International Journal of Social Science and Human Research

ISSN (print): 2644-0679, ISSN (online): 2644-0695

Volume 07 Issue 10 October 2024

DOI: 10.47191/ijsshr/v7-i10-58, Impact factor- 7.876

Page No: 7804-7810

Use of School Data Management System (SDMS) For Performance of Students in Twelve Years Basic Education in Rwanda

TWAHIRWA Alexis[1], MUGIRANEZA Faustin[2]

[1]Department of Education Management and Curriculum Studies, Leadership and Management Option, Mount Kenya University.

[2]School of Education, Mount Kenya University

ABSTRACT: This paper assessed the use of school data management system in performance of students in twelve years basic education in Musanze District. The Research project aimed to achieve the following objectives: to evaluate the DSMS types of financial services in use for the performance of students of 12YBE; to assess the role of SMS academic evaluation in the performance of students of 12YBE; to show how SDMS helps in school infrastructure management for the performance of students of 12YBE; and to ascertain the effects of SDMS personal identification in the performance of students of 12YBE. The research project employed a descriptive survey design, incorporating both quantitative and qualitative methodologies. The target population was 1,130 respondents projecting in education sector Musanze District. In this Research project 339 respondents were sampled from 1,130 teaching staff. This sample was scientifically determined using an appropriate research project formula. The sample size was determined using Slovin's formula. Stratified random sampling was implemented, wherein strata were established according to the schools. The primary data were collected using questionnaires elaborated for 339 respondents. For validity, the questionnaire was shared with seasoned research project for their inputs which were taken into consideration before piloting the questionnaire and conducting comprehensive data collection. The data analysis encompassed both quantitative and qualitative methods. Quantitative research project involved precise measurement techniques to yield accurate mathematical outcomes. Data were presented in tables and graphs, and quantitative data were analyzed and interpreted using the Statistical Package for Social Sciences (SPSS) software. The findings were done for only 330 respondents as 9 questionnaires were not returned. So, the findings from 330 respondents showed that the use of School Data Management Systems (SDMS) in Rwanda's 12-Year Basic Education system has demonstrated significant potential to enhance educational practices and improve student outcomes. The comprehensive analysis conducted in this Research project reveals strong correlations between SDMS implementation and various facets of student performance, academic evaluation, infrastructure management, and personal identification. Recommendations have been provided to both SDMS users in schools and MINEDUC to optimize SDMS utilization, ensure sustainable implementation, and foster data-driven decision-making.

KEYWORDS: SDMS Academic Evaluation, SDMS Financial Services in Use, SDMS Infrastructure Management, SDMS Personal Identification, Students Performance.

INTRODUCTION

This paper aims at assessing the use of school data management system (SDMS) for the performance of students in twelve years basic education with a particular focus on Musanze District, in Rwanda.

In a Research project conducted by Mwangi et al. (2019) on "The Role of School Management Systems in Financial Management of Public Secondary Schools in Kenya,". The research project found that schools using SDMS experienced more efficient fee collection, reduced instances of financial mismanagement, and improved transparency in budgetary allocations. The link between this reviewed research project and the current one is that both studies focus on the impact of SDMS on improving financial transparency and management within educational institutions.

In a Research project conducted by Sharma et al. (2020) on "Effectiveness of Digital Financial Management Systems in Indian Schools,". The research project found that the implementation of SDMS significantly reduced administrative burdens related to financial transactions and increased the accuracy of financial reporting. The connection to the current research project is the emphasis on the benefits of digital financial management systems in enhancing financial operations in schools.

In a Research project conducted by Ssebunnya (2021) on "The Impact of Financial Management Systems on Resource Allocation in Ugandan Secondary Schools,". The Research project revealed that schools with SDMS were more effective in aligning their

budgets with educational goals and were able to better track financial disbursements. This Research project relates to the current research project by highlighting the role of SDMS in optimizing resource allocation in educational settings.

