and customization options.

Open-source reporting tools have gained traction in academic institutions due to their cost-effectiveness, adaptability, and integration capabilities (Jaspersoft Community, 2022). Among these tools, Jaspersoft iReport Designer stands out as a widely used reporting solution, offering greater control over report design and customization (Rahim et al., 2021), compatibility with multiple databases, including legacy systems such as PMIS (Shah & Yusof, 2021), and reduced reliance on proprietary software, leading to long-term cost savings (Nordin & Ismail, 2020). One of the key advantages of Jaspersoft iReport Designer is its ability to integrate seamlessly with various institutional databases, ensuring quick and accurate retrieval of student records.

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Institutions that have implemented similar reporting tools have reported enhanced data accessibility and improved workflow efficiency (Ahmed & Sulaiman, 2020), while also ensuring that historical student data stored in older systems like PMIS remains retrievable even after system migrations (Shah & Yusof, 2021). Digital transformation in higher education extends beyond classroom technology to include administrative automation, with research suggesting that automating transcript generation can reduce manual workload, minimize human errors, and improve overall institutional efficiency (Kumar & Singh, 2019).

The successful implementation of Jaspersoft iReport Designer at Politeknik Seberang Perai aligns with global trends in higher education modernization and supports the push toward digital-first administrative strategies (Lee & Tan, 2022).

Overall, the literature highlights the limitations of traditional academic transcript systems and the advantages of open-source reporting tools like Jaspersoft iReport Designer. The findings suggest that integrating flexible and cost-effective reporting solutions can enhance efficiency, reduce administrative burdens, and ensure better student record management. This study builds upon these insights by evaluating the effectiveness of iReport Designer in optimizing transcript generation at Politeknik Seberang Perai.

Method

This study employs a mixed-methods approach combining quantitative and qualitative methods to evaluate the effectiveness of implementing iReport Designer for academic transcript generation at Politeknik Seberang Perai. The methodology consists of three key phases: data collection, system evaluation, and statistical analysis (Creswell & Clark, 2017)

To assess the effectiveness of the system, data was collected based on four key elements: time efficiency, cost savings, user experience, and customer satisfaction. The time efficiency of transcript generation was measured by recording the average processing time before and after the implementation of iReport Designer. A comparative analysis was conducted between SPMP-based transcript generation and iReport-based transcript generation to determine the percentage of time reduction (Rahman et al., 2021). Cost savings were evaluated by calculating the financial benefits of using open-source software (iReport Designer), reducing paper consumption with the two-column transcript format, and eliminating pre-printed transcript paper costs by embedding logos directly into the digital template (Lee & Tan, 2022).

For user experience and system usability, a survey was conducted among 41 staff members, including examination officers and department exam coordinators, to assess user-friendliness and accessibility. A three-point Likert scale was used to measure user perceptions regarding system accessibility, ease of use, the speed of transcript processing, and the efficiency of transcript modifications (Rahman et al., 2021). Additionally, customer satisfaction was assessed through a survey of 100 students who applied for transcripts at the Examination Unit counter. A Mean Score Analysis was used to evaluate student satisfaction concerning the ease of obtaining transcripts, waiting time at the counter, the accuracy of transcript information, and the overall transcript design (Lee & Tan, 2022).

Following data collection, a system evaluation was conducted to analyze the impact of iReport Designer on transcript generation. The evaluation criteria included the percentage reduction in processing time, cost savings based on reduced paper usage and printing expenses, and user satisfaction levels in terms of system functionality, accessibility, and reliability (Rahman et al.,

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2021). Additionally, an error analysis was performed to identify any data inconsistencies or duplication issues (Shah & Yusof, 2021).

The study employed quantitative and qualitative statistical analysis methods to interpret the results. A percentage reduction analysis was used to assess time efficiency improvements, while cost-effectiveness evaluations compared pre-implementation and post-implementation expenses on transcript production (Lee & Tan, 2022). Furthermore, survey responses from staff and students were analysed using Mean Score Analysis and percentage distribution to measure the usability and overall acceptance of the system (Nordin & Ismail, 2020).

Results and Discussion

The implementation of iReport Designer at Politeknik Seberang Perai's Examination Unit has demonstrated significant improvements in time efficiency, cost savings, system usability, and customer satisfaction. The findings of this study are based on quantitative analysis of processing time and cost savings, as well as qualitative survey responses from staff and students.

