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Integrating ICT to Enhance School Functioning: A Case Study of Lutheran Schools in Fianarantsoa, Madagascar

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Abstract

This study investigates the integration of Information and Communication Technologies (ICTs) in Lutheran schools in Fianarantsoa, Madagascar. Through classroom observations, interviews with teachers and school principals, and document analysis, the study examines the current level of ICT integration and identifies key challenges and opportunities. Findings reveal significant discrepancies between established best practices and actual classroom practices in areas such as administrative organization, pedagogical approaches, and didactic methods. Notably, teacher training in ICT integration is crucial, requiring a structured approach that addresses pedagogical skills, resource utilization, and the development of student-centered learning environments. The study emphasizes the importance of leveraging ICTs to enhance teaching and learning, foster student engagement, and improve overall educational outcomes in the context of Lutheran schools in Fianarantsoa.

Keywords
ICT Integration, Teacher, Pedagogical Practices, Lutheran Schools, Madagascar

I. Introduction

A growing global consensus recognizes the significant potential of Information and Communication Technologies (ICT) to enhance education. This potential is evident across various facets of school operations, including improved teaching and learning processes, increased student engagement and academic achievement, and more efficient school management and monitoring. Given the pivotal role of knowledge in contemporary societies, the transformative power of ICT in education is unsurprising. (Tic UNESCO, version 2.0; Bharti et al., 2024)

In the realm of education, ICTs have the potential to mitigate challenges arising from limited access to quality teaching materials and inadequate educational resources. By providing access to a wealth of online information and knowledge, ICTs offer immense opportunities for millions of students. (Az Zuhri, et al., 2024). However, the integration of ICTs into education in many African countries faces significant hurdles. While policies for ICT integration are often developed, their implementation is frequently hampered by various factors, including inadequate planning and a lack of robust political will.

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In Madagascar, initiatives to integrate ICT into the education system are underway, spearheaded by the Ministry of Education. Lutheran schools in Fianarantsoa, while possessing valuable assets such as computer laboratories, are facing challenges including declining enrollment, particularly at the primary level, and a shortage of qualified teachers and administrators. These factors, coupled with a lack of adequate teaching materials, necessitate innovative solutions to improve the quality of education.

The integration of ICT in education necessitates a shift in teacher roles, pedagogical approaches, and teacher training methodologies. This study aims to develop an in-service training program that equips Lutheran school staff with the knowledge and skills required to effectively utilize ICT in education. We believe that by enhancing their ICT pedagogical competencies, this training program will empower teachers to become proficient educators in the digital age, ultimately contributing to the overall improvement of educational outcomes.

II. Research Method

2.1 Classroom observations

Classroom observation is a widely utilized methodology in educational research to analyze teacher-student interactions and the instructional process (Durand, 2012). In this study, we observed four primary school teachers, focusing on their classroom facilitation techniques. Our observations were guided by :

a. Administrative organization
b. Pedagogical organization
c. Didactic organization

2.2 Interviews

An interview is a structured conversation between two or more individuals, commonly employed as a data collection method across various disciplines, including human resources, psychology, and sociology (Ketele, 1993). Interviews can be used to gather information, explore perceptions, and understand individual experiences. In this study, we conducted interviews with four primary school teachers and two school principals within the Lutheran School Service.

2.3 Document study

Documentation encompasses all records, information, and materials used to capture, organize, and disseminate knowledge within a specific field. This can include a wide range of formats, such as written documents, audio and video recordings, photographs, graphics, databases, presentations, manuals, reports, data sheets, articles, and books.

III. Results and Discussion

3.1 Class observation results

During classroom observations, teachers' activities were summarized in the following tables.

Table 1. Observed Teaching Practices : Admiistrative organization

ACTIVITIES		YES	NO
Administrative Organization	Teacher information sheet	00	04
	Timetable	04	00
	List of students by gender	00	04
	Weekly planning	00	04
	Student attendance curve	00	04
	Age pyramid	00	04
	Table of songs and recitations	00	04
	Internal regulations	00	04
	Distribution of students by committee	00	04
	Updating the call register	00	04
	Updating the logbook	00	04
	Implementation of the rolling book	00	04

Source : Observation of primary school teachers

Table 1 demonstrates a significant gap between established administrative practices and their actual implementation in the observed classrooms. None of the teachers utilized essential administrative tools such as teacher information sheets, timetables, student lists by gender, weekly planning, attendance curves, age pyramids, tables of songs and recitations, internal regulations, student committee distributions, or consistently updated call registers and logbooks. These findings highlight a critical need for improved administrative practices within these schools.

