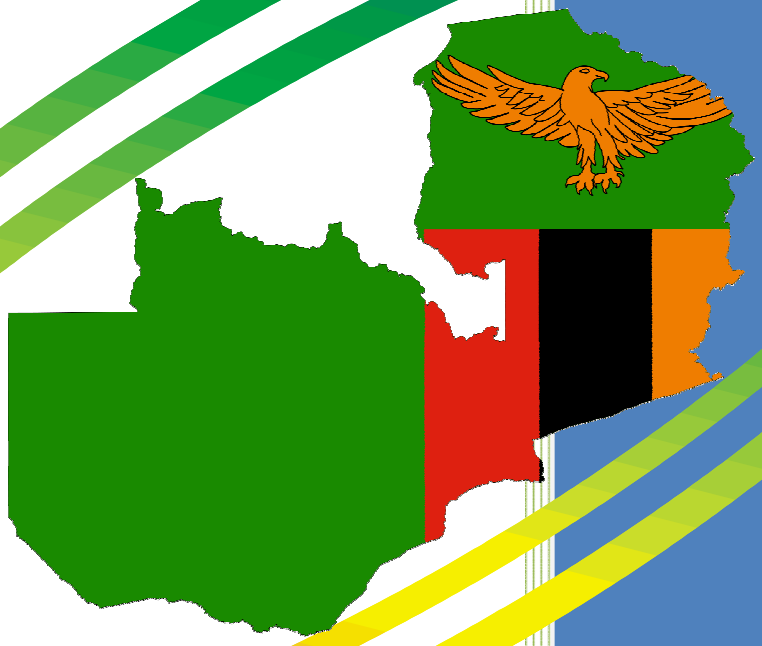
MoE

THE ROAD MAP TO IMPLEMENTATION OF E-GOVERNMENT IN ZAMBIA



School Information Management System
(e-School)

Ministry of Education

The Road-Map to Implementation of e-Government in Zambia

"School Information Management System (e-School)"

This book, *The Road-Map to Implementation of e-Government in Zambia "School Information Management System (e-School)"* describes the e-school portal for managing school information more effectively and streamlining internal administrative procedures. Participants in the 'e-school' programmes include representatives from David Kaunda Technical High School, St. Mary's High School, Arrakan High School, Kamwala High School, Matero Girls High School, Kabulonga Boys High School, Rhodes Park School, Bayuni Basic School, Gladtidings Software LTD, The University of Zambia (UNZA), and the Zambia Research and Development Centre (ZRDC).

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INTRODUCTION

This book, *The Road-Map to Implementation of e-Government in Zambia "School Information Management System (e-School)"* describes the implementation and operation of the School Information Management (e-School) portal, and the skills training needed (for school management and administrative staff) to achieve a fully ICT enabled education sector. The e-school portal will enable more effective and efficient administration and management of information in schools. It is aimed at promoting the application of ICTs in managing information more effectively and streamlining internal administrative procedures as an important incentive for headmasters and administrative staff to institutionalize the use of ICT at all levels. This will positively contribute to the ongoing efforts in the implementation of e-Government in Zambia.

The concept of e-Government is defined as including the use of ICT (Information and Communications Technologies), to facilitate daily administration of services and improve the satisfaction level of citizens. E-government focuses on the utilization of ICTs to deliver government services including education. It is also envisioned in the national ICT policy "A Zambia transformed into an information and knowledge-based society and economy supported by consistent development of, and pervasive access to ICTs by all citizens by 2030."[1]

The School Information Management System (e-School) is part of the on-going efforts to the implementation of e-Government in Zambia, in particular the Ministry of Education (MoE). The implementation of e-School is a process of integrating all day-to-day school management and administrative processes into an electronic system known as e-school portal which provides one central repository for all school information.

In this book, we present an incite of the steps and strategies in the development, implementation and operation of the e-school portal, an integrated system that will provide optimization of school processes, and enable members of staff to access all facets of management and administrative work. The e-school system will also generate reports on items such as overall school financial profile, teacher to pupil ratio, pupil enrolment

status, skill management reports, and performance management reports. These will be sent electronically to the MoE's Educational Management Information System database.

Since the adoption of ICTs in the education sector, many school administrators and teachers at large have not fully realized its importance as a tool for development, in overall school management and administration. Hence, ICTs have not been exploited to the full capacity that would pave way to e-Governance initiatives in the ministry of education at large. Therefore, this book illustrates the use of ICTs in managing information more effectively and streamlining internal administrative procedures as an important incentive for headmasters and administrative staff to institutionalise the use of ICT at all levels.

Furthermore, this book highlights the training programme necessary to ensure that School administrators understand the benefits of the new system and are actually prepared to use it. The e-School Training Programme is a special course aimed at training school administrators in the ministry of education, to equip them with an in-depth understanding of how ICTs can be effectively used as tool to facilitate daily administration of school activities and knowledge management in schools, to close knowledge gaps.

In Chapter I, we will describe the current situation in the education sector. In chapter II, we will describe the School Information Management (e-School) portal and its functionality. In chapter III, we will present the training programme necessary for both the teachers and administrative staff, to achieve a successful implementation and effective use of e-School portal in the school. Finally, recommendations will be presented in chapter IV.

CHAPTER I – *ICT in Education*

1. ICT in Education

Education receives special attention in the Millennium Development Goal 2 (MDG2), which focuses on enhancing primary education in terms of quality and access; in MDG3, which focuses on women's access to education; and in MDG8, which seeks to promote collaboration and develop a skilled workforce. In addition, the Education For All (EFA) principles developed by UNESCO provide a more specific set of objectives for the education sector. Information and Communication Technologies (ICTs) can be used to achieve the MDGs and the EFA principles described above as they can enhance the quality of education across the board at primary, secondary and tertiary level, and also support teacher training. Apart from that, schools can attain a more conducive environment through the application of ICT in management and administration.

With the support of the International Institute for Communication and Development (IICD), the Commonwealth of Learning (COL), and the United States Agency for International Development (USAID), the Ministry of Education developed an ICT policy for education. This represents an extension of Zambia's national education and national ICT policies. The vision is for ICTs to contribute towards reaching innovative and lifelong education and training in Zambia by 2030. The Education Strategy intends to 'harness the potential of information technology to significantly improve policy formulation, planning, management and the delivery of education services and to provide managers, teachers and learners with the opportunity to access vast sources of information.'[2]

The policy also provides an overview of goals, objectives, and government commitment in key programme areas of ICT infrastructure to education institutions, content development, curriculum integration, teacher training, distance education, administration and support services, and finance. Linked to the policy is an implementation framework that sets out in detail the implementation objectives, activities, time frames, and budgets

for each of these programme areas. It also outlines the ministry's commitment to promote collaboration between the private sector and education institutions and to establish appropriate structures to facilitate the integration of ICTs in the education system.

Therefore, the Ministry of Education's ICT policy provides a clear and compelling roadmap to drive the use and development of Information and Communication Technology (ICT) in the delivery of education and training. The policy complements and builds upon the National Vision 2030, the Firth National Development Plan, the National ICT Policy and the Ministry of Education Policy 'Educating our Future'. As a follow-up to the ICT policy, the Ministry of Education has identified a large number of ICT-related programmes and activities to assist in achieving the goals and objectives set forth in the Ministry's ICT Policy.[3]

Many of these programmes are being implemented to provide rapid benefits, others lay the foundations on which the full ICT Policy Programmes will be implemented in the coming years. Prompt design and implementation of the activities to promote application of ICT in management and administration within schools must be seen as a high priority for the Ministry if the ICT Policy is to maintain progress and deliver early results. The prospect of managing information more effectively and streamlining internal administrative procedures will act as an important incentive for headmasters and administrative staff to institutionalize the use of ICT at all levels.

2. The School

'Many pupils learn in crowded, poorly furnished and unfinished classrooms, and often have to share scarce textbooks. Many teachers are poorly qualified and poorly deployed, but in any case are often trying to do a good job with a minimum of basic resources. The curriculum is often seen as too diverse and in some ways irrelevant for many of the pupils and their life needs. Many teachers, head teachers and other education support staff are also poorly prepared for the management and quality assurance tasks demanded of their

roles, but are also often trying to work to the best of their ability in isolated and under-resourced contexts.'