In a Research project conducted by Kim et al. (2018) on "The Use of School Management Systems for Academic Performance Monitoring in South Korean Schools,". The research project found that SDMS enabled more effective tracking of student progress and provided teachers with tools to identify and address learning gaps. The link to the current research project is the focus on using SDMS for academic evaluation to improve student performance.

In a Research project conducted by Ochieng et al. (2020) on "Impact of Digital Academic Evaluation Systems on Student Performance in Kenyan High Schools," The Research project found that schools utilizing these systems had higher student engagement and improved academic outcomes due to the timely feedback provided to students and educators. The connection to the current research project lies in the exploration of how academic evaluation systems within SDMS can enhance student outcomes.

In a Research project conducted by Dlamini et al. (2021) on "Evaluating the Effectiveness of SDMS in Academic Assessment in Swaziland Secondary Schools,". The findings indicated that SDMS contributed to more accurate and comprehensive student evaluations and allowed for better tracking of academic progress over time. This Research project is related to the current research project as it highlights the role of SDMS in enhancing the quality of academic evaluation in schools.

In a Research project conducted by Wanjiku et al. (2019) on "Implementation of School Management Systems for Infrastructure Management in Kenyan Secondary Schools,". The research project found that SDMS facilitated better planning and maintenance of school facilities, leading to reduced downtime and improved learning environments. The link to the current research project is the focus on how SDMS can improve infrastructure management in educational settings.

In a Research project conducted by Musa et al. (2020) on "The Role of Digital Management Systems in Enhancing School Infrastructure in Nigerian Secondary Schools,". The Research project found that these systems improved the allocation and utilization of resources for infrastructure development and maintenance. The connection to the current research project is the investigation of how SDMS can be used to manage and improve school infrastructure.

In a Research project conducted by Nyamache et al. (2021) on "Effectiveness of SDMS in School Infrastructure Management in Tanzanian Public Schools,". The Research project found that SDMS provided significant improvements in scheduling and tracking maintenance tasks and managing physical resources. This Research project is related to the current research project by emphasizing the role of SDMS in infrastructure management within schools.

In a Research project conducted by Jones et al. (2018) on "Management of Student Records Through School Data Systems in the United States,". The Research project found that SDMS improved the accuracy and accessibility of student records and enhanced data security. The connection to the current research project is the examination of how SDMS handle personal identification information in educational institutions.

In a Research project conducted by Abdullah et al. (2020) on "Effectiveness of School Management Systems in Managing Personal Data in Malaysian Schools,". The research project found that schools using SDMS had more efficient processes for updating and verifying student and staff records. The link to the current research project is the focus on personal identification management within SDMS.

In a Research project conducted by Kabera et al. (2021) on "Use of Digital Systems for Personal Identification Management in Rwandan Secondary Schools,". The Research project found that digital systems, including SDMS, improved the accuracy of personal data and facilitated easier access for administrative purposes. This Research project is related to the current research project as it highlights the importance of personal identification management in educational settings through SDMS.

In a Research project conducted by Nguyen et al. (2019) on "Impact of School Management Systems on Student Academic Performance in Vietnamese Schools,". The Research project found that SDMS contributed to better tracking of student performance and more effective academic interventions, leading to improved academic outcomes. The link to the current research project is the exploration of how SDMS can be used to monitor and improve student performance.

In a Research project conducted by Kariuki et al. (2020) on "Effects of Digital Learning Management Systems on Student Performance in Kenyan High Schools,". The Research project found that these systems provided valuable insights into student progress and facilitated tailored instructional strategies, resulting in improved academic achievements. The connection to the current research project is the focus on the use of digital systems to enhance student performance.

In a Research project conducted by Adewale et al. (2021) on "Evaluating the Role of SDMS in Student Performance Enhancement in Nigerian Secondary Schools,". The findings indicated that schools using SDMS saw improvements in student engagement and academic results due to better data management and feedback mechanisms. This Research project is related to the current research project by examining how SDMS contribute to improving student performance in secondary schools.

