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Designing an ICT-Integrated Learning Program Strategy

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Abstract: *This study examines the obstacles and opportunities in creating an ICT-integrated learning strategy at Ambararatabe General High School in Madagascar. Several interconnected factors hinder optimal ICT integration: limited teacher expertise, a scarcity of resources, and logistical challenges like unreliable transportation and communication infrastructure. A SWOT analysis, incorporating the PESTEL framework, shows that while political stability and digitization offer opportunities, economic disparities, insecurity, and insufficient ICT proficiency among students and teachers pose threats. The study explores the institution's micro-environment, highlighting collaborations with the Ministry of Education, UNICEF, and UNESCO, which provide crucial support. However, many students lack technology access and proficiency, a divide worsened by socio-economic factors. School procedures aim to raise parental awareness and support struggling students, emphasizing the need for community and institutional engagement. The findings suggest a multi-faceted approach is needed, including investments in infrastructure, teacher training, and interventions to address socio-economic barriers. Emphasizing ICT's potential to reduce inequalities and promote sustainable development, the study advocates for policies that foster digital literacy, ensure equitable access to technology, and enhance education to prepare students for a digital world.*

Keywords: *ICT, high school, teacher, educational development, socio-economic factors, Ambararatabe*

I. Introduction

Contemporary society is fundamentally shaped by Information and Communication Technology (ICT), a significant social, cultural, and economic force driving the transition to knowledge-based structures. (**Castells, 2000**). This technological advancement presents diverse opportunities in education, commerce, and health, necessitating new competencies and critical engagement with technology and the internet (**Livingstone et *al.*,2008**). Student ICT proficiency is significantly influenced by teacher expertise, underscoring the need for a robust technological and informational foundation for effective participation in modern culture. (**Ertmer & Ottenbreit-Leftwich, 2010**)

Recognizing education as a fundamental right and a cornerstone of individual and societal development, governments prioritize enhancing educational systems as a key indicator of progress (**United Nations, 1948**). Foundational learning experiences profoundly shape character and cognitive processes, with parental engagement remaining crucial in fostering critical thinking and ethical discernment. (**Darling-Hammond, 2010 ; Epstein et *al.*, 2009**) Values instilled during childhood serve as enduring personal resources, highlighting the importance of sound guidance (**Rokeach, 1973**). Access to education is a universal entitlement and a significant parental duty, with formal schooling indispensable for future prospects. (**Organisation for Economic Co-operation and Development (OECD), 2019**)

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Education, etymologically signifying emergence and cultivation, encompasses the development of intellectual, moral, and physical capacities within specific cultural and historical contexts (**Dewey, 1916**). Globally diverse educational systems exist, with increasing state involvement complementing traditional parental roles. (**Ramirez & Boli, 1987**)

Despite its developing status, Madagascar has pursued educational enhancements, implementing the national Education For All (EFA) plan since 2003 (**UNESCO, 2015**) and reinforcing educational policy through legislative reforms prioritizing the intellectual, physical, and artistic development of each individual (**Orientation Law n° 2008-011 of July 17, 2008, Madagascar**). Significant governmental investment includes ongoing recruitment of NFE teachers to increase parental engagement (**Bruns et *al.*, 2011**). The Ministries of National Education and Technical and Vocational Education share objectives in advancing education through policy and the Education Sector Plan (PSE), guiding instruction at the High School level to prepare students for higher education. (**World Bank, 2018**)

This discourse focuses on the General Education High School Ambararatabe within the Tsiroanomandidy School District. Challenges in formulating a computer literacy strategy at the High School arise from a deficit in ICT competence among students and educators, potentially hindering national ICT proficiency (**van Dijk, 2020**).

The overarching aim is to establish a strategic framework for ICT acquisition, promoting skill development among young learners and identifying a guiding policy strategy. Initial suppositions are that insufficient ICT proficiency disadvantages students... (**Hargittai, 2002**) and that implementing an ICT learning strategy fosters the integration and eco-social development of young individuals. (**Siemens, 2005**).

II. Research Methods

Several factors contribute to a less than optimal quality of instruction for learners in Madagascar. These include significant challenges in pedagogical practices, a scarcity of instructional resources, the application of cognitive and metacognitive learning strategies that present complexity and comprehension difficulties for learners, and the limited pedagogical expertise of some educators.
Regarding the research methodology employed, the following approaches were adopted: personal observation, survey administration, documentary analysis, and webographic investigation.

2.1 Materials

a. Ambararatabe General High School Institutional Profeile and Context

In adherence to statutory mandates, the Ministry of National Education formally recognized this High School with an Establishment Code during the 2012-2013 academic year. Subsequently, civil servant educators were assigned to the public High School, enhancing instructional quality. Currently, twelve teachers constitute the faculty.