Time Efficiency

A comparative analysis of transcript generation using SPMP and iReport Designer demonstrated a significant reduction in processing time. The average time required for transcript generation with SPMP was 5 minutes and 38 seconds due to its manual, multi-step process. In contrast, iReport Designer streamlined the workflow, reducing the number of steps involved and lowering the processing time to 45 seconds, resulting in an 86.7% improvement in efficiency. This substantial decrease in processing time allows the Examination Unit to handle a higher volume of transcript requests with greater speed and accuracy.

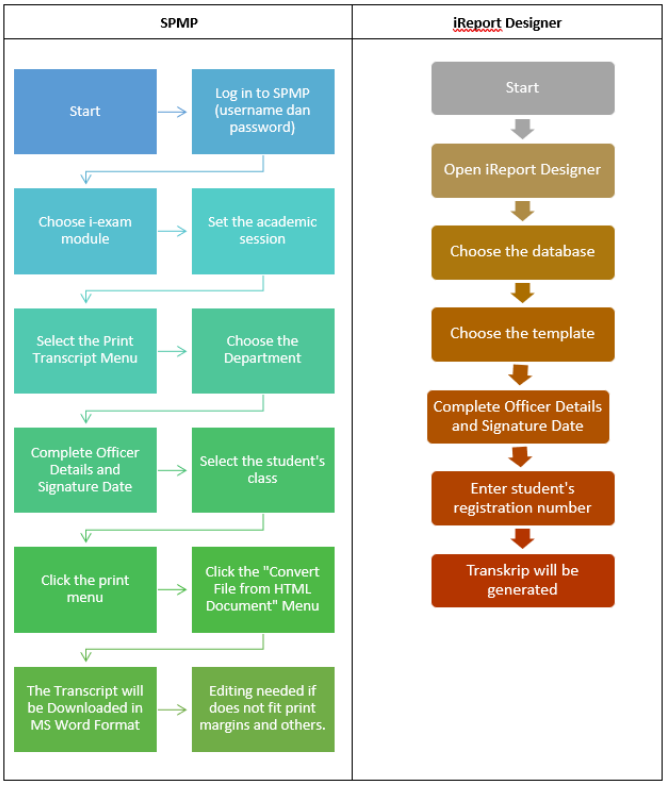

Figure 1: Comparison of Transcript Generation Process Flowcharts Using SPMP and iReport Designer

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Cost Savings

The cost-effectiveness of implementing iReport Designer was evaluated based on paper usage and software costs. The key cost-saving measures include:

a) Open-source software: Since iReport Designer is free, there are no licensing fees, reducing the financial burden on the institution.
b) Paper consumption reduction: By adopting a two-column transcript format, the number of transcript pages per student was minimized, resulting in a 50% reduction in paper usage.
c) Elimination of pre-printed transcript paper: Previously, transcript printing required pre-printed letterhead paper, incurring an annual cost of RM5,000. With iReport Designer, institutional logos are embedded directly into the digital template, eliminating the need for expensive pre-printed materials. Additionally, modifications to the ministry logo or name do not require reprinting new transcript paper, further preventing wastage.

System Usability and User Experience

A survey was conducted among staff who use the iReport Designer software to assess its effectiveness in terms of user-friendliness. Data for this study was collected through questionnaires distributed to them. Their perception of the system was measured based on three aspects: the physical aspects of the system, the overall system, and their overall perception of the system. The respondents' level of agreement was measured using a three-point Likert scale.

1. Demography

A total of 41 respondents, consisting of examination unit staff and departmental examination coordinators, participated in the survey.

Table 1: Respondent's Demography

Item	Frequency	Percentage
Gender		
Male	9	22%
Female	32	78%
Department		
JKE (Department of Electrical Engineering)	6	15%
JKM (Department of Mechanical Engineering)	6	15%
JP (Department of Commerce)	8	19%
JTMK (Department of Information Technology and Communication)	6	15%
JPA (Department of General Studies)	5	12%
JMSK (Department of Mathematics, Science and Computer)	6	15%
Examination Unit	4	9%

