ICT Based Solutions for Special Educational Needs in Ghana

A Strategic Planning Document for use by the Special Education Division (SpED) to integrate ICT to support the delivery of the Ghana Education Service's core objectives.

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Contents

Executive Overview

The following report is the response to a request from the Director General of the Ghana Education Service (GES) to Imfundo in 2002 to examine ways in which Information and Communication Technologies (ICT) can best contribute to the delivery of education for those with Special Educational Needs (SEN) in Ghana. It has shown that a range of Assistive Technology, including ICT, do indeed have an important role to play in delivering the objectives of the Ghana Education Service (GES) with regard to SEN. The challenge is now to turn these conclusions into reality on the ground. Ghana has the opportunity to become the leading country in Africa in terms of its delivery of an enhanced learning environment for children and adults who require special educational support. Donors, civil society organisations and the private sector have all indicated their willingness to help the GES deliver appropriate and sustainable solutions.

This report is based on the premise that further work is needed to prioritise and formulate a detailed operational strategy by the GES in consultation with relevant stakeholders. This process is currently underway. A synthesis of data has been collected during the study to highlight potential areas of intervention within the special education sector. To facilitate this intervention process, we recommend that the following strategic activities be considered:

1. **Improvement in the facilities available to the SpED**. The SpED offices reflect the marginalised status of the Division within the GES. If the SpED is going to address the enormous challenges that it faces, it is important that it is centrally located, and provided with premises that would enable it to house a learning and resources centre to cater for those working within SEN domain. This could usefully be co-located in the compound in central Accra where the Ghana Society for the Blind's computer centre is situated.

2. **Establishment of a steering group to shape an implementation strategy**. Should the GES decide to implement an ICT for SEN strategy, a small steering group, including representatives of various private sector, civil society and donor organisations should be created to formulate an implementation strategy within three months. It is important that a 'champion' with appropriate understanding and expertise is appointed to lead on the use of ICT for SEN. A key role of this steering group would be to create partnerships that would

enable the best value for money to be achieved in delivering its strategy.

3. **Key elements**.   This implementation strategy should address the ways in which ICT can best be used in five main ways:

- Teacher education.   It is crucial that training in SEN is provided in all pre- and in-service contexts. SEN should form an integral element of all ICT for teacher training programmes being developed in the country. Close collaboration with the Teacher Education Division will be important in achieving this;

- Assessment. An urgent priority is for the establishment of appropriately equipped assessment centres across the country;

- Inclusive schooling. Careful planning and consideration must be given to the ways in which ICT can be used to support those with SEN in mainstream schooling;

- Special Schools. It would be relatively easy to provide appropriate training and equipment for the use of ICT to support learning in all Special Schools in Ghana. This could build on existing activities in this field in Ghana, and GES might consider beginning its work at this level;

- Special Needs Resource Centre: More support is needed to augment the number of low cost accessible ICT materials for children, teachers and schools within Ghana. The Material Resource Centre in Accra should develop and be supplied with up to date educational resource materials in order to supply these institutions.

4. **High profile activities.** One of the key recommendations of this report is that the overall profile of the SEN sector in Ghana needs to be raised if children and adults who have special learning requirements are to be given appropriate educational opportunities. The rapid implementation of a small number of key activities could play a significant part in helping to achieve this objective. These might include:

- Close collaboration with the Ghana Broadcasting Corporation to ensure that signing is used on key television programmes such as news bulletins;

- Production of a video to be used in the training of people (including those with hearing) in use of sign language [Imfundo has already offered to explore the feasibility of undertaking such an activity as part of its KnowledgeBank programme];

- Creation of an ICT resource centre that is adequately equipped to provide training courses for the blind and deaf.

- Equip the Schools for the blind with tape cassette recorders and tapes to tape lessons, listen to stories on tape and music;

- Support the establishment of libraries for the blind, which includes the stocking of books in large print, CD ROMs and screen reading software across the country (Southern, Middle and Northern Belt).

- Call on the expertise of Granada Learning (Semerc), which has expressed its strong interest in the support of training, team-teaching and organising of exhibitions in ICT and SEN.