Geographically, the Ambararatabe General High School is located south of the National Road 1, on the way to Tsiroanomandidy, at a distance of 10 km via a secondary road, approximately thirty minutes by vehicle or one hour on foot. The commune is bordered by Ambatolampy (Ambohitrakely) to the north, Mahasolo and Maroharona to the south, Mahasolo and Tsinjoarivo Imanga to the east, and Maritampona to the west.

Demographically, the region exhibits a notable youth presence, with 68% of the population aged 18-50. A high birth rate, influenced by cultural values, is evident. A slight female predominance exists across most age cohorts.

The institution is committed to fostering students' acquisition of information and communication technology through structured instruction. Education is viewed as encompassing civic preparation, communal engagement, and professional development, alongside the pursuit of equity. Contemporary educational aims are threefold: learning, training, and schooling. While the school is central, developmental influences extend beyond its physical boundaries. The institutional mission seeks to cultivate achievement, autonomy, and personal fulfillment, nurturing a passion for learning, intellectual curiosity, and open-mindedness. Furthermore, the educational endeavor aims to impart knowledge, techniques, and methodologies; prepare students for adulthood through skill development; and instill values of solidarity, democracy, cooperation, respect, and responsibility, thereby shaping active citizens.

Financial resources comprise local contributions from parental school fees and a state-allocated school fund. Material resources are supplemented by parental donations and state support, with additional provisions from a French volunteer association. Internal communication among staff utilizes written notices, posters, and telephone. Regular and ad hoc meetings occur, alongside monthly pedagogical exchange sessions (EPE). General assemblies facilitate communication among administration, teachers, and parents, acknowledging their collaborative role in education.

2.2 Methods

a. Data Collection Equipment

The acquisition of information constitutes a fundamental step in establishing a usable dataset. The origin of information offers critical insights into its reliability. For the present research, primary information sources include scholarly publications relevant to the field, material presented within classroom instruction, and data obtained through internet-based research (**Alam et *al.*, 2025 ; Ghashim & Arshad, 2023**). Furthermore, internal data from the educational institution, resources from the French Ministry of Education, and other pertinent sources were consulted to augment the information base.

Documentary research serves to consolidate the student's understanding of a chosen subject, thereby enhancing the efficacy of interviews, focus groups, and questionnaire design (**Bohnsack et *al.*, 2010**). This phase of inquiry, involving the examination of existing research, can generate novel working hypotheses for the investigator and contribute to addressing initial research questions.

Access to pertinent documents can be achieved through various resources. The consultation of official sources is advisable, including periodicals in specialized journals, doctoral theses or dissertations, patents, and statistical datasets. (**Birkle et *al.*, 2020**)

b. Direct Observation as a Research Methodology

This methodological approach involves direct engagement with the field or the implementation of surveys to facilitate firsthand observation of realities, enabling objective data collection and awareness of phenomena relevant to the research project.

Direct observation proves valuable when the research question necessitates studying a phenomenon within its natural context. It can also be employed when initial knowledge of a subject is limited, and the objective is to ascertain the verity of a situation.

The preparation of an observation entails several stages: initially, the definition of the target; subsequently, the determination of the observation type and the preparation of necessary formalities. Following this, reconnaissance of the area and the creation of an observation diagram are required. Finally, the preparation of essential equipment is undertaken.

Various observation tools exist, including logbooks, anecdotal reports, notebooks, observation grids, rhythm sheets, thematic descriptions, and checklists. The educator or supervisor determines the most suitable instrument for the specific research context. (**Goldkuhl, 2019**)

c. Targeted Interviews for Specific Data Acquisition

This methodological approach focuses on individuals directly involved with the research topic. The data gathered serves to augment the information necessary for the development of the research work. The information obtained is specific due to the targeted nature of the interviews, with participants selected for their specialized knowledge.

This method facilitates the acquisition of pertinent information through well-structured questions designed to maintain a logical flow of conversation. Interviews were conducted with teachers, pupils, and parents. (**Rezzky et *al.*, 2021 ; Alshenqeeti, 2014**)

During interviews with teachers, their perspectives on the teaching-learning process within lessons and student attitudes were solicited. This data collection method was implemented both before and after classroom observations, within the principal's office, and during site visits, employing direct personal contact.

d. Structured Surveys for Quantitative Data Collection

The establishment of a survey guide, encompassing questionnaires relevant to the research theme, was essential for data acquisition. This entailed the creation of a questionnaire incorporating open-ended, semi-structured, and closed-ended questions.