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Research Findings

Perception of the System's Physical Aspects

Table 2: Percentage Of Responses For System's Physical Aspects Questions

ITEM		Disagree	Agree	Strongly Agree
A1	This system is comprehensive	0%	24%	76%
A2	This system is easily accessible.	0%	12%	88%
A3	This system has no access issues when generating transcripts.	0%	71%	29%
A4	The system layout is easy to understand.	0%	73%	27%
A5	The information layout in the system is very clear.	0%	61%	39%

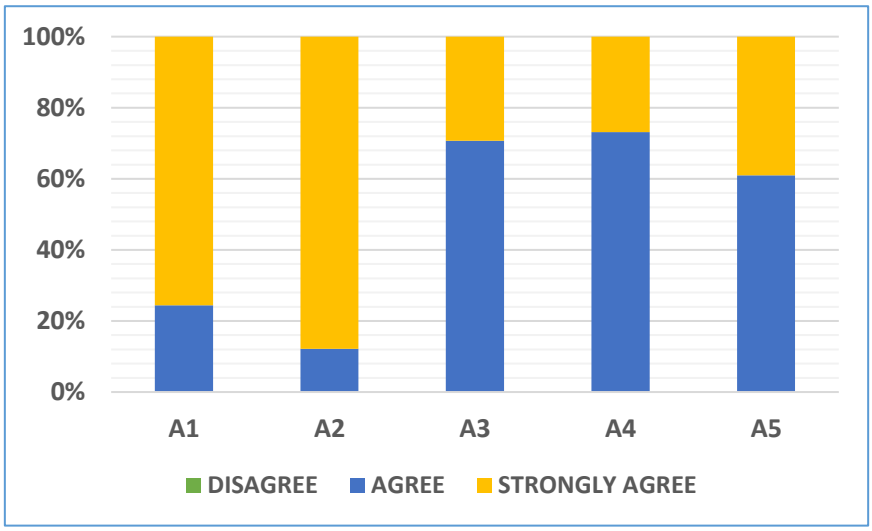

Figure 2: Percentage of Responses for the System's Physical Aspect Questions

Table 2 shows that 100% of respondents either agreed or strongly agreed with each item related to the system's physical design. The highest agreement was on the statements that the system is comprehensive and easily accessible. This indicates that the system's physical design is easy to understand and user-friendly.

Perception of System Capability

Table 3: Percentage Of Responses For System Capability Questions

ITEM		Disagree	Agree	Strongly Agree
B1	The steps required to generate transcripts in the system are easy to understand.	0%	15%	85%
B2	The time taken to generate transcripts is fast.	0%	7%	93%
B3	Using this system for transcript generation is faster than SPMP.	0%	0%	100
B4	Transcript modifications are easier to perform with this system.	0%	0%	100%

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B5	The system's response time is fast.	0%	7%	93%
B6	The time taken for transcript display is quick.	0%	10%	90%
B7	The system does not allow data duplication.	24%	49%	27%
B8	The system has high reliability.	0%	85%	15%
B9	Assistance in operating the system is rarely needed.	0%	78%	22%
B10	System operation errors rarely occur.	0%	49%	51%
B11	Transcript modifications are easier to perform with this system.	0%	15%	85%