In most schools currently, dependable pupil information is poorly managed and not always readily available. Among the problems faced by these schools are: Low Teacher to Pupil Ratio; Lack of Efficient Monitoring and Evaluation Systems; Poor Communication; Inefficient Management of Pupil Enrolment; Lack of Proper Accounting Systems; Timetabling Issues; and General School administration.

The Teacher to pupil ratio for basic schools is very high. This is often a challenge for teachers when it comes to grade book management, especially considering the fact that one teacher takes one or more classes in one or more subjects. This results in delays in publication of end of term tests results, and poor or no analysis of performance in various subjects.

Neither Parents nor School administrators are able to track efficiently the performance of a pupil from the time of admission into school up to completion or departure. To obtain results of their children's end of term tests, parents have to wait for an "open day" on which they physically travel to the school and then collect the results. Worse still for pupils who attend boarding schools far from their homes, they have to travel long distances to collect their results.

When it comes to enrolment, paper based systems make it hard to track enrolment which results in corruption and illegal enrolments. Apart from that, it is difficult to keep an accurate record about the payments made by pupils and their balance. Requesting a report from the school accountant about the number of pupils with unfinished payments would require probably a long time to wait before it is fully compiled.

Furthermore, creating a chart that tells the class and subject allocation of individual teachers and timetable is something that consumes a considerable amount of valuable

time in many schools. School administration information such as *which teacher takes which class, in which subject* is also poorly managed

Therefore, the e-school portal will enable pupil information be stored, protected, processed, transmitted, retrieved and be made readily available to all interested parties—school administrators, teachers, Accounts personnel, Library attendants, and parents. It will manage pupil information, enhance the productivity of teachers and improve the way a school operates. It will handle School Administration, Gradebook Management, Enrolment, Accounting—Pupil Payment, Time tabling, Library Management, and Stock management of School Property.

3. The e-School and Research

In its 1996 policy statement, *educating our future*, the ministry of education stated that *"the ministry will support and inform its decision making…by a more systematic use of research."*[4] And the Zambia Research and Development Centre, an institution with an overall objective to foster innovation and capacity building for national development is spearheading in the programme to facilitate rapid adoption of the internet-based information access and dissemination among schools and research communities, nationwide. This is to promote e-access and e-participation in decision-oriented research and evidence-based decision making in the education sector.

An e-school will serve as a tool for knowledge management, a technology that promotes research and prevents the loss of intellectual property in the current knowledge-based economy of Zambia. It will enable e-access and e-participation in schools by: Providing a worldwide dissemination of information; Enabling pupils access to school information anywhere; Enabling other schools worldwide to learn about your school and have access to information on current school activities; Enabling possibilities of collaborations with other schools in terms of exchange pupils; Enabling possibilities for grants and funding from other organizations worldwide; and Speeding up possibilities of partnerships with other schools worldwide.

As a result, e-enabled research will: Orient schools to existing databases, including the MoE's Educational Management Information System (EMIS) and the examinations Council of Zambia's National Assessment Surveys, to encourage their use by researchers and decision makers; and Strengthen capacity and commitment to planning, conducting and disseminating decision oriented research as well as engaging in evidence-based decision making in the education sector.

Therefore, the e-school system installed in the school will be able to generate reports on items such as overall school financial profile, teacher to pupil ratio, pupil enrolment status, skill management reports, and performance management reports. These will be sent electronically to the MoE's Educational Management Information System database, thereby providing relevant information to the ministry of education that will support evidence-based decision making.

4. Stages of ICT Development in Schools

Information and communication technology (ICT) has become, within a very short time, one of the basic building blocks of modern society. Therefore, understanding ICT and mastering the basic skills and concepts of ICT is now part of the core of education, alongside reading, writing and numeracy. Advances in technology and the way technology is incorporated into a school is a dynamic process. The stages are hierarchical with the emerging stage as a beginning point, and the transforming stage as a goal for the future of education.

Emerging

Schools at the beginning stages of ICT development demonstrate the emerging stage. Such schools begin to purchase, or have had donated, some computing equipment and software. In this initial phase, administrators and teachers are just starting to explore the possibilities and consequences of using ICT for school management and adding ICT to the curriculum. Schools at this emerging stage are still firmly grounded in traditional,

teacher-centred practice. For example, teachers tend to lecture and provide content while pupils listen, take notes, and are assessed on the prescribed content. School organization provides discrete time periods for each subject. Learners' access to technology is through individual teachers.

Applying

Those schools in which a new understanding of the contribution of ICT to learning has developed are in the applying stage. In this secondary phase, administrators and teachers use ICT for tasks already carried out in school management and in the curriculum.

For example, instructing may be supplemented with ICT such as electronic slide presentations and word-processed handouts. Pupils receive instruction and add notes to teacher prepared handouts. They use ICT tools to complete required lessons and are assessed on prescribed content. School organization provides discrete time periods for each subject with some flexibility to combine subjects and time periods. Learner access to technology is through one or two classroom computers and computer labs. Teachers largely dominate the learning environment, and ICT is taught as a separate subject area. Schools at the applying stage adapt the curriculum in order to increase the use of ICT in various subject areas with specific tools and software.

Infusing

The infusing stage involves integrating or embedding ICT across the curriculum, and is seen in those schools that now employ a range of computer-based technologies in laboratories, classrooms, and administrative offices. Teachers explore new ways in which ICT changes their personal productivity and professional practice. The curriculum begins to merge subject areas to reflect real-world applications.

For example, content is provided from multiple sources, including community and global resources through the World Wide Web. Pupils' access to technology enables them to choose projects and ICT tools that stimulate learning and demonstrate their knowledge across subject areas. School organization provides the flexibility to combine subjects and

time periods. Learners have more choices with regard to learning styles and pathways. They take more responsibility for their own learning and assessment. ICT is taught to selected pupils as a subject area at the professional level. To advance to the next phase, schools choose an ICT curriculum that allows a project-based, ICT-enhanced stage. These schools begin to involve the community more in the learning environment and as resource providers.

Transforming

Schools that use ICT to rethink and renew school organization in creative ways are at the transforming stage. Here ICT becomes an integral though invisible part of daily personal productivity and professional practice. The focus of the curriculum is now learner-centred and integrates subject areas in real-world applications. ICT is taught as a separate subject at the professional level and is incorporated into all vocational areas.

For example, pupils may work with community leaders to solve local problems by accessing, analyzing, reporting, and presenting information with ICT tools. Learners' access to technology is broad and unrestricted. They take even more responsibility for their own learning and assessment. ICT is taught as a subject area at an applied level and is incorporated into all vocational areas. Schools at this stage become centres of learning for their communities.

5. Characteristics of Schools Related to ICT Development

Along with stages to ICT development noted above, there are various characteristics of schools, or aspects of school leadership, that relate to a school's progress in ICT development. Below are general descriptions of the more important of these characteristics of schools that have an effect on ICT development within schools.

Vision

Vision is the aspirations and goals of both individuals within a school and the school system as a whole. As the school advances, the mission statements should become clearer and provide a basis for decision-making. Mission statements should help individual members of the learning community visualize a school's aspirations for the future and act in harmony.

Philosophy of learning and teaching

Ways in which teachers and pupils interact and how the school is managed for learning are part of what is meant by a school's philosophy of learning and teaching. These philosophies will necessarily characterize the ways in which ICT is incorporated into a school. A setting that is dominated by the teacher as the main provider of subject content is adopting a teacher-centred philosophy.

The teacher controls the use of ICT in such a setting as well. A learner-centred philosophy, by contrast, describes a setting where content comes from a variety of resources, and where projects are chosen and designed by the pupils. ICT tools and resources are selected by pupils in ways that match the aims of a project best. These contrasting approaches to teaching are sometimes referred to as instructivist and constructivist respectively.

Development plans and policies

How a school's vision and teaching philosophies are carried out is translated into development plans and policies. In the detailed steps of such plans and policies, goals and objectives are further defined providing interim and long-term targets. Policies are set, a budget is allocated, facilities are determined, roles are defined, tasks are delegated, and an evaluation plan is created to define the direction ICT development will take.