The survey administration spanned one month, employing a non-probability sampling method necessitated by temporal and financial limitations. A quantitative approach, aligned with Angers' methodology, was adopted. Quantitative methods aim to quantify the phenomenon under investigation. To this end, a survey represents a direct investigative technique applied to specific individuals.

Furthermore, a survey constitutes a process directed at uncovering facts, enhancing understanding, or resolving uncertainties and issues. Concretely, it involves the discovery of information not known at the outset of the inquiry, sometimes with the intention of disseminating the collected data.

Distinct questionnaire forms were developed for each category of respondent, including principals, teachers, parents, and students. The questions posed varied according to the role of these individuals, and communication was conducted with empathy and discretion to foster trust and facilitate participation. (**Cheung, 2021**)

2.3 Data processing method

a. Conceptualizing Information and Communication Technology

The expression "information and communication technology" represents an English term employed across international organizations, broadly corresponding to the domain of telematics. Its definition has varied, influenced by authorial perspective and temporal context, reflecting the evolving boundaries of related fields and the rapid advancement of techniques through digital convergence. Consequently, a precise definition of ICT remains elusive. The term "technology," signifying "discourse on technique," is often used in place of the simpler and potentially more accurate "technique."

Information and communication technologies function as supportive instruments for information processing and communication, wherein the latter remain the primary objectives and technology the facilitating means. The Larousse dictionary defines information and communication technologies as "all computer techniques and equipment used to communicate remotely by electronic means (cable, telephone, Internet, etc.)."

However, this definition primarily addresses the convergence of computing and telecommunications for communicative purposes, potentially overlooking the impact of digital convergence within multimedia and audiovisual domains. Operational proficiencies encompass, for instance, the adept utilization of ICT tools and their diverse applications, such as word processing, spreadsheets, effective information retrieval on communication networks, messaging, and the capacity to produce integrated documents containing text, tables, and images. (**Chen et *al.*, 2024 ; Robey et *al.*, 2000**)

III. Results and Discussion

The execution of this research encountered several logistical and contextual challenges. Difficulties arose concerning transportation to the research site, with limited availability of public transport options such as taxi-brousses and taxi-motos per week. Accommodation posed a further consideration, as road infrastructure degradation and geographical distance presented obstacles to project completion.

Communication was also impeded by inconsistent telephone network coverage, affecting scheduling and interaction with the principal and staff. Online research presented specific difficulties, with certain desired information proving elusive. Furthermore, consulted websites often provided incomplete or unsatisfactory responses to the research questions and information needs.

Finally, the increased cost of daily living, a consequence of the Coronavirus 2019 pandemic, impacted the interaction between researchers and target participants. Sanitary barriers implemented during the pandemic also presented significant hindrances to the research process.

3.1 Results

a. Opportunities and threats

This section employs the SWOT analysis framework to delineate the institution's strategic position through the examination of four key dimensions. The macro-environment of the General Education High School of Ambararatabe will be analyzed to identify potential opportunities and threats. Subsequently, its micro-environment will be explored, focusing on

the establishment's relationships with external stakeholders, including partners, competitors, and members.

b. Macro-environmental Analysis: A PESTEL Framework

To analyze the macro-environment, the PESTEL framework will be applied to elucidate the political, economic, social, technological, ecological, and legal context of the institution.

Political Environment

This analysis reveals that the current political landscape of Madagascar presents both opportunities for the implementation of ICT learning strategies, fostering educational development, and potential threats to the establishment.

Opportunities: Current political stability offers significant opportunities for public institutions. The emphasis on digitalization by Malagasy operators facilitates the advancement of essential new technologies. The recruitment of FRAM (Fonds Régional d'Appui à la Mutualisation or Regional Mutualization Support Fund) or ENF (Enseignants Non Fonctionnaires or Teachers Non Civil Servants) teachers and improvements to school calendars and curricula contribute to enhanced educational quality. The development of a strategic plan within the institution, encompassing operational, technical, educational, and health strategies, presents a substantial opportunity for activity management. This strategic plan, a guiding document defining development strategy, motivates students to exert greater effort in ICT learning.

Threats: Frequent ministerial changes due to shifting political perspectives and the presence of corruption, particularly in the recruitment of FRAM or ENF teachers, pose threats. Additionally, a lack of ICT proficiency among stakeholders within the education sector presents a challenge.

Economic Environment: Opportunities and Challenges for ICT Integration

This analysis examines how Madagascar's current economic environment presents both opportunities for economic advancement, facilitated by the implementation of an ICT learning strategy, and potential challenges for the institution.