Acronyms, Abbreviations and Frequently Used Terms

ADD	Action on Disability and Development
AESOP	Annual Education Sector Operational Plan
AT	Assistive Technology
CBR	Community Based Rehabilitation
ESP	Education Sector Plan
ESR	Education Sector Review
GES	Ghana Education Service
GNAD	Ghana National Association of the Deaf
GNAT	Ghana National Associations of Teachers
GSB	Ghana Society for the Blind
GSL	Ghanaian Sign Language
GSPD	Ghana Society of Physically Disabled
ICT	Information and Communication Technology
MMDE	Ministry of Manpower Development and Employment
NVTI	National Vocational and Technical Institutes
PMED	Policy, Monitoring and Evaluation Division
PMLD	Profound and Multiple Learning Disabilities
SEN	Special Educational Needs
SpED	Special Education Division
SSS	Senior Secondary School
TTCs	Teacher Training Colleges
VSO	Voluntary Service Overseas

Introduction

This report focuses on a strategy for the use of ICT to support the delivery of the Ghana Education Service's (GES) Special Education Division's core objectives. The aim of the study is to investigate how Information and Communication Technology (ICT) can be introduced to three areas of Special Educational Needs (SEN) provision:

- Teacher Training,
- Inclusive educational settings,
- Special Schools.

The main categories of students identified in this Imfundo KnowledgeBank Activity are students with hearing impairments, visual impairments and general learning disabilities (mild, moderate to profound and multiple learning disabilities). The first phase report, "A Review of Good Practice in ICT and Special Educational Needs in Africa" focused on how innovative practice and experiences from global use of ICT can be shared with African governments[1]. The report highlighted the lessons learned from the integration of ICT in non-African contexts and proposed guidelines for African governments considering the introduction of new technology within Special Education.

A second phase of the work involved the preparation of a strategic plan in collaboration with the Special Education Division of the GES. The following report is therefore the culmination of Phase Two which involved workshops in Ghana and the UK with key stakeholders and like-minded agencies involved in Special Education and ICT. The first workshop identified key strengths and weaknesses within the special education sector in Ghana in order to formulate a strategic plan. The second workshop brought together Imfundo partners and interested agencies to consult on ways which could contribute to the Ghana Education Service's Special Education Strategy. Key stakeholders in both special education and ICT were consulted on approaches to build sustainable activities that could help the Special Education Division achieve its objectives. The findings of these two workshops are integrated into this report along with data collected during field visits as well as survey work carried out in 22 special schools. This report analyses the potential of using ICT in the teaching and learning process to increase accessibility and disseminate information to students with SEN.

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[1] See Imfundo Knowledge Bank Reports
(http://imfundo.digitalbrain.com/imfundo/web/papers/sen/?verb=view)

Outline of the Report

The first section of the report provides the Ghana Education Service with advice on how best to use ICT to support their Special Education Sector in Ghana. The second part of the report provides an in-depth analysis of special education challenges within Ghana and how ICT can be integrated within this context. The final sections consider concrete proposals, recommendations and advice for piloting in Ghana over the long-term basis, particularly in three areas: teacher education, inclusive education and special schools.

Methodology of the Study

The following report is based on a detailed study of the context in which ICT and SEN are working in Ghana. The data was collected over a six-month period with key stakeholders from the Special Education Division at the Ghana Education Service. The investigation involved the following methods:

- A questionnaire and analysis of SEN work in all special needs institutions across the country,
- Visits to several SEN institutions and consultations with staff,
- A Workshop to review the strengths and weaknesses of SEN in Ghana,
- A workshop with key stakeholders within the UK interested in supporting SEN activities in Ghana,
- Consultations with key SEN workers, teachers and civil society agencies in Ghana and the UK.

1.0 A Short Review of SEN in Ghana

The first section of the report provides an overview of the challenges faced within the Special Education Sector. The Special Education Division (SpED) is the statutory agency for the provision of special needs education in Ghana and is within the Ministry of Education (MOE) and Ghana Education Service (GES). The division has the responsibility of providing equal educational opportunities and programmes for children with disabilities. Presently, Ghana has twenty-three schools at the basic level, which cater for the education of three disability groups-the Blind, the Deaf and the Mentally Handicapped. The following section will review the key challenges for SEN within the country.

1.1   The Incidence

According to Disability Studies conducted by the Ministry of Manpower Development and Employment (MMDE) approximately 6% of the Ghanaian population have some type of mild to severe disability. Other agencies, which have conducted surveys on children with disability, suggest that:

- 12,000 to 30,000 children have problems with low vision (Ghana Society for the Blind 1990).
- Between 20-25% of children in regular schools experience some type of impairment which is often not readily discernible but can affect the child's performance resulting in failure or drop out (SpED Division, 2000).