The main purpose of the research project was to analyze the use of SDMS for performance of students of twelve years' basic education in Rwanda particularly in Musanze district. The specific objectives were: (i) to evaluate the DSMS types of financial services in use for the performance of students of 12YBE, (ii) to assess the role of SMS academic evaluation in the performance of

students of 12YBE, (iii) to show how SDMS helps in school infrastructure management for the performance of students of 12YBE, and (iv) to ascertain the effects of SDMS personal identification in the performance of students of 12YBE.

The project's significance, it was important to the government in encouraging the education managers like district authorities especially DDE and DEOs, and sector authorities to put more efforts in encouraging school managers such as head teachers, DOS and teachers of 12YBE to use the SDMS also for performance of their students as the outcome of education quality. The project was important to the research to receive skills and knowledge of analyzing and interpreting data related to the contribution of the use of SDMS for performance of students of 12YBE in Rwanda. Also; it was an important fulfillment of requirement in Master's degree award in Education. Finally, it was helpful for the students of 12YBE in Rwanda to perform well as outcome of using the SDMS for performance encouraged by the different authorities in education.

MATERIALS AND METHODS

For methodological details, this research project was conducted in 12-Year Basic Education schools in Musanze District. The focus was on key informants involved in the use of SDMS for student performance, specifically school leaders and teachers. Key informants included: DDE (1), DEO (3), SEI (14), HT (142), DOS (21), ACCOUNTANTS (142), School IT (7), and some teachers. The population sample represented at least 30% of the total population of 1,130, with a calculated sample size of 339. A simple stratified random sampling method was used to determine the sample size, not stratified or systematic sampling. According to Dushimimana (2019), statistical tests such as ANOVA and regression analysis were employed, with the significance level set at 0.05, which indicated the probability threshold for rejecting the null hypothesis. If the p-value was less than this significance level, the null hypothesis was rejected. Quantitative data were collected through questionnaires, and qualitative data were gathered from interviews. A purposive sampling technique was used for selecting participants. For data analysis, Statistical Package for the Social Sciences (SPSS) version 22.0 was used for data entry and analysis, and the Pearson correlation coefficient (r) was calculated to evaluate the relationship between variables, using a simplified approach.

RESULTS

Table 1: Types of SDMS Financial Services in use

	Frequency	Percent	Mean	SD
Savings for financial records	33	10.0	0.100	.090
Fast financial reporting	60	18.2	0.182	.121
clear financial reporting	56	17.0	0.170	.119
Reduction of delay of capitation grant	47	14.2	0.142	.108
withdrawing services	77	23.3	0.233	.139
Pension fund services	28	8.5	0.085	.086
Money transfer services	29	8.8	0.088	.089
Overall	**330**	**100.0**	**3.83**	**1.773**

Source: Primary data, (2024)

Table 2. Assessment of performance of students in 12YBE

	Frequency	Percent	Mean	SD
Students performance rate	88	26.7	0.267	.444
School Drop Out Rate	132	40.0	0.400	.490
Teaching & Learning Rate	81	24.5	0.245	.430
Students Retention	29	8.8	0.088	.283
Overall	**330**	**100.0**	**2.15**	**.918**

Source: Primary data (2024)

Table 3. Correlations analysis between SDMS types of financial services in use and performance of students in 12YBE

		Types of SDMS Financial services in use	Assessment of performance of students in 12YBE
Types of SDMS Financial services in use	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	330	

Assessment of performance of students in 12YBE	Pearson Correlation	.935**	1
	Sig. (2-tailed)	.000	
	N	330	330

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Primary data (2024)

Table 4. SDMS Academic Evaluation

	Frequency	Percent	Mean	SD
Students marks record	83	25.2	0.252	.434
Students deliberation	95	28.8	0.288	.454
Students performance	52	15.8	0.158	.365
Teachers performance	46	13.9	0.139	.346
Students Marks Reporting	54	16.4	0.164	.370
Total	**330**	**100.0**	**2.68**	**1.410**

Source: Primary data (2024)

Table 5. Correlations analysis between SDMS academic evaluation and performance of students in 12YBE

		Assessment of performance of students in 12YBE	Academic Evaluation
Assessment of performance of students in 12YBE	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	330	
Academic Evaluation	Pearson Correlation	.938**	1
	Sig. (2-tailed)	.000	
	N	330	330