Opportunities: The prevailing economic context offers a relatively favorable landscape for the economic and social development of young students at the High School. Various support initiatives for the Malagasy population and the PJE (Youth Entrepreneur Project by the State and donors in Madagascar) can stimulate growth within the national economy. These projects aid parents and school leavers in pursuing further education, particularly in ICT. ICT plays a significant role in enhancing the competitiveness of ministries and the efficiency of public administrations and services (health, education, security). Furthermore, ICT has become a critical element in the production and distribution of cultural and intellectual resources. Field surveys indicate that the ICT sector has become a major economic segment in leading countries, including Madagascar and the Establishment. The growth of tertiary activities at the High School has amplified the institution's need for information processing and communication capabilities. The widespread adoption of information technologies exemplifies the pervasive impact of progress across various sectors.

Threats: Economic disparities such as inflation, rising unemployment, and poverty negatively affect the Malagasy economy, leading to a decrease in annual parental contributions. Consequently, a gradual decline in the number of students engaging in ICT learning is observed. Diminished purchasing power and low everyday prices contributing to poverty,

alongside unfavorable exchange rates for the Malagasy Ariary against major currencies, pose challenges. Moreover, the ongoing pandemic's economic repercussions in numerous countries are likely to impact Madagascar's economic trajectory, including significant reductions in economic activity that will strongly influence the deceleration of high school operations. Finally, the economic downturn is resulting in a decline in the population's purchasing power, as well as that of the institution (affecting the acquisition of potentially overpriced computer equipment and other material necessities for developing ICT learning programs).

The subsequent table illustrates the findings regarding the availability and usability of school IT equipment based on the conducted investigation.

Table 1. Availability of ICT equipment

Answer	**Girl (%)**	**Boy (%)**
Yes	5	10
No	75	72
A few	20	18

Table 1 shows that the vast majority of girls (75%) and boys (72%) are unable to use technological equipment to continue their studies.

Social Environment: Influences on the Educational Ecosystem

This section analyzes the prevailing social conditions in Madagascar, identifying both opportunities and challenges for the institution.

Opportunities: Collaborative relationships among partners, specific ministries, and teachers present a significant opportunity for the school's operational efficiency and the enhancement of ICT learning and other pedagogical areas. For instance, the Ministry of Health provides support through medical personnel at the Ambararatabe II basic health center and implements preventative measures against pandemics, such as classroom disinfection, thereby benefiting the health of students and staff. Furthermore, the Ministry of National Defense periodically deploys military personnel, and the Secretary General of the Gendarmerie establishes a Brigade Post in the rural Commune of Ambararatabe, offering a valuable resource for maintaining public safety. The Ministry of the Civil Service also establishes a right-to-education center, empowering teachers with knowledge of their rights and facilitating conflict resolution. This inter-ministerial collaboration aids in mitigating challenges faced by students and teachers in their work. Online training for students with learning difficulties and the creation of engaging video game-based courses by teachers represent innovative pedagogical approaches. Additionally, ICT offers tools for course enrichment through new methodologies, promoting self-directed learning, knowledge acquisition, and technological proficiency. The internet enables videoconferencing, remote work, online access to learning materials, and remote medical consultations, among other applications. The integration of ICT as an educational tool serves to complement and enhance student learning. Educating young individuals to seek reliable and precise information fosters critical analysis skills and discourages dependence on technology to the detriment of essential activities such as sleep. Proactive measures are necessary to mitigate the negative aspects of the internet and promote its positive utilization, emphasizing the value of education in developing analytical capabilities and ethical frameworks.

Threats: Current insecurity poses a risk to parents, students, and teachers. Increased insecurity around the High School can deter students, particularly those living independently due to their parents residing far from the institution, potentially leading to mental distress and

discontinuation of studies. Information and communication technology presents security vulnerabilities, notably concerning privacy. Domestic containment measures following pandemics, such as school closures, transport restrictions, and event cancellations, can disrupt institutional activities. Students' health conditions, potentially exacerbated by prolonged screen time, such as headaches and eye strain, also present challenges. The prevalence of pandemics poses a significant threat to all establishments. Diminished parental authority can lead to student disengagement from learning. Relationship issues among parents, pupils, and teachers can generate generational divides, particularly regarding teaching methodologies. Parental poverty can contribute to student apathy and a devaluation of the internet's relevance to their lived experiences. Geographical distance between parents and pupils can reduce student motivation and academic effort. Furthermore, the internet presents risks such as the inability or lack of discernment among users, potentially leading to the subversion of human values, the propagation of misinformation, and the obstruction of academic pursuits, including the incitement of violence and exposure to harmful content.

The subsequent table illustrates the percentage of students expressing curiosity about internet usage during the survey, categorized by gender and age group.