Table 2. Observed Teaching Practices : Pedagogical organization

ACTIVITIES		YES	NO
Pedagogical organization	Clean Room	04	00
	Well-ventilated room	04	00
	Well-decorated room	03	01
	Room with regulatory dimensions	04	00
	Master's office	04	00
	Master chair	04	00
	Blackboard with regulation dimensions	04	00
	Teaching aids (ruler, squares, compasses, etc.)	04	00
	Sufficient table and bench	04	00
	Table bench in good condition	04	00
	U-shaped table and bench	00	04
	Student handbooks	01	03
	One notebook per subject	04	00
	Large slate per group	00	04
	Small slate for each student	04	00
	Activities relating to disciplines corresponding to the established timetable	04	00
	Activities corresponding to the timing of the timetable	01	03
	Group activities	00	04
	Individual activities	04	00

Source : Observation of primary school teachers

Table 2 demonstrates a positive emphasis on essential pedagogical considerations within the observed classrooms. All classrooms were found to be clean, well-ventilated, and adequately dimensioned, with appropriate teacher desks and chairs.

Furthermore, all classrooms were equipped with blackboards of the appropriate size and essential teaching aids (Table 2). While all teachers provided students with notebooks, the use of large and small slates varied. Notably, all observed lessons adhered to the established timetable, indicating a structured approach to instruction. However, the lack of student handbooks and the limited use of group activities suggest potential areas for improvement in pedagogical practices.

Table 3. Observed Teaching Practices : Didactic organization

ACTIVITIES			**YES**	**NO**
Didactic organization	Program content		00	04
	Lesson content adapted to student level		04	00
	Language of instruction	French	00	04
		Malagasy	04	00
		French/Malagasy	00	04
	Document		00	04
	Teaching aids		00	04
	Notebook		02	02
	Preparation sheet		00	04
	Class management	The teacher circulates	00	04
		He stays close to the painting	04	00
		He remains seated at his desk	00	04
		Questioning mode: Direct question	04	00
		Clear question	04	00
		Question adapted to student level	04	00
		Rephrasing questions	01	03
		The teacher questions the same students	00	04
		The teacher asks those who raise their fingers	04	00
		The teacher questions the passive	00	04
	Lesson sequence	Revision/recall	00	04
		Introduction to the lesson	00	04
		The lesson itself	04	00
		Summary	00	04
		Application exercises	00	04
		Remediation and/or correction	01	03
		Checking students' written records	00	04
		Follow-up to group work	00	04
		Individual correction (notebook)	00	04
		Collective correction (notebook)	00	04
		Assessment of student responses	00	04

Source: Observation of primary school teachers

Table 3 reveals significant shortcomings in the observed teachers' didactic organization. Notably, none of the teachers adhered to the prescribed lesson plan, indicating a lack of proper lesson preparation. Furthermore, while all lessons were conducted in Malagasy, the use of French as a medium of instruction was entirely absent. Classroom management strategies were also observed to be inadequate, with teachers predominantly remaining seated at their desks and relying heavily on direct questioning without adequately addressing individual student needs or incorporating group activities. These findings suggest a critical need for professional development programs to enhance teachers' pedagogical skills and improve the quality of instruction in these classrooms.

Table 1, 2, and 3 collectively demonstrate a significant discrepancy between established best practices in administrative, pedagogical, and didactic organization, and the observed classroom realities. This analysis reveals a critical gap in teacher training, particularly in classroom management techniques. Recognizing the pivotal role of effective pedagogy in student learning outcomes, it is imperative to prioritize professional development programs that equip teachers with the necessary skills in both administrative and pedagogical domains. Furthermore, the complete absence of activity sheets in all observed classrooms underscores the need for enhanced pedagogical planning and resource utilization.

Activity sheets serve as valuable tools for teachers, guiding their planning and preparation by outlining the activities, techniques, and processes to be employed in relation to specific learning objectives and content. This process of developing activity sheets necessitates careful consideration of the necessary materials and their effective utilization during instruction. Furthermore, the creation of activity sheets facilitates the alignment of learning objectives, content, teaching methods, and assessment strategies, ensuring a coherent and effective learning experience for students (Lebrun, 2007).

3.2 Interview results

This study investigates teachers' use of and access to technology, exploring its potential to enhance their pedagogical practices. Interviews were conducted to understand how technology integration can support teachers in fulfilling their roles effectively. The analysis of these interviews revealed several key themes, which are summarized in the table below.