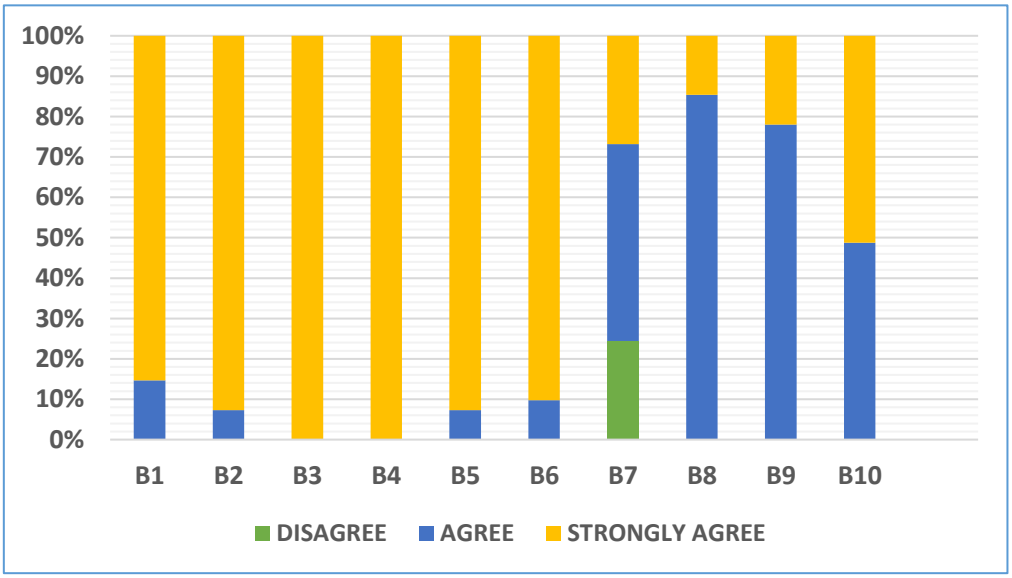

Figure 3: Percentage of Responses for the System Capability Questions

Table 3 shows that respondents strongly agreed that using the system for transcript generation is faster than SPMP and that modifying transcripts is easier with this system. However, 24% of respondents disagreed that the system prevents data duplication. This may be due to student course data occasionally overlapping in transcripts. The duplication issue is resolved once corrections are made in the SPMP database.

Overall System Performance Perception

Table 4: Percentage Of Responses For Overall System Performances Questions

ITEM		Disagree	Agree	Strongly Agree
C1	This system is satisfactory.	0%	5%	C1
C2	This system helps simplify academic transcript generation.	0%	0%	C2
C3	This system is cost-effective.	0%	0%	C3
C4	This system is easy to operate.	0%	0%	C4

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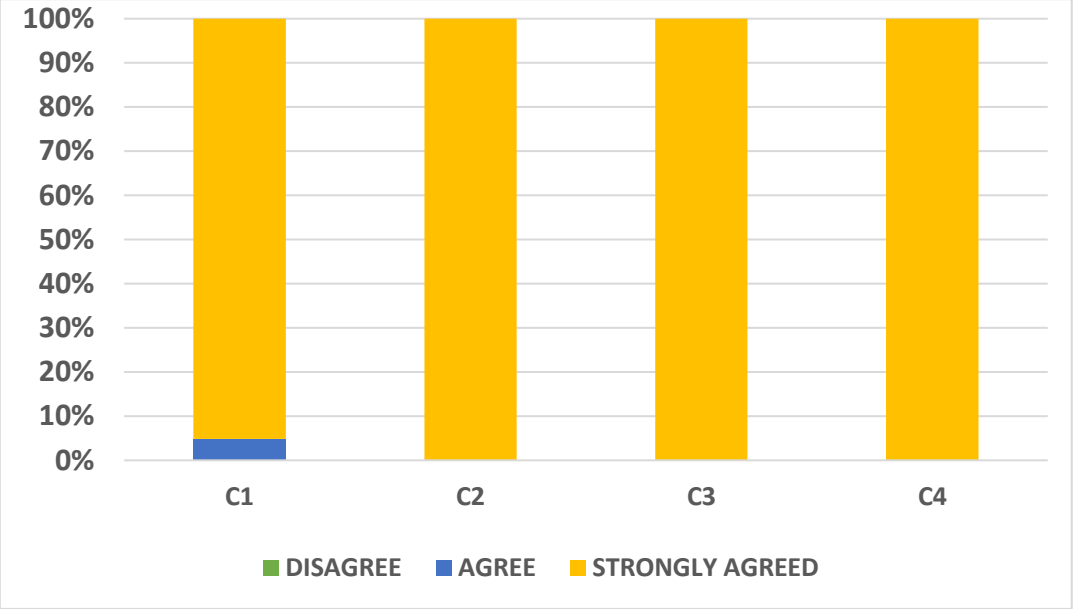

Figure 4: Percentage of Responses for Overall System Performances Questions

Based on Table 4, the majority of respondents agreed that, overall, this system helps simplify academic transcript generation, reduces costs, and is easy to operate**.**

Customer Satisfaction

To evaluate the effectiveness of this element, a survey was conducted at the examination unit counter using a questionnaire. A total of 100 samples were taken from the overall pool of students who applied for transcripts at the counter. The mean score was used to assess the effectiveness of the implementation. Figure 1 shows the gender distribution of the samples involved, where out of the 100 samples taken, 63 were female students and the remaining were male.