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Primary data (2024)

Table 6. SDMS School Infrastructure Management

	Frequency	Percent	Mean	SD
Record school buildings and materials	135	40.9	0.409	.492
Record ICT tools	88	26.7	0.267	.444
School infrastructure management reporting	107	32.4	0.324	.468
Overall	**330**	**100.0**	**1.92**	**.853**

Source: Primary data (2024)

Table 7. Correlations analysis between SDMS school infrastructure management and performance of students in 12YBE

		SDMS School Infrastructure Management	Assessment of performance of students in 12YBE
SDMS School Infrastructure Management	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	330	
Assessment of performance of students in 12YBE	Pearson Correlation	.886**	1
	Sig. (2-tailed)	.000	
	N	330	330

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Primary data (2024)

Table 8. SDMS Personal Identification

	Frequency	Percent	Mean	SD
Record student's information	112	33.9	0.339	.473
Record teaching staff information	115	34.8	0.348	.476
Record teachers' subjects	103	31.2	0.312	.463
Total	**330**	**100.0**	**1.97**	**.808**

Source: Primary data (2024)

Table 9. Correlations analysis between SDMS identification and performance of students in 12YBE

		SDMS Personal identification	Assessment of performance of students in 12YBE
SDMS Personal identification	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	330	
Assessment of performance of students in 12YBE	Pearson Correlation	.908**	1
	Sig. (2-tailed)	.000	
	N	330	330

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Primary data (2024)

DISCUSSION AND CONCLUSIONS

In light of the project objectives of the study, the author interprets data and draw conclusions. The findings in Table 1 validated the first objective regarding the types of financial services provided by DSMS for 12YBE student performance. The results showed varying effectiveness among different services. "Withdrawing services" (mean = 0.233) and "fast financing reporting" (mean = 0.182) were seen as more impactful, while "pension fund services" (mean = 0.085) and "money transfer services" (mean = 0.088) were less effective. The standard deviations (0.086 to 0.139) indicated varied responses, with "pension fund services" having the least variability and "withdrawing services" the most. The overall mean of 3.83 and standard deviation of 1.773 suggested a generally positive yet varied perception of these services. Comparisons with studies by Mwangi and Ng'ang'a (2019), Sharma and Gupta (2020), and Ssebunnya (2021) highlighted the importance of effective financial tools and the need for improvement in less effective services to enhance student performance.

The results in Table 2 show varying perceived impacts among performance metrics for 12YBE students. "School Drop Out Rate" has the highest mean (0.400), indicating a significant concern. "Students performance rate" (0.267) and "Teaching & Learning Rate" (0.245) show moderate effectiveness, while "Students Retention" has the lowest mean (0.088), pointing to challenges in keeping students engaged. The standard deviations range from 0.283 to 0.490, with "School Drop Out Rate" showing the highest variability. The overall mean of 2.15 and standard deviation of 0.918 suggest moderate yet inconsistent perceptions of student performance, highlighting the need for targeted interventions.

The results in Table 3 show a strong positive correlation between the use of SDMS financial services and 12YBE student performance, with a Pearson Correlation coefficient of .935**, indicating a very high positive relationship and statistical significance ($p < .01$). This suggests substantial improvement in student performance with better SDMS financial services. The significance level (Sig. = .000) confirms the reliability of this correlation, supported by a robust sample size of 330 (N=330). The perfect correlation within each variable underscores the internal consistency of the data, highlighting the critical role of effective SDMS financial services in enhancing student performance.

The results in Table 4 validated the second objective regarding the role of SDMS academic evaluation in the performance of 12YBE students. The findings showed varied impacts among different aspects. "Students' deliberation" (mean = 0.288) and "students marks records" (mean = 0.252) were seen as the most significant features for improving academic outcomes, while "students' performance" (mean = 0.158) and "teachers' performance" (mean = 0.139) were less effectively supported by SDMS. The standard deviations (0.346 to 0.454) indicated considerable variability, with "students marks records" and "students' deliberation" having the most variation, suggesting diverse experiences among respondents. The overall mean of 2.68 and standard deviation of 1.410 suggested a moderate yet somewhat inconsistent perception of SDMS's role in academic evaluation. Comparisons with studies by Ochieng and Obiero (2020) and Kim and Lee (2018) highlighted the benefits and challenges of academic performance monitoring systems, indicating the need for improvements in less effective areas to enhance student performance.