Table 2 . Internet access

Age range	Girls		Boys	
	Yes (%)	No (%)	Yes (%)	No (%)
13-15	10	30	9	21
16-20	15	25	15	30
20-22	3	17	5	20

Faced with this situation, students in second through first grade don't think too much about this access, as most of them don't have the means to connect to the Internet.

Technological Environment: Impact on Pedagogy and ICT Integration

This analysis examines the extent to which technological advancements and global digitization are influencing the institution's teaching methodologies and the development of an ICT learning strategy.

Opportunities: The advent of novel technological resources, including the internet, social media platforms, computers, and mobile phones, is simplifying communication and facilitating the transmission of information and pedagogical exchange with other institutions. This is enabled by increasingly sophisticated information and communication technologies that streamline online document retrieval. The national digitization initiative in Madagascar serves as a motivating factor for young students to pursue studies in computer science, encouraging engagement with global news and developments through ICT. Providing ICT training for parents and teachers empowers them to guide students toward responsible technology use and positive academic conduct. The availability of didactic and pedagogical materials, such as a library and a computer laboratory, can foster research skills and counteract student disengagement, ultimately leading to ICT proficiency. Open discourse regarding the implications of information on young individuals' behavioral patterns is essential. Rising educational attainment has correlated with increased utilization of personal computers and diverse software applications among a growing proportion of students. Local authorities are investing in ICT training to enhance the competitive edge of businesses within their jurisdictions.

Threats: Insufficient ICT proficiency can disadvantage students and may not invariably yield positive outcomes. The utilization of information and communication technologies, such as social media and the internet, can disrupt students' learning processes and diminish direct interaction among students, teachers, and peers. Furthermore, reliance on technology can impede the development of reading habits involving books and other educational materials.

Table 3 . Relationship between ICT skills and student grades

Answer	Girls (%)	Boys (%)
Yes	15	20
No	55	55
Don't know	30	25

Faced with this situation, computer skills in general are of little interest to most students, because of the lack of practical experience and the inadequacy of computer equipment. But teaching techniques can also be the cause.

Ecological Environment: Institutional Opportunities and Vulnerabilities

Prevailing ecological conditions are contributing to environmental degradation, prompting the State and relevant local entities to promote a green economy policy.

Opportunity: The Ministry of the Environment's emphasis on environmental protection presents a potential opportunity for the General Education High School of Ambararatabe. The institution could integrate environmental awareness initiatives into its activities, such as launching school reforestation programs and discouraging deforestation and slash-and-burn agriculture. The presence of the High School 's existing school reforestation plot offers a significant ecological advantage for activities during school hours and other suitable times for reforestation efforts.

Threats: Similar to any entity, the institution faces potential risks from natural disasters in the ecological domain. While past cyclones have not significantly impacted the establishment, deforestation and ozone layer depletion represent broader environmental challenges affecting nature and living organisms. The insufficient provision of waste receptacles may also contribute to litter accumulation in public spaces.

Legal Environment: Regulatory Influences on the Institution

This analysis examines how Madagascar's current legal framework presents both opportunities and challenges for the establishment. The institution's legal standing as a public entity is affirmed.

Opportunities: Various legal provisions offer advantages to the establishment. The law prohibits educators from subjecting pupils to verbal threats, physical violence, and other severe disciplinary measures. The existence of school discipline provides a framework for student conduct, fostering respect and academic success, thereby enabling students to shape their future and cultivate human values. These regulations guide young individuals toward mutual respect. Regarding justice, ICTs possess the potential to mitigate inequalities through enhanced access to information, knowledge, and culture; conversely, they can exacerbate existing disparities due to the uneven distribution of necessary skills. FRAM (Fonds Régional d'Appui à la Mutualisation or Regional Mutualization Support Fund) represents a legally recognized grouping of individuals, legal entities, and private autonomous structures, as

stipulated by Law 2002-011 of September 3, 2003, concerning the general status of civil servants.

Threats: The non-enforcement of certain decrees and laws poses threats, such as the inconsistent application of Law 2003-011 and articles pertaining to the establishment's internal regulations. Corruption undermines the transparency of funding across Malagasy institutions. For example, reductions in subsidies can exacerbate the financial vulnerability of non-civil servant teachers (FRAM or ENF).

Table 4 . List of partners

List of partners	**Nature of partnership**
French Ministry of Education	Education and finance
Ministry of Public Health	Public health: vaccines, classroom disinfection during the lockdown period
ZAP – CISCO – DRFEN	Administrative managers
UNICEF – UNESCO	Technical partners: teaching materials and support for the education system
French volunteers	School supplies, desks and other materials
Ambararatabe Rural Commune	Equipment (water pumps, etc.)