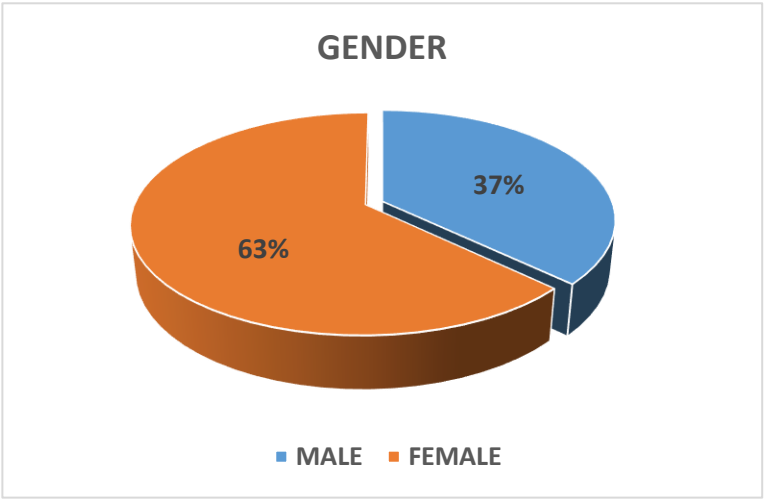

Figure 5: Gender Distribution

A descriptive analysis was conducted to obtain the mean score for each item questioned to the students. Table 2 shows the distribution of mean scores for each evaluated item.

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Table 5: Mean Score

ITEM		Mean Score	Interpretation
1	The process of obtaining my academic transcript is easy.	4.95	High
2	I did not have to wait long to receive my academic transcript at the examination counter.	4.90	High
3	The information on my academic transcript is accurate.	5.00	High
4	I like the design of my academic transcript.	4.90	High

From the data obtained, the items "The process of obtaining my academic transcript is easy" and "The information on my academic transcript is accurate" received the highest mean scores.

Overall, the generation of student academic transcripts using the customer-friendly iReport Designer is rated at a high level, with an average mean score of 4.94. This indicates that respondents agree that they can easily obtain their transcripts at the Examination Unit counter without long waiting times, while also receiving accurate information and an appealing transcript design.

The findings of this study highlight the significant improvements in time efficiency, cost savings, system usability, and overall user satisfaction following the implementation of iReport Designer at Politeknik Seberang Perai's Examination Unit. The results demonstrate how automated reporting systems can enhance administrative efficiency and streamline transcript generation in higher education institutions. The system reduced transcript processing time by 86.7%, from 5 minutes 38 seconds with SPMP to 45 seconds, by eliminating manual data entry, complex system navigation, and reliance on pre-printed transcript paper. Cost savings were achieved through open-source licensing (eliminating software fees), a two-column transcript format (reducing paper usage by 50%), and digital transcript templates (eliminating RM50,000 in pre-printed paper costs). Survey results show that 100% of respondents agreed the system is comprehensive, accessible, and user-friendly, with faster processing and easier transcript modifications. However, 24% raised concerns about data duplication, which was attributed to pre-existing inconsistencies in SPMP rather than a flaw in iReport Designer. Overall system performance received positive feedback, with 95% satisfaction and 100% agreement that the system simplifies transcript generation, reduces costs, and is easy to operate. Customer satisfaction was high, with a mean score of 4.94, as students found the system efficient, accurate, and accessible, reinforcing its positive impact on service delivery.

Conclusion

The implementation of iReport Designer at Politeknik Seberang Perai's Examination Unit has significantly enhanced the efficiency, cost-effectiveness, and usability of academic transcript generation. Overall, iReport Designer has proven to be an effective solution for optimizing academic transcript generation, reducing administrative workload, and improving service delivery. These findings support the broader adoption of open-source reporting tools in higher education institutions to enhance administrative automation and operational efficiency.

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Suggestion

Based on the study's findings, the following suggestions are proposed:

a) Enhance Data Validation and Integrity
   Implement automated data validation protocols to prevent data duplication issues. Regularly update and synchronize databases (SPMP & PMIS) to maintain accuracy. Conduct periodic audits to ensure consistency in student records.
b) Improve User Training and Technical Support
   Conduct regular training sessions for staff and users to maximize system potential. Establish a technical support team for faster troubleshooting and assistance.
c) Broaden the Implementation of iReport Designer
   Extend its use to other administrative functions such as certificate generation, grading reports, and enrolment summaries. Consider integration with cloud-based storage for secure and accessible record-keeping.

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