Facilities and resources

The learning environment in which ICT is used requires certain facilities and resources. Facilities include basic infrastructure such as electrical wiring, Internet access, lighting,

air-conditioning, and space. Decisions on inclusion or lack of ergonomic design and choice of furniture impact not only on use of ICT, but also on the health and well being of users. Resources include various types of technological devices from computers with peripherals, video equipment, and specialized tools like digital microscopes. Further resources include various types of software, as well as traditional tools like books, videos, and audiotapes.

Understanding the curriculum

An understanding of the curriculum affects the progression of ICT in the curriculum in following various stages of development. First, is an awareness stage in which pupils become ICT literate with regard to what technology is available and how it might be used. Second, as pupils learn basic skills, they begin to apply various ICT tools to their regular learning assignments and projects. Third, as pupils become more capable and confident with ICT, they begin to integrate and overlap both subject areas and tools. Last, is the applied use of ICT in which pupils are now enabled to address larger, more complex, real-world professional issues.

Professional development of school staff

In parallel with the curriculum for pupils, there must be professional development of the staff within a school. The personal productivity and professional practice of teachers are enhanced with the use of ICT. First, is an awareness stage in which teachers and staff become ICT literate with regard to what technology is available and how it might be used. Second, as teachers and staff learn basic skills, they begin to apply various ICT tools to their regular tasks and projects. Third, as teachers and staff become more capable and confident with ICT, they begin to integrate and overlap both subject areas and tools.

Last, is a change in professional practice in which teachers are now enabled to design lessons to incorporate larger, more complex, real-world projects using ICT tools and resources. As ICT is introduced into school systems, there is a tendency to move from discrete skills training to reflective practice and integrative professional development. Budgetary allocation and provision for release time for teacher professional development

seriously impact on the ability of a school system to incorporate ICT in a meaningful way.

Community involvement

Community involvement may include parents, families, businesses, industry, government agencies, private foundations, social, religious and professional organizations, as well as other educational institutions such as vocational schools and universities. Community involvement can come in the form of donations of equipment and resources, or may be in human resources provided for training and technical assistance. As a community contributes to a school, so can the school give back in many ways. For example, a school may decide to provide community members with evening access to computer labs, or have pupils offer training to parents. The use of ICT provides an opportunity for a school and its pupils to interact with both local and global communities. Interaction may range from building web sites for community organizations, to sharing projects with remote schools.

Assessment

Assessment includes both assessments of pupils as well as overall evaluation of a school system, two aspects that are intricately interwoven. An improvement in the one should predicate an improvement in the other. Means of pupil assessment should reflect choices in learning teaching and an understanding of ICT in the curriculum. For example, in the emerging and applying stages of ICT, assessment may be linked to pencil and paper tests, whereas in the infusing and transforming stages project-based portfolios may be more appropriate. Each part of a school system needs to be evaluated to determine its impact on learning. Assessment should inform practice and support the management of learning.

Assessment should allow a system to determine whether outcomes have been met, and then reviewed and revised accordingly. Budget allocations, policies, and procedures for ICT should match vision, teaching philosophies, and curriculum choices.

6. Readiness for e-School

The most important factor in e-readiness is the School's willingness to share information with the public and the Ministry of Education and different levels within it. Smooth, rapid information-sharing enables schools to take a more functional approach to services. Although readiness depends on e-School priorities, there are certain factors that demand consideration:

• ***Telecommunications infrastructure:*** Telecommunications equipment and computers, while not the focus of e-School, must be addressed in the e-school plan. The level of telecommunications infrastructure needed will depend on the e-School projects pursued. Significant investment in ICT infrastructure may be needed for certain e-School applications.

• ***Current Connectivity and ICT usage by School:*** Understanding current ICT usage indicates the school's readiness to manage information and e-school projects as well as whether the ICT framework meets national standards. In addition, it may help allow e-school efforts to build on previous computerization projects that have been successful.

• ***Human capital within School*****:** Sufficient numbers of skilled, ICT literate administrative staff are essential. Change management issues must also be addressed as new work practices are introduced.

• ***E-business climate:*** Current environment for e-business, including the legal framework and information security, is a key criterion for assessing readiness. Establishing protections and legal reforms will be needed to ensure, among other things, the privacy, security and legal recognition of electronic interactions and electronic signatures.

• ***Administrative staff's readiness for change:*** The corporate culture within school is an important aspect of e-readiness. The level of resistance to change and level of involvement by administrative staff in setting policies and practices will greatly impact how fast or smooth the implementation of e-School will be.

• ***Factors Influencing e-School Adoption:***

- ***Policy framework and implementation:*** Zambia has a national ICT policy that includes references to ICTs in education. Zambia also has a draft national ICT for education policy and implementation framework developed by its Ministry of Education which is the outcome of a multistakeholder consultative process.
- ***Advocacy leadership:*** Zambia has had dedicated champions for the cause of ICTs for development both within government and civil society.
- ***Gender equity:*** The national ICT policy mentions a stated commitment to gender equality and women's empowerment. While the ICT for education policy and implementation framework make some references to gender, they do not explicitly refer to the promotion of gender equality and women's empowerment. These considerations may well be included in subsequent drafts.
- ***Infrastructure and access:*** Zambia's national policies promote a commitment to universal access, and a range of organisations and groups have made headway in improving the country's ICT infrastructure.
- ***Collaborating mechanisms:*** Zambia's national ICT policy and draft ICT for education policy both promote multi-stakeholder collaboration and propose the establishment of dedicated structures to facilitate collaboration.
- ***Human resource capacity:*** Zambia has extremely limited human resource capacity.
- ***Fiscal resources:*** Zambia's ICT for development strategy is strongly dependent on external donor funding.
- ***Learning content:*** The implementation framework to support the ICT for education policy provides a detailed plan for the promotion of localized electronic content. Zambia has also introduced computer science as a subject in school and the draft policy promotes the greater spread in the provision of computer science as a school-based subject. There is little digital education content based on the local curriculum frameworks available in Zambia's education institutions.
- ***Procurement regulations:*** Organisations like Computers for Zambian Schools and their partners have successfully negotiated duty-free import of equipment.

- ***Attitudes:*** The leadership of Zambian government, the local private sector, and civil society have demonstrated an enthusiasm and positive attitude in promoting ICTs for development in general and in education in particular.

CHAPTER II – *The School Information Management (e-School) Portal*

7. The e-School Portal

The e-school portal will comprise two main applications: administrative (School Information Management System) and Dissemination (website) applications. These will enable effective and efficient management of information, dissemination and Knowledge Management in schools

Administrative application (School Information Management System, SIMS) is a Web-based application that will help school manage information more effectively and streamline internal administrative procedures, and act as an important incentive for headmasters and administrative staff to institutionalise the use of ICT at all levels. It will also help schools manage and use data to drive instructional practices, improve pupil achievement, and optimize learning results. SIMS Tools include: Teaching and Learning, Assessment and Accountability, Grading and Reporting

The SIMS application will bring data directly to the desktop computers of classroom teachers and administrative staff. It will identify the critical educational standards, which allows schools to pace instruction, align materials to the standards over the school year, create formative assessments, and generate MoE, DEBS, school, class, and pupils reports that are meaningful, actionable, and easy to use.

Dissemination application (website) will provide a worldwide dissemination of information and enable other schools worldwide to learn about your school and have access to information on current school activities.

8. System Architecture

Figure 1: General System Architecture.