The existence of these partners is an asset for the school in terms of financial, material and real-estate support, and encourages students to master ICT learning.

Competitors

Regarding operational activities, the High School 's direct competitors consist of all private schools and establishments operating within the Ambararatabe administrative zone. These include the Akany Tsiry Private High School and the Salettine Sister Catholic High School. Certain activities undertaken by these institutions mirror those of the General Education High School of Ambararatabe. The increasing number of High School has intensified competition for both current and planned initiatives, as exemplified by the Akany Tsiry Private High School.

Internal Analysis: Strengths and Weaknesses

Following the examination of the external environment, a source of opportunities and threats, the internal resources of the school will be analyzed, and existing procedures at the school level will be presented to identify its inherent strengths and weaknesses.

Institutional Resources

This subsection will now delineate the strengths and weaknesses pertaining to the institution's resources. This analysis encompasses various categories of resources, including human, material, financial, organizational, and informational assets.

Human Resources: Strengths and Weaknesses

Building upon the establishment's descriptive overview presented earlier, this subsection identifies the strengths indicative of the entity's effective operation and its weaknesses within the domain of human resources.

Strengths: The High School's organizational structure exhibits simplicity, facilitating rapid communication due to a less hierarchical framework. Task distribution promotes the delegation of authority, enabling the swift execution of pedagogical activities. Furthermore, the assistance provided by volunteers constitutes a valuable asset in supporting instruction and

enhancing student comprehension. The teaching staff comprises twelve educators, including five with Bachelor's degrees and seven with Master's degrees. The High School employs nine civil servant teachers and three non-civil servant teachers (ENF) or those supported by FRAM. These human resources represent the school's strengths, organized to optimize the application of knowledge, skills, and motivation. The existence of a teachers' mutual aid association reinforces solidarity among colleagues through expressions of condolence and welcoming gestures for significant life events. Effective internal communication is fostered through weekly meetings at the beginning of the week for information sharing on High School affairs, and monthly pedagogical exchange sessions (pedagogical council, teacher capacity building) held on the first Wednesday of each month. The versatility of the teaching staff represents a significant strength, particularly in facilitating the substitution of teachers who are ill or absent.

The subsequent table presents the percentages of students demonstrating ICT skills.

Table 5 . ICT handling skills

Type	Girls		Boys	
	Yes (%)	**No (%)**	**Yes (%)**	**No (%)**
Internet	04 %	10 %	05 %	10 %
Facebook	10 %	15 %	09 %	15 %
Phone	35 %	15 %	45 %	05 %
Other social networks	02 %	09 %	05 %	06 %

Table 5 shows that the vast majority (50%) of students in the second and first year of secondary school are able to handle the telephone as well as other IT tools.

Weaknesses: Research indicates several areas of concern. A significant proportion of teachers, both tenured and non-tenured, exhibit a lack of awareness regarding their professional responsibilities and entitlements. Insufficient adherence to professional ethics and the principles of the teaching profession, coupled with inadequate ICT proficiency, can impede intellectual growth, diminish the motivation for rigorous learning, critical thinking, and creative endeavors. Regarding security, reliance on external surveillance and telemetry networks, while intended for protection, carries the risk of vulnerability in the event of system failures.

Financial Resources: Strengths and Weaknesses

This section identifies the strengths and weaknesses associated with the institution's financial resources.

Strengths: As a public institution, the High School benefits from financial allocations from the Ministry of National Education (MEN), which is crucial for enhancing pedagogical activities. The school acknowledges the Ministry's policy promoting ICT learning at the High School level and the recruitment of non-subsidized teachers (NFE). Leveraging these policies, the school has secured internal revenue streams to ensure the effective delivery of instruction, supplemented by subsidies from the MEN or the school fund. Salary payments for FRAM or ENF teachers by the parents' association contribute to their ability to fulfill their duties. Furthermore, the rural commune of Ambararatabe provides material assistance, including repairs to equipment, furniture, and school infrastructure. The school also receives material support from French volunteers.

Weaknesses: Increasing economic hardship within the community leads to a reduction in the school's local financial resources, evidenced by delayed or unpaid school fees. This, in turn, contributes to insufficient salaries for NFE teachers and a potential decline in students' motivation to engage with ICT learning.

Material and Real Estate Resources: Strengths and Weaknesses

This section identifies the strengths and weaknesses pertaining to the school's material and real estate assets.

Strengths: Research findings indicate the school's capacity to mobilize its resources effectively. IT equipment and furniture, such as computers, are new. Infrastructure, including classroom buildings and sports facilities (physical education, soccer, basketball), adequately serves the High School 's internal needs. Classrooms are equipped with sufficient bench-tables for the student population, along with teacher desks and blackboards. Teaching aids, such as textbooks and teacher guides, are available in the school library. A significant strength is the school's solar-powered electricity supply. Information and communication technology (ICT) plays a vital role in facilitating learning across various life contexts, and ICT proficiency is essential for active societal participation.