The results in Table 5 reveal a highly significant relationship between SDMS academic evaluation and 12YBE student performance, with a Pearson Correlation coefficient of .938**, indicating a very strong positive correlation and statistical significance ($p < .01$). This suggests that improved SDMS academic evaluation leads to substantial enhancement in student performance. The significance level (Sig. = .000) confirms the reliability of this relationship, supported by a sample size of 330 (N=330). The perfect correlation within student performance highlights the internal consistency of the data, emphasizing the critical role of SDMS in academic evaluation for improved educational outcomes.

The results in Table 6 validated the third objective regarding how SDMS aids in school infrastructure management for 12YBE student performance. "Record school buildings and materials" (mean = 0.409) was seen as the most impactful, highlighting its key role in managing physical resources effectively. "School infrastructure management reporting" (mean = 0.324) showed moderate influence, while "record ICT tools" (mean = 0.267) had the lowest mean, indicating less effectiveness. The standard deviations (0.444 to 0.492) suggested moderate variability in responses, with "record school buildings and materials" showing the highest variability. The overall mean of 1.92 and standard deviation of 0.853 suggested moderate yet variable effectiveness of SDMS in infrastructure management, with room for improvement in ICT tools and reporting. Comparisons with studies by Wanjiku and Njenga (2019) and Jones and Smith (2018) highlighted the benefits and challenges in managing school infrastructure and ICT tools, indicating the need for enhancements to consistently support student performance.

The results in Table 7 show a highly significant relationship between SDMS school infrastructure management and 12YBE student performance, with a Pearson Correlation coefficient of .886**, indicating a strong positive correlation and statistical significance ($p < .01$). This suggests that effective SDMS infrastructure management, including the recording and maintenance of school buildings and ICT tools, enhances student performance. The significant correlation (Sig. = .000) confirms the reliability of this relationship, supported by a robust sample size of 330 (N=330). The perfect correlation within student performance underscores the internal consistency of the data, highlighting the critical role of effective infrastructure management in supporting better educational outcomes.

The results in Table 8 validated the fourth objective regarding the effects of SDMS personal identification on 12YBE student performance. "Record teaching staff information" (mean = 0.348) and "record students' information" (mean = 0.339) were perceived as slightly more impactful, indicating the importance of managing essential personal data effectively. "Record teachers' subjects" (mean = 0.312) had the lowest impact, suggesting less effectiveness in accurately linking teachers to their subjects. The standard deviations (0.463 to 0.476) indicated moderate variability in responses, with "record teaching staff information" showing the highest variability. The overall mean of 1.97 and standard deviation of 0.808 suggested moderate effectiveness of SDMS in handling personal identification data, with variability pointing to areas for improvement. Comparisons with studies by Abdullah and Hussein (2020) and Kabera and Mutabazi (2021) highlighted the importance and challenges of managing personal data, indicating the need for better precision in linking teachers to their subjects to enhance student performance.

The results in Table 9 reveal a substantial and highly significant relationship between SDMS identification and 12YBE student performance, with a Pearson Correlation coefficient of .908**, indicating a strong positive correlation and statistical significance ($p < .01$). This suggests that effective management and accurate recording of personal data through SDMS significantly enhance student performance. The high correlation underscores that improvements in personal identification accuracy and comprehensiveness lead to better academic outcomes. Supported by a robust sample size of 330 (N=330), these findings highlight the critical importance of precise personal identification systems in supporting student success in Rwanda's 12-Year Basic Education system.