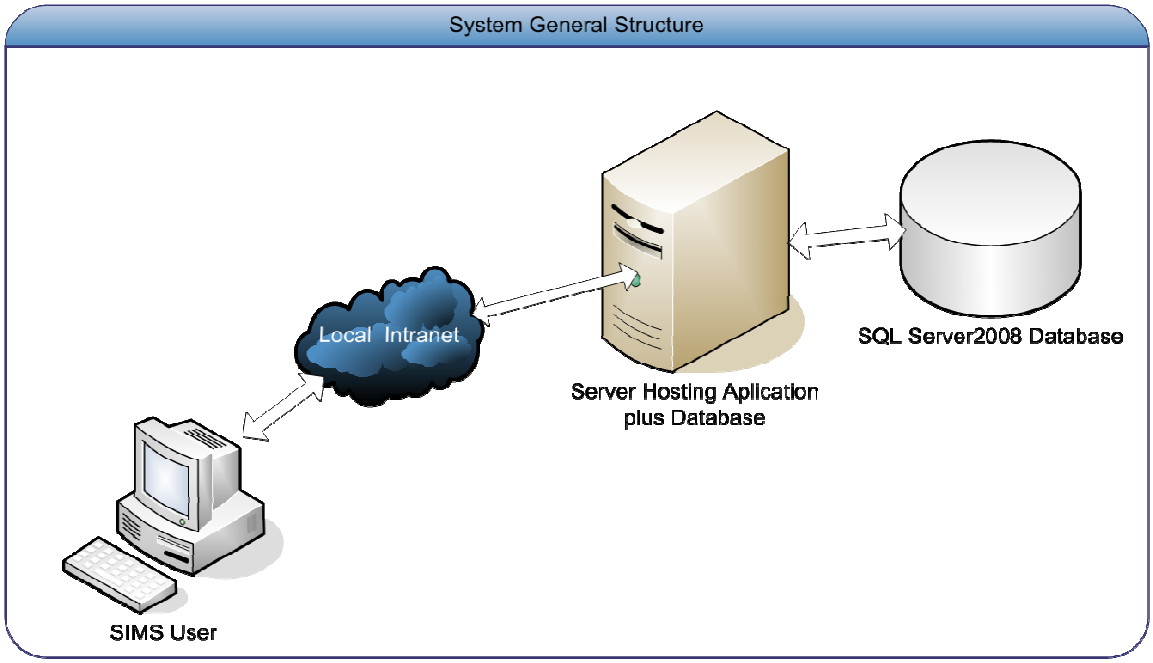
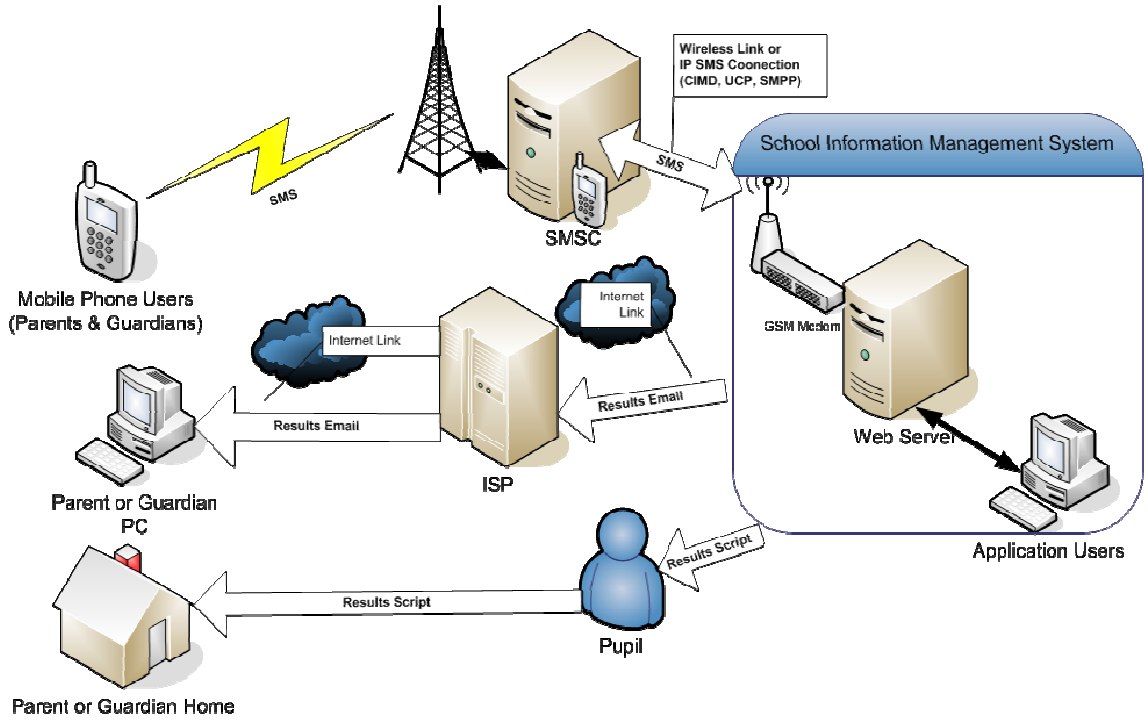


Figure 1 above illustrates the deployment architecture of the SIMS. The SIMS runs on a local web server which is then accessed by users from any office-computer on the local network of a school. The Web server also hosts the database.

Figure 2: Architecture of Information Dissemination to Parents/Guardians



Dissemination of Pupil results, announcements and other related information to parents and Guardians is done in either or all of the three ways:

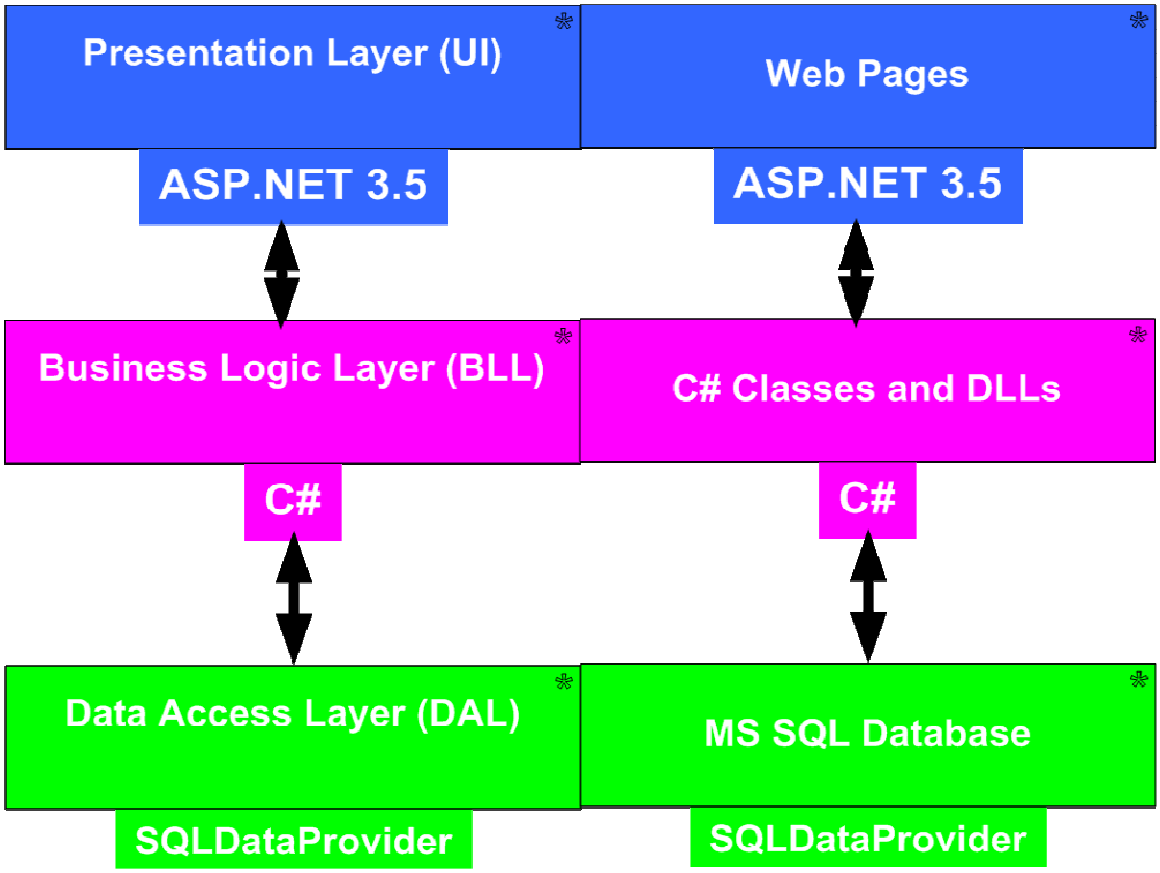
SMS: This is done through a GSM modem to an SMS centre (Zain, MTN or CellZ).

Email: This is done over an internet connection. Information is delivered to a parent's or guardian's email box where it can be viewed and/or printed. The Internet connection can be acquired trough a GSM Modem as which then connects to a Service Provider like MTN or Zain.