Weaknesses: A deficiency in computer hardware and real estate hinders students' ability to acquire ICT mastery, as adequate access to computers is necessary for studying this technology. The obsolescence of certain materials, office equipment, school supplies, benches, tables, chairs, and other equipment can impede the timely completion of teaching activities. Inadequate teaching materials and other school supplies create challenges for effective learning.

The subsequent table presents the percentages of pupils and the existence and availability of computer equipment.

Table 6 . Existence des matériels TIC

Place	Gender	**Computer**	**Cell phone**	**Tablet**
City	Girl (%)	2	80	1
	Boy (%)	5	90	2
Campaign	Girl (%)	2	40	0
	Boy (%)	4	70	1

From the analysis and field survey, we observe that the students live in the countryside and are not familiar with the use of computer equipment until they arrive to study at the High School.

Organizational and Informational Resources: Strengths and Weaknesses

This section identifies the strengths and weaknesses associated with the institution's organizational framework and informational assets.

Strengths: Adherence to established and periodically reviewed procedures constitutes a strength for the institution. The school observes standardized conventions and principles, such as the implementation of updated curricula, particularly for ICT learning. For instance, teaching files are systematically archived chronologically within codified principal files. Throughout the academic year, scheduled meetings are conducted with parents and teachers at the beginning of each term and prior to the year's conclusion. Additionally, weekly teacher meetings, monthly pedagogical exchange sessions (EPE), and informational sessions for students are held. The evolution of information technology enhances internal and external communication within the school through channels such as telephone calls and electronic

messages. This technological advancement can facilitate learning across diverse life contexts and proves beneficial for students' social and academic engagement.

Table 1 . Perception de la TIC et l'éducation

Category	No (%)	Yes (%)	No/Yes (%)
Girl	20	62	18
Boy	15	60	25
Parents	85	10	5
Teacher	5	85	10

Fieldwork observations during meetings with parents, learners, and teachers indicate a growing, albeit still limited, awareness among parents regarding the necessity and importance of ICT literacy.

Weaknesses: A lack of adherence to communication protocols and certain procedures by some teachers results in delays in information dissemination, which is fundamental to communication within the High School. Unjustified absences of some teachers from work and meetings, without the principal's knowledge, disrupt the schedules of other educators and impede the progress of the ICT program.

The subsequent table illustrates the current situation regarding technological proficiency.

Table 8 . Capacité d'utiliser la TIC

	Girl		Boy	
	Self-learning	Learning	Self-learning	Learning
Medium skill (%)	5	15	5	15
Superior competence (%)	2	5	2	5
Sufficient competence (%)	8	20	7	25
Insufficient competence (%)	5	26	4	23
Incompetence (%)	10	4	15	3

Source : School specification

This table illustrates that the lack of didactic materials and incompetence in using these tools play a major role at the school level. Student offenses have already been discussed. An effort to learn and self-learn ICT is needed in order to achieve results.

Existing School Procedures

This subsection highlights the significance of internal procedures at the High School level, examining membership processes and the intervention protocols of the FRAM association in the context of this dissertation project.

Internal Procedures at Association Level

Raising Parents' Awareness: During every general meeting, the association consistently presents its activities and guidance to parents for the benefit of High School students, encouraging their engagement with ICT learning. It emphasizes the fundamental right of all children to quality education, good health, and adequate nutrition. The association educates parents on their primary responsibility to ensure their children's education, particularly in the current era of information and communication technology. During these

assemblies, the principal and teachers convey essential information to persuade parents to provide their children with all possible resources for ICT education.

Communication Awareness:

Use of Public Address Systems: Members of the FRAM association, under the leadership of its president, organize awareness sessions to promote self-directed exploration and learning in information and communication technology among parents, mirroring their children's engagement.

The Use of Idea Boxes: The association maintains a suggestion box accessible to all individuals with ideas for improving the High School's activities, with a particular focus on the development of an ICT strategy for the relevant teachers.