Table 4. Teachers' responses

Questions	YES	NO
Knowledge of ICT	00	04
Internet access via Android phone	04	00
Using a computer	00	04
Internet skills	00	04

Source : Interview results

The integration of educational technologies offers significant potential to enhance teaching and learning effectiveness. While access to technology, particularly through mobile devices, is widespread among teachers, a critical gap lies in the effective utilization of these tools. Specifically, teachers often lack the necessary training to effectively integrate the internet into their pedagogical practices.

3.3 Madagascar's Progress in Integrating ICTs in Education

Madagascar has made noteworthy strides in recent years towards integrating Information and Communication Technologies (ICTs) into its education system. This is evident through several initiatives spearheaded by the Ministry of National Education, including:

a. E-Learning Platform: The Ministry launched an e-learning platform to provide digital learning resources for students.
b. ICT Infrastructure Development: Projects like the PRF, PAEB, and CRO (Computer Recycling Center) have contributed to establishing ICT infrastructure in schools, including CRTICs (ICT Resource Centers) and digital libraries in high schools.
c. Teacher Training: Training programs for CRTIC coordinators and teachers have been implemented to enhance their capacity to utilize ICTs effectively in education.
d. Digital Collaboration Platform: The creation of the INFP Madagascar wiki website fosters collaboration among trainers by enabling them to share and document French-language teaching resources.

These initiatives demonstrate Madagascar's commitment to leveraging technology to improve the quality of education for its students.

To effectively integrate ICTs, Lutheran schools in the Haute-Matsiatra region must remain at the forefront of educational technology advancements in Madagascar. This study investigates the extent to which ICTs are currently utilized to facilitate teaching and learning and foster the development of cross-disciplinary skills within these schools.

ICTs offer significant potential in education, primarily through:

a. Enhanced Access to Information: Providing access to a vast repository of information, images, simulations, and multimedia resources.
b. Facilitated Communication: Enabling real-time and asynchronous communication within and beyond the classroom.
c. Interactive Learning Environments: Fostering interactive learning experiences and collaborative projects.
d. Development of Essential Skills: Cultivating essential 21st-century skills, such as critical thinking, problem-solving, and digital literacy.

These affordances necessitate a student-centered pedagogical approach that emphasizes active learning and the development of key competencies. Furthermore, the effective integration of ICTs requires teachers to possess strong technological and pedagogical skills, which necessitates ongoing professional development (Njoka et al., 2020).

ICT integration offers numerous pedagogical advantages. Teachers can utilize ICT to acquire new teaching techniques, update their knowledge, and exchange best practices with colleagues. Moreover, ICT tools facilitate the creation of engaging teaching materials, such as multimedia presentations and interactive exercises, enhancing the learning experience. These technologies also empower students by facilitating collaborative learning, providing access to a wealth of information, and enabling interactive communication within and beyond the classroom. This aligns with active learning pedagogies, emphasizing student-centered learning, individual exploration, and the development of essential skills. As Vial (1986) asserts, "The construction of knowledge by the subject himself, individual freedom and tolerance are defended at every opportunity. Experimentation is essential; if it's successful, we're on the right track, and the only fundamental value is the progress, development and enrichment of knowledge. The trainee is active in the learning process." Furthermore, effective lesson planning requires teachers

to not only define clear learning objectives but also to carefully consider the specific activities that will enable students to achieve those objectives. This necessitates the selection and integration of appropriate resources. The internet provides a valuable resource for educators, offering a wealth of materials that can be seamlessly integrated into lesson plans to enhance student learning.

Research consistently demonstrates that the effective integration of ICTs in education can significantly enhance learning experiences through increased diversification, innovation, and interactive opportunities (Lebrun, 2007). This includes leveraging a wide array of digital resources, such as online platforms, software tools, and educational applications, to support teaching and learning processes (Barette, 2007).

To effectively prepare teachers for this digital age, professional development programs must adhere to a structured approach. Following the three-phase training engineering model proposed by Lebrun, Smiots, and Bricoult (2011) – analysis, conception, and realization – will ensure that teacher training programs are effectively designed and implemented.

IV. Conclusion

This study highlights the critical need to enhance the integration of ICTs in Lutheran schools in Fianarantsoa. While some initiatives have been undertaken, significant gaps remain in areas such as teacher training, resource utilization, and the implementation of effective pedagogical practices. The findings underscore the importance of a multifaceted approach that addresses both the technological and pedagogical dimensions of ICT integration. This includes providing teachers with comprehensive training on ICT tools and pedagogical strategies, equipping schools with adequate infrastructure and resources, and developing a supportive environment that fosters the innovative use of technology in the classroom. By addressing these challenges and capitalizing on the potential of ICTs, Lutheran schools can significantly improve the quality of education and better prepare students for success in the 21st century.

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