Physical delivery by Pupil: This is done by a pupil carrying a printed Report Card of results or Circular letter containing announcements from the school to their home and then physically delivering the results to their parent or guardian.

9. Application Architecture

Figure 3: Application Architecture



Users Interact with Web pages through their web browsers. This is what they see of the system. Data flows from the web pages to the C# programs then to the database and vice versa. C# classes and Dynamic link libraries handle requests from web pages and send back responses. Database stores all school data and information.

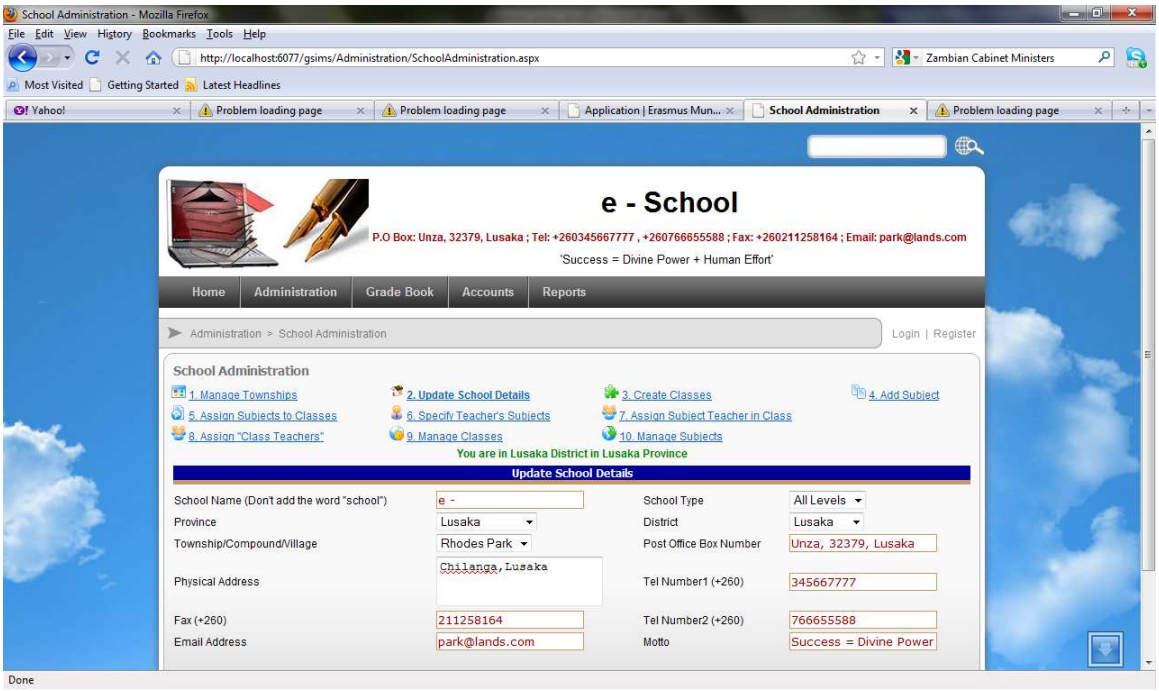
10. System Operation

The School Information Management System provides the following features

School Administration

School Administrators are able to:

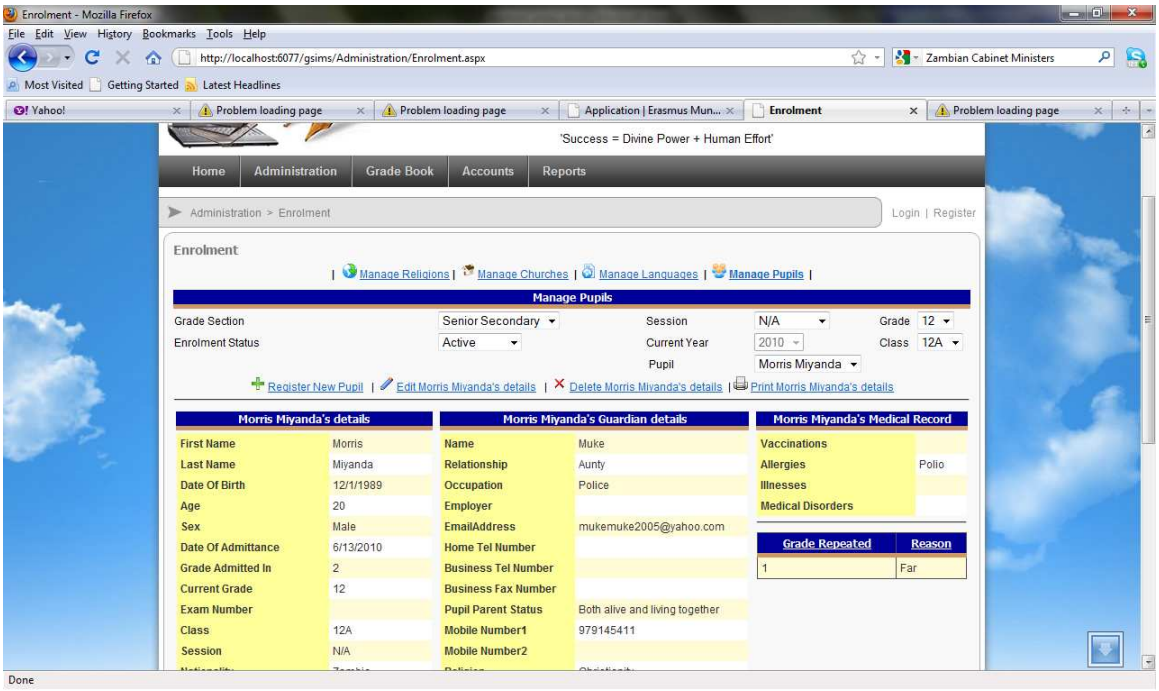
- Manage Teachers (Add/Update Teacher information, Assign Teachers to Classes as Class or Subject Teachers)
- Manage Subjects (Add, update, and delete Subjects)
- Manage Classes (Create Classes, and assign subjects to classes)
- Send announcements to parents/guardians through SMS and email



Enrolment Management

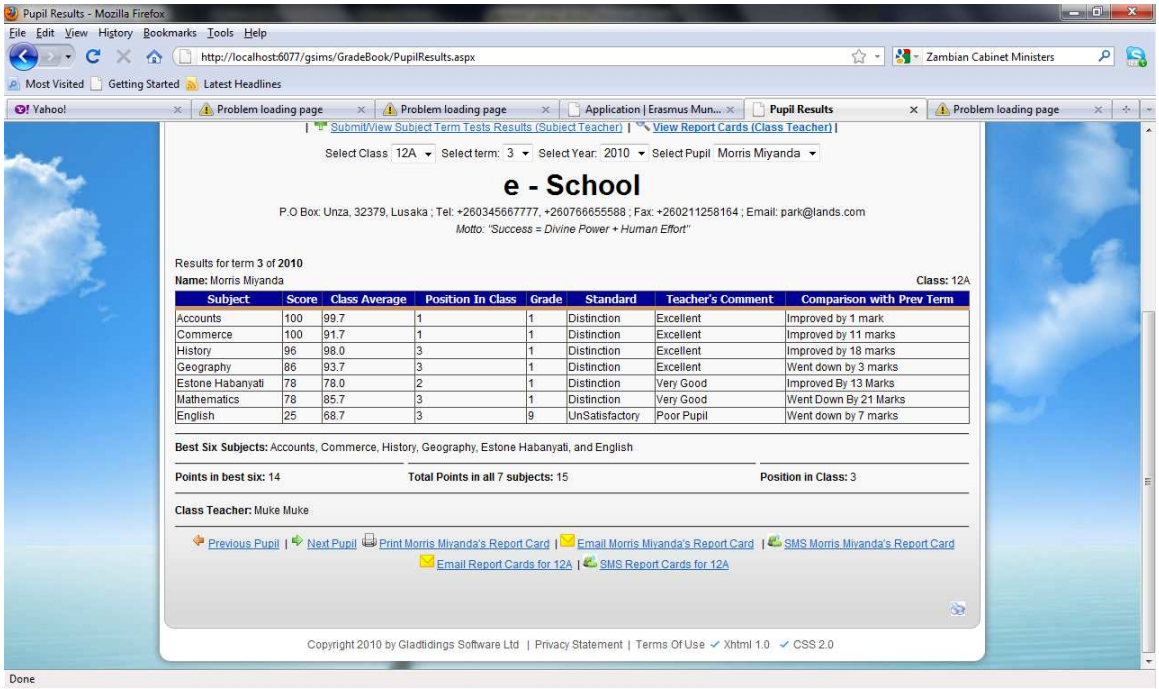
School Administrators are able to:

- Add, update, delete or print pupil details, pupil parent details, medical records etc



Grade Book management

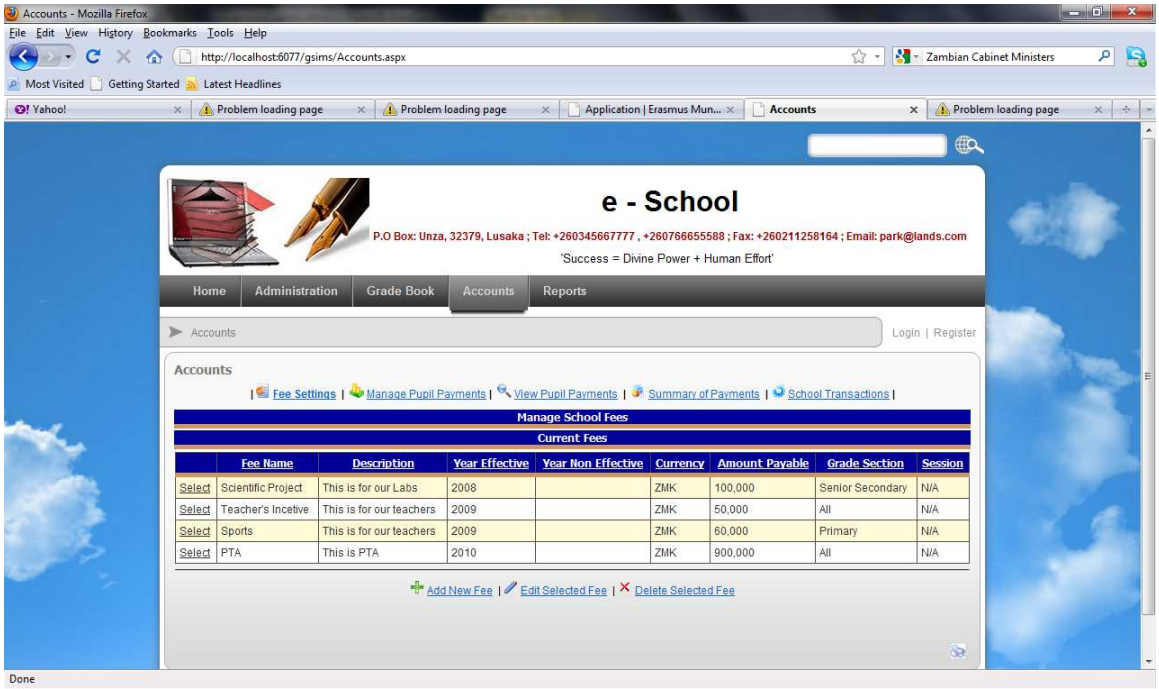
- Subject Teachers in each class are able to record each pupil's end of term results.
- Class Teachers are able to view, print or send end of term results to parents and guardians through SMS and email
- All Test Papers for any year or term can be easily stored and accessed.
- Parents can receive results of their children for any term and year of their child's schooling
- Teachers and Parents can track performance of each Pupil in each subject from the time of admission up to completion

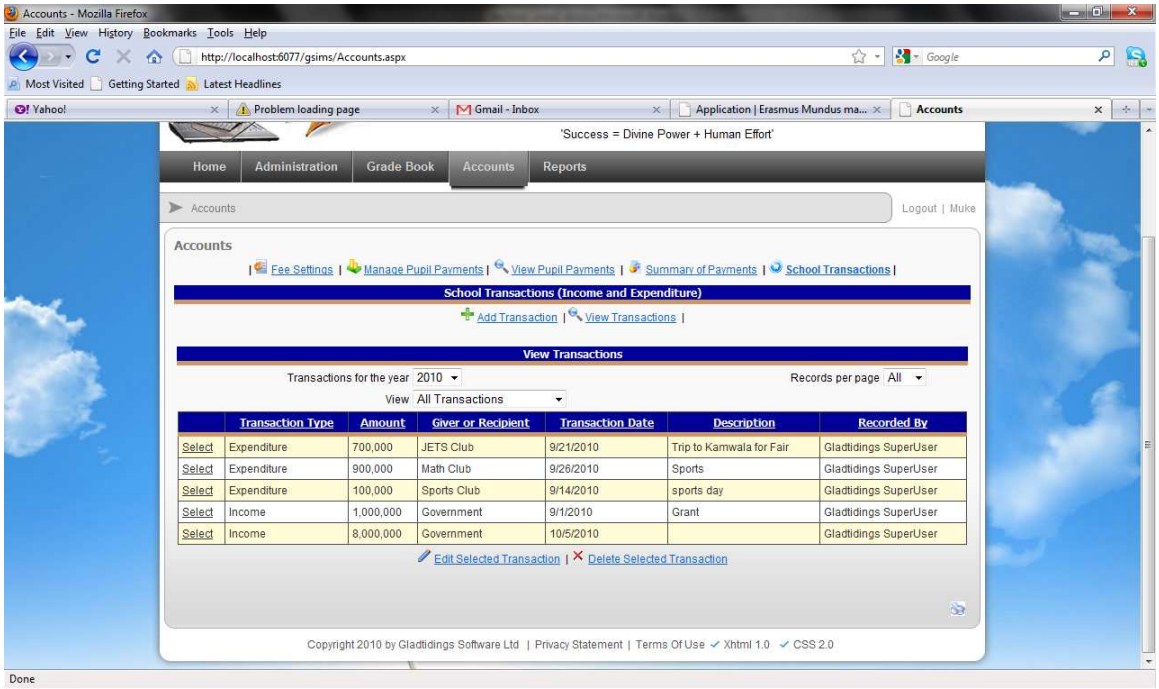


Subject	Score	Class Average	Position In Class	Grade	Standard	Teacher's Comment	Comparison with Prev Term
Accounts	100	99.7	1	1	Distinction	Excellent	Improved by 1 mark
Commerce	100	91.7	1	1	Distinction	Excellent	Improved by 11 marks
History	96	98.0	3	1	Distinction	Excellent	Improved by 18 marks
Geography	86	93.7	3	1	Distinction	Excellent	Went down by 3 marks
Estone Habanyati	78	78.0	2	1	Distinction	Very Good	Improved By 13 Marks
Mathematics	78	85.7	3	1	Distinction	Very Good	Went Down By 21 Marks
English	25	68.7	3	9	UnSatisfactory	Poor Pupil	Went down by 7 marks

Accounts

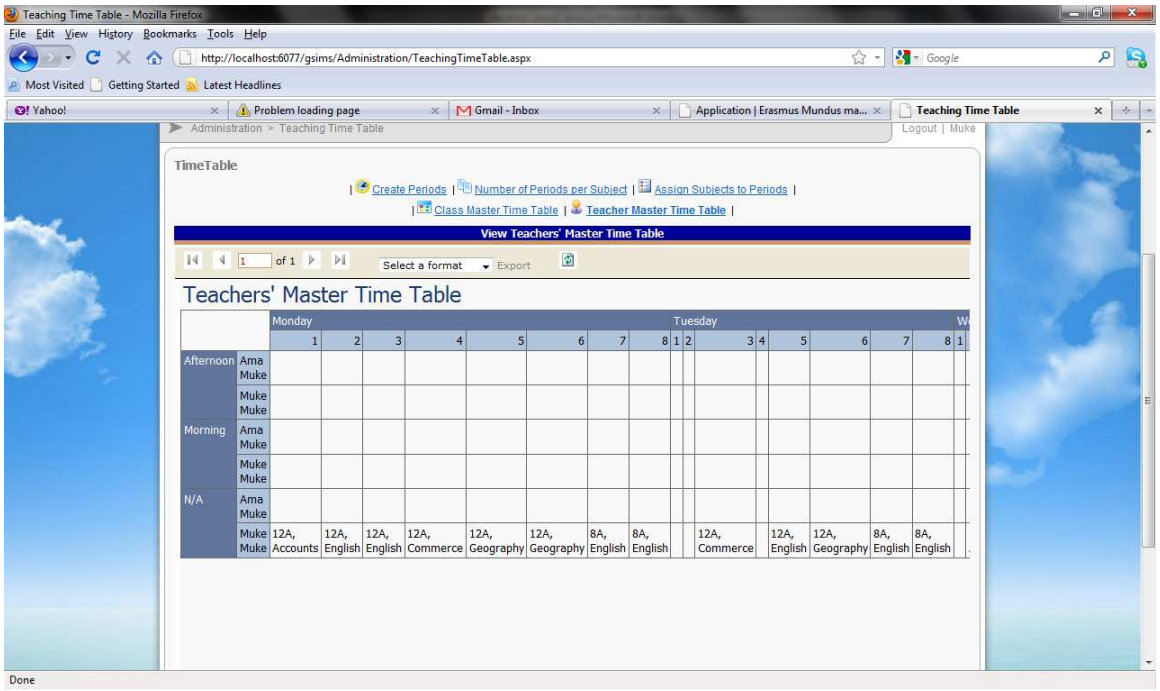
- School administrators are able to define fees payable at the school and how much is payable per year.
- School accountants are able to record pupil payments and school transactions (i.e. income and expenditure)