Handling Students in Difficulty at School Level

Education: Education is a fundamental right and a crucial condition for individual and societal development. The teacher's role is multifaceted, complex, yet motivating, requiring innovation, dynamism, communication skills, critical thinking, and effectiveness. Educators must not only teach but also train and impart knowledge, while simultaneously instilling essential working methods and values such as comprehension and a commitment to learning. It is the teacher's responsibility to foster critical thinking, reflection, creativity, and intellectual curiosity. The two primary roles of teachers, encompassing psychological support and pedagogical guidance, as well as the teacher-student relationship, are vital in preventing students from failing to acquire ICT proficiency. All students are entitled to continued education for a specified duration per month and day, according to the school calendar, to facilitate the development of the ICT program. All school personnel share responsibility for student learning, with teachers playing a central and driving role. (**Mashinga, 2023**)

Materials and Other: The school provides necessary materials or school supplies for classroom use in urgent situations, with the association charging the High School's support fund. The FRAM association recognizes that poverty and educational neglect contribute to students' lack of ICT mastery at the secondary level. Nevertheless, it participates in the social and economic well-being of students' parents by donating school supplies such as desks and chairs.

The data collected in the initial phase informed the presentation in the subsequent phase of the opportunities and threats facing the FRAM association, as well as the strengths and weaknesses relevant to the development of an ICT learning strategy for secondary-level students, the central focus of this dissertation project. This section has also outlined the existing procedures within the FRAM association. The following section will further explore these aspects.

Discussion of Internal and External Analysis Findings

An examination of the interplay between the institution's internal strengths and weaknesses and the external opportunities and threats can inform the development of effective strategic proposals.

Interplay of Weaknesses and Opportunities

Financial Constraints

The institution's limited financial resources, exacerbated by widespread socio-economic challenges leading to reduced local income and difficulties in achieving financial self-sufficiency, necessitate expenditure reduction on essential supplies. However, opportunities

exist through partnerships with entities such as the Ministry of National Education, which provides resources for enhancing ICT strategy development for relevant teachers. Furthermore, the support from the students' parents' association and the contributions of volunteers strengthen pedagogical efforts and student learning. External financial assistance from the MEN, the Rural Commune of Ambararatabe, and volunteers provides crucial support, although its sufficiency for comprehensive institutional operations remains a concern.

Equipment Deficiencies

The obsolescence of certain office equipment and the scarcity of computer hardware in classrooms impede timely instruction and hinder students' ICT acquisition. The rapid dissemination of information through technology, while offering opportunities for communication among school members and collaboration with partners like the State (providing school supplies and material support for ICT implementation), also carries the risk of accelerating the spread of misinformation. The progressive replacement of traditional tools with computers in professional settings underscores the potential for optimizing tasks and enhancing efficiency through technology.

Human Resource Limitations

The inadequate competence of some teachers and the misalignment of certain educators' ICT skills with institutional needs negatively impact academic performance and the advancement of the ICT learning program. Nevertheless, the State's commitment to implementing an ICT learning strategy aims to foster the eco-social development of young students while promoting humanistic values among both learners and educators. While concerns exist regarding the potential for ICT to increase feelings of isolation, digital platforms also offer avenues for correction and intellectual engagement.

IV. Conclusion

Technological advancement, applying scientific principles to human needs, has reshaped society, with digital tools empowering citizens. Innovation drives economic resilience and offers paths to sustainable development. Information and communication technology (ICT) is crucial for learning across life domains, and digital proficiency is vital for societal participation.

Beyond utility, technology streamlines social interaction, reducing effort and enhancing communication and mobility. It accelerates understanding and response to global health challenges. Remote work illustrates its potential to redefine professional landscapes and reduce environmental impact.

Education, a cornerstone of development, is embodied by schools, ensuring the right to learn. Young learners engage through adult guidance. Education is a catalyst for societal progress. In rural contexts, educators provide crucial support, fostering digital literacy for societal participation.

Effective ICT integration requires acknowledging varying digital competence and prioritizing technology's application to contextualize learning, foster creativity, enhance educator effectiveness, empower marginalized communities, and cultivate information literacy. The research process engaged stakeholders to establish a tailored ICT learning strategy and inform policy. Methodologies prioritized communication. The strategy focused on practical ICT implementation.

Identified challenges included disparities in digital skills and digital literacy transmission. Technology's influence prompts critical examination, impacting work, leisure, and communication. While offering benefits like efficiency and access, drawbacks such as dependency and misinformation warrant consideration.

Educators support individual learning, considering developmental principles. Their autonomy is within curricula and institutional missions. As knowledge bearers, educators require subject mastery and broad knowledge, enabling versatile instruction. Strategic technology integration aids learning and enhances educator effectiveness.

The research faced practical limitations, navigated through diligence and collaboration. A concrete action plan fostered stakeholder engagement. The High School's existing technology offers an advantage, and a positive institutional disposition towards technology is crucial for development.

Ultimately, technology enriches human experience and fosters meaningful connections, contributing to well-being and positive societal outcomes. Its thoughtful application in education is paramount for preparing individuals for the complexities of the modern world.

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