Future researchers should conduct a Research project: (i) to analyze the long-term impact of SDMS on student academic performance, retention rates, and overall educational outcomes across multiple cohorts of students, (ii) to compare different models of SDMS implementation in schools to identify variations in effectiveness based on system features, user engagement levels, and institutional contexts, (iii) to conduct qualitative research project to explore user experiences and perceptions of SDMS among teachers, administrators, and students. Investigate factors influencing adoption rates, usability challenges, and strategies for enhancing user engagement.

In conclusion, the use of School Data Management Systems (SDMS) in Rwanda's 12-Year Basic Education system has demonstrated significant potential to enhance educational practices and improve student outcomes. The comprehensive analysis conducted in this Research project reveals strong correlations between SDMS implementation and various facets of student performance, academic evaluation, infrastructure management, and personal identification. Recommendations have been provided to both SDMS users in schools and MINEDUC to optimize SDMS utilization, ensure sustainable implementation, and foster data-driven decision-making. Furthermore, suggestions for future research project underscore the need for longitudinal studies, comparative analyses, and qualitative assessments to continually refine SDMS strategies and maximize their impact on educational quality and equity. Overall, leveraging SDMS effectively holds promise for transforming Rwanda's educational landscape by fostering efficiency, accountability, and student-centered learning approaches.

REFERENCES

1) Abdullah, S., & Hussein, M. (2020). *Effectiveness of school management systems in managing personal data in Malaysian schools*. Asian Journal of Educational Technology, 13(2), 77-92.
2) Adewale, B., & Adetunji, F. (2021). *Evaluating the role of SDMS in student performance enhancement in Nigerian secondary schools*. Nigerian Journal of Education, 25(2), 95-110.
3) Dlamini, T., & Mkhize, N. (2021). *Evaluating the effectiveness of SDMS in academic assessment in Swaziland secondary schools*. Journal of Educational Management, 23(4), 112-128.
4) Jibril, I., & Nwanmou, K. (2012). *Research methodology*. Journal of Research Methodology, 5(1), 22-37.
5) Jones, L., & Smith, R. (2018). *Management of student records through school data systems in the United States*. American Journal of School Administration, 22(1), 99-114.
6) Kabera, A., & Mutabazi, C. (2021). *Use of digital systems for personal identification management in Rwandan secondary schools*. Journal of Educational Administration and Policy, 19(1), 59-74.
7) Kariuki, M., & Njoroge, S. (2020). *Effects of digital learning management systems on student performance in Kenyan high schools*. Journal of Educational Research and Practice, 14(3), 122-139.
8) Kim, H., & Lee, Y. (2018). *The use of school management systems for academic performance monitoring in South Korean schools*. Educational Technology Research and Development, 66(3), 567-585.
9) Musa, A., & Ali, M. (2020). *The role of digital management systems in enhancing school infrastructure in Nigerian secondary schools*. Nigerian Journal of Educational Technology, 19(3), 156-171.
10) Mwangi, J., & Ng'ang'a, S. (2019). *The role of school management systems in financial management of public secondary schools in Kenya*. Journal of Educational Administration and Policy, 12(4), 45-59.
11) Nguyen, T., & Le, H. (2019). *Impact of school management systems on student academic performance in Vietnamese schools*. International Journal of Educational Research, 27(4), 301-315.
12) Nyamache, R., & Chege, M. (2021). *Effectiveness of SDMS in school infrastructure management in Tanzanian public schools*. Journal of Educational Facilities, 16(2), 48-64.
13) Ochieng, D., & Obiero, A. (2020). *Impact of digital academic evaluation systems on student performance in Kenyan high schools*. East African Journal of Education and Social Sciences, 11(2), 89-102.
14) Sharma, R., & Gupta, S. (2020). *Effectiveness of digital financial management systems in Indian schools*. International Journal of Educational Technology, 15(2), 134-150.
15) Ssebunnya, J. (2021). *The impact of financial management systems on resource allocation in Ugandan secondary schools*. African Journal of Education and Training, 18(1), 22-37.
16) Wanjiku, R., & Njenga, M. (2019). *Implementation of school management systems for infrastructure management in Kenyan secondary schools*. Journal of School Infrastructure, 14(1), 75-89.