Time Table

- Teachers can create class periods, assign subjects to periods, and generate class master and teacher master time tables very easily



Calendar of Events

- Schools are able to keep all their events calendar in one place for any year

Photo Gallery

- Schools can make their events memorable by keeping a photo gallery of important events which can be accessed at anytime by anyone rather than restricting them to a notice board in some office.

Forum for Teacher discussions

- SIMS enables Teachers to have a platform for discussions where each teacher can contrite towards some idea being brain stormed.

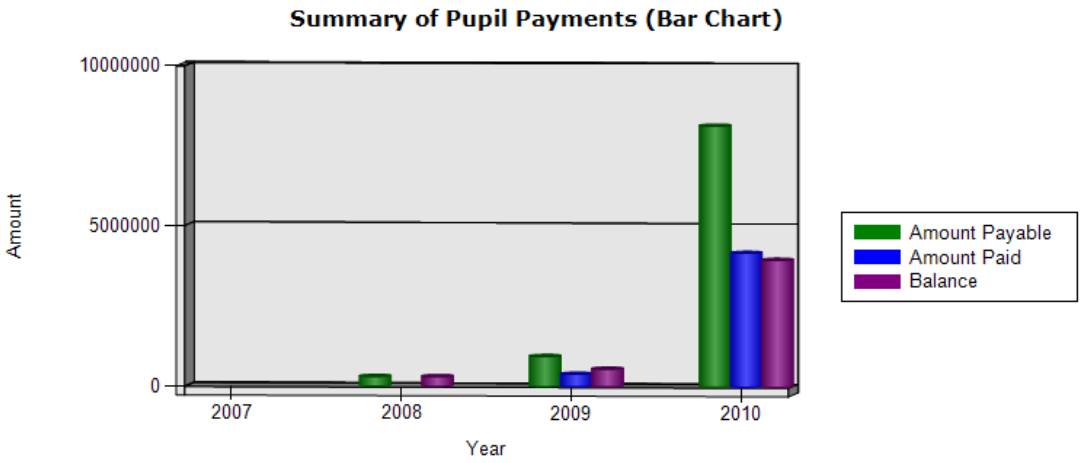
Reports

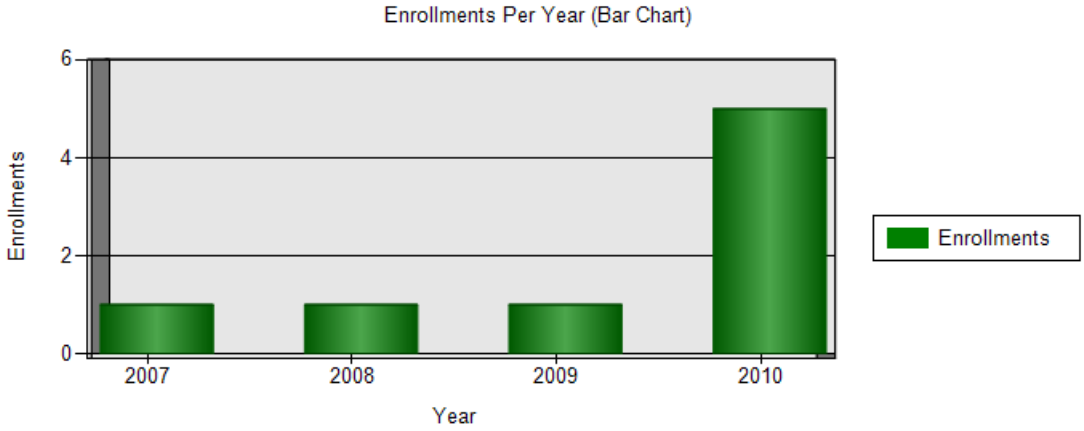
- School administrators are able to run reports (both textual and graphical) on:
- School Administration, such as list and number of current teachers, classes and

subjects offered at the school

- Enrollment (e.g. Enrollments per month, term, and year, pupils who completed or stopped school per year including reasons for stopping such as financial reasons, pregnancy etc.
- Grade-Book such as class averages per subject per term, best boy and girl per subject per term etc.
- Accounts such as summary of payments per year, pupil payment details per year etc

Below are screen shots of sample reports that are generated on accounts and enrollment respectively.





CHAPTER III – *The Training Programme*

The e-school portal will enable more effective and efficient administration and management of information in schools. This will help to motivate headmasters and administrative staff to institutionalise the use of ICT across the board in all educational institutions. Therefore, training needs will go beyond the training of teachers; management and administrative staff will also require basic ICT training so that this can become an integral part of a school's administrative procedure.

11. Specialized e-school training (administrative staff training)

This is a skills training programme on basic ICT skills and how to use the e-School portal. This course will be based on the e-School manual, and will aid the use of e-School portal at the school. The manual will highlight user interfaces and how to access various system modules based on user categories and the department.

12. Technology Transfer based Training (administrator training)

The Technology Transfer based training program will ensure that the e-school software and system technology are understood by the technical staff at the school so that they are able to rectify most of the operational problems without relying heavily on interventions of the external IT specialists. This training will also ensure that the school staff effectively and efficiently use the e-School system that will be developed and installed on their computers.

13. Stages of Teaching and Learning

Teaching and learning are best thought of, not as separate and independent activities, but rather as two sides of the same coin, interconnected and interrelated. Studies of teaching and learning in schools around the world identify four broad stages in the way that teachers and pupils learn about and gain confidence in the use of ICT. There are four

stages in this process: discovering, learning how, understanding how and when, and specializing in the use of ICT tools.

Discovering ICT tools

The first stage that teachers and learners go through in ICT development is of discovering ICT tools and their general functions and uses. In this discovery stage, there is usually an emphasis on ICT literacy and basic skills. This stage of discovering ICT tools is linked with the emerging stage in ICT development.

Learning how to use ICT tools

Following on from the discovery of ICT tools comes the stage of learning how to use ICT tools, and beginning to make use of them in different disciplines. This stage involves the use of general or particular applications of ICT, and is linked with the applying stage in ICT development.

Understanding how and when to use ICT tools

The next stage is understanding how and when to use ICT tools to achieve a particular purpose, such as in completing a given project. This stage implies the ability to recognize situations where ICT will be helpful, choosing the most appropriate tools for a particular task, and using these tools in combination to solve real problems. This stage is linked with the infusing and transforming stages in ICT development.

Specializing in the use of ICT tools

The fourth and last stage involves specializing in the use of ICT tools such as occurs when one enters more deeply into the science that creates and supports ICT. In this stage pupils study ICT as a subject to become specialists. Such study concerns vocational or professional education rather than general education and is quite different from previous stages involving the use of ICT tools.

CHAPTER IV – *Miscellaneous*

14. Recommendations

The e-school portal will enable more effective and efficient administration and management of information in schools. This will help to motivate headmasters and administrative staff to institutionalise the use of ICT across the board in all educational institutions, and consequently influence a paradigm shift into an e-government enabled nation.

1. E-School Project Sustainability

Sustainability of e-School programs has four components: social, political, technological, and economic.

Economic sustainability refers to the ability of a school and community to finance an e-School programme over the long term. Cost-effectiveness is key, as technology investments typically run high and in many cases divert funds from other equally pressing needs. Planners should look to the total cost of ownership and build lucrative partnerships with the community to be able to defray all expenses over the long term. The need to develop multiple channels of financing through community participation ties economic sustainability closely to social and political sustainability.

Social sustainability is a function of community involvement. The school does not exist in a vacuum, and for an e-School project to succeed the buy-in of parents, political leaders, business leaders and other stakeholders is essential. Innovation can happen only when all those who will be affected by it, whether directly or indirectly, know exactly why such an innovation is being introduced, what the implications are on their lives, and what part they can play in ensuring its success. e-School programs must ultimately serve the needs of the community. Thus community-wide consultation and mobilization are processes critical to sustainability. In short, a sense of ownership for the project must be developed among all stakeholders for sustainability to be achieved.

Political sustainability refers to issues of policy and leadership. One of the biggest threats to ICT enabled projects is resistance to change. If, for instance, teachers refuse to use ICTs in their classrooms, then use of ICTs can hardly take off, much less be sustained over the long term. Because of the innovative nature of e-School projects, leaders must have a keen understanding of the innovation process, identify the corresponding requirements for successful adoption, and harmonize plans and actions accordingly.

Technological sustainability involves choosing technology that will be effective over the long term. In a rapidly changing technology environment, this becomes a particularly tricky issue as planners must contend with the threat of technological obsolescence. At the same time, there is the tendency to acquire only the latest technologies (which is understandable in part because these are the models which vendors are likely to push aggressively). Generally, however, planners should go with tried and tested systems; stability issues plague many of the latest technologies. Again, the rule of thumb is to let the learning objectives drive the technology choice and not vice versa—the latest technologies may not be the most appropriate tools for achieving the desired educational goals. When making technology decisions, planners should also factor in not just costs but also the availability of spare parts and technical support.

Set up an appropriate organisational structure

Strategically involving headmasters and parents is necessary for the institutionalization and longer-term sustainability management of the e-school portal. Setting up administrative committees to manage ICT facilities has proven to be very effective in ensuring the sustainability of ICT initiatives.

While in many cases access to ICT is limited to a small group of interested teachers and pupils, participation of a larger group of administrative staff, teachers and pupils in the e-school project is crucial to ensure the widespread institutionalisation and integration of e-school portals in educational institutions. Beyond the institution, it is important to seek political support from the local authorities and the district education board secretary

(DEBS) or the Ministry of Education to prepare for longer-term opportunities of funding and to have the e-school portal recognised as part of the administrative system.

Think through a viable financial model before Starting

Make sure that partners identify a locally feasible financial plan. This starts with choosing e-school solutions that can be sustained by the financial capabilities of the educational establishment or training institution concerned. Even though external funding can initially finance investments in infrastructure, it is necessary that the institution take up recurrent costs including salaries of the ICT manager or teachers, office costs, Internet service costs, and maintenance.

Schools must define how much of the institutional budget can be reserved for the recurrent costs of ICT and take this as a starting point for an e-school plan. Contributions made to the school by the Parent-Teacher Associations can also go a long way towards supporting e-school projects. It is often the case that once a small computer lab has been installed and made available to the children, smaller contributions can sustain recurrent costs and investments in new or additional computers.

Secure technical capacities at the institutional level

ICT managers in the participating institutions need to be sufficiently trained to ensure that they can maintain and upgrade the e-school system on their own without any outside help. As it is very difficult to retain ICT-trained managers, institutions need to train a core group of enthusiastic teachers and pupils to ensure that temporary replacements will be available if needed.

Different skills are required to train staff and teachers and to maintain the e-school portal at both national and local (school) level. A network of skilled individuals needs to be in place in order for each person to assist and share new skills. As the ICT sector is constantly changing, staff members will need to be retrained regularly and have their existing skills upgraded.

2 Monitoring and Evaluation

Set up a monitoring and evaluation approach before you start

It is essential to introduce a monitoring and evaluation approach for projects right from the start to facilitate learning, particularly during the implementation process. ZRDC's participatory and learning-based evaluation system serves as a good example of how this can be done in practice.

Find methods to increase peer-to-peer learning

Networking between e-school projects at the country level is very valuable. For this, ZRDC provides a possible approach. Cross-country exchanges are also important to motivate and promote the exchange of experiences with regard to e-school projects and programmes. This can be accomplished through the participation of partners in ZRDC national learning programmes, as well as through their participation in international conferences, particularly the E-learning conferences.

3 Effective use of e-School

The use of e-School portal to improve the school's efficiency and transparency dependents on how well we tackle important areas such as:

a. Improvement of Information Management

The introduction of e-school and the construction of web pages is seen as an objective on its own. However, the success of these endeavors depends largely on the capacity of school administrative staff to manage the information under their control. This requires standardization of concepts and procedures, as well as the creation of secure Storage systems, Back-ups and Redundancy. Digital data may prove highly volatile and entrusting archives to hard disks might be the securest way to their loss if preventive measures are not taken.

b. Improvement of Services to Pupils

E-school is pupil centered. Obviously, putting a computer on somebody's desk is not enough to shift the focus of school to the pupils. To achieve this, one has to change the existing institutional culture. Improvement of attitude requires a cultural change that can only happen if the leadership fully understands and supports the need for attitudinal and behavior change.

c. Improvement of Education Level

The technology used in the processing, storage and publication of data and in the transactions with the teachers is a secondary issue; it is the capacity to interact between the teachers and school that will guarantee the quality of services.

Working in a period where the world has shrunken to a village and ICT are increasingly permeating the different aspects of life makes it necessary that teachers acquire the knowledge and skills to fully benefit from these technologies. For that reason, it is necessary to invest in raising the ICT skills of teachers. The use of e-school is heavily dependent on literacy and related skills of reading information.

d. Adequate Technological Solutions

Currently, different options exist as to the various aspects related to ICT and it is likely that in the near future new options will emerge. It is up to the school to find the different combinations that respond adequately to the geographical, cultural and educational diversity existing in Zambia. The efficiency of e-School usage depends on increased teledensity and mobile penetration and the scale-up of initiatives such as the development of e-government.

4 SMS-Based School Information Management module

The SMS-Based School Information Management system module for the e-school portal is an important technology as it enables pupils and parents to be able to access school reports via their mobile phones.

The Zambia Research and Development Centre carried out a study on the acceptance of SMS-based e-government services in Zambia. This study showed that whether or not citizens adopt SMS-based e-government services is influenced by the fifteen beliefs about using SMS-based e-government services: *perceived ease of use*; *perceived efficiency in time and distance*; *perceived value for money*; *perceived* convenience; perceived *availability of device and infrastructure*; *perceived usefulness*; *perceived responsiveness*; *perceived relevance, quality and reliability of the information*; *trust in the SMS technology*; *perceived risk to user privacy*; *perceived reliability of the mobile network and the SMS-based system*; *trust in the government and perceived quality of public services*; *perceived risk to money*; *perceived compatibility*; and *self-efficacy in using SMS*.

Among the factors; *perceived ease of use, perceived efficiency in time and distance, value for money, perceived convenience,* and *perceived availability of device and infrastructure* are the most important in influencing the use of SMS-based e-government services. The advantages of SMS are: it is simple, easy to use, extensive in coverage, reliable in delivering the message, low in cost, and can reach citizens anywhere anytime including areas with no Internet access. And in Zambia people prefer to communicate using the SMS-based channel (87% of the population) rather than Internet (11% of the population) because this technology channel is more familiar, simple and easy to use, supports their native language, uses a readily available device and infrastructure and is low cost.

Common factors which discourage citizens adoption of available SMS-based e-government services include: *perceived usefulness, perceived responsiveness, perceived relevance, quality and reliability of the information, trust in the SMS technology,*

perceived risk to user privacy; *perceived reliability of the mobile network and the SMS-based system, trust in the government and perceived quality of public services, perceived risk to money, perceived compatibility*, and *self-efficacy on using SMS*.

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