Table 1.1: Number of Children in Special Schools

Type of institution	Male	Female	Total number of students
Schools for the Deaf	1348	839	2187
Schools for the Blind	332	152	484
Mentally Handicapped	432	237	669
Deaf /Blind	22	--	22
Total	2134	1228	3362

(Special Education Division, Sept. 2001)

1.2 Key Challenges within the Sub Sector

Some of the key **access and participation** challenges faced by children with disabilities and their families within Ghana include:

- Services are unevenly distributed across the country and located mainly in urban centres;
- There is a problem of ensuring that only severely handicapped children gain access to special schools and others are integrated into the mainstream,
- Several special schools are taking care of children with mild to moderate disabilities that could be mainstreamed into the regular school system;
- Special education only benefits a small proportion of children with disabilities and rarely leads to employable skills. Additionally, only 2% of disabled people are provided for through special institutions (Ministry of Manpower Development and Employment, 2000);

There is much more opportunity and scope to encourage the private sector and NGOs to take up responsibility for special education (i.e. construction of schools, provision of teachers, etc).

There are six key challenges related to **educational quality** facing the sub sector, namely the following:

- A high attrition rate of teachers completing the University of Education, Winneba (UEW) Special Needs Training Course;
- A high proportion of teachers are not interested in the education of children with special educational needs;
- A disagreement within the sub sector concerning the type of sign language taught (e.g. Sign Exact English or Ghanaian Sign Language);
- A lack of books for the visually impaired and basic special equipment for the hearing impaired;
- Insufficient financing to the sector (less than 4 % of the MOE budget goes to children with SEN);
- Inadequate repair and maintenance of existing buildings.

1.3   Access and participation

A very small percentage of children (approximately 2%) with special educational needs have access to educational support and training through "Special Schools" (MMDE, 2000). Children who gain access to special schools are primarily residing in urban areas. According to the MOE data only 3,362 children are provided with special services representing less than 2% of the population. Studies suggest that

approximately 10% of visually impaired children are being provided for through special institutions. Females are under represented in most of the special needs schools.

The main proportion of funding for Special Education is used for the provision of food for special institutions. Most of the special schools are under-resourced and operate with inadequate basic learning materials (i.e. Hearing aids, Braille paper and styluses, tape recorders books in large print, magnifying reading glass etc.). The schools do not have special equipment for learners (hearing aids, learning materials etc). There is a very high stigma attached to children with SEN making it difficult for them to integrate into the community and gain employment after they complete school. Table 1.2 presents the number of special schools in the country.

Table 1.2: Schools for Children with Special Educational Needs

Type of School	Number	Location
Public Schools for the Blind (Basic Level)	2	One in Akropong- (Eastern Region) One in Wa (Northern sector, Upper West)
Private integrated	1	Accra, De Youngsters
Integrated Senior Secondary Schools	3	Wa, Akuapem and Wenchi, Akropong
Vocational		
Public Schools for the Deaf (Basic Level)	12	Wa, Hohoe- Volta, Koforidua, Mampong-Akwapim, Sekondi, Kibi, Cape Coast, Savelugu, Jamasi, Bechem, Gbeogo, Accra
Religious Unit Schools	3	Swedru (Salvation Army)
Senior Secondary (deaf)	1	Secondary /Technical at Mampong Akwapim
Technical Institute	1	Bechem
Public Schools for the Mentally Handicapped	6	Asylum Down, Dzowulu, Sekondi, Kumasi, Kpando, Battor and Nkoranza
Private school for the Mentally Handicapped	1	New Horizon, Accra
Unit schools	3	3 units attached to the School for the Deaf at Hohoe, Wa and Koforidua Unit School; One inclusive school in Kpando; Kibi
Sheltered Workshops	1	Accra attached to the NGO run School for the Mentally Handicapped
TOTAL Number of special needs schools at Basic level	20	

(Special Education Division, Accra, 2003)

There are currently 9 Assessment Centres mainly located in southern Ghana with one in the Central Region (UEW), 1 in the Volta and 2 in the Ashanti Region.   Most of these centres concentrate on the

assessment of hearing problems. There is a tremendous need for more assessment centres in some of the regions particularly the Western, and Northern areas of Ghana.

1.4 Educational Quality and Performance

Educational attainment of the hearing impaired has remained very low due to communication difficulties. Programmes for integrating children into post basic schools have been suspended due to lack of interpreters. There are approximately 10 interpreters for the hearing impaired across the country. Educators of the hearing impaired make the following recommendations:

➢ Official recognition of the use of Sign Language as the medium of communication in Schools for the Deaf;
➢ A review of the special education programme at the University of Education, Winneba (UEW) to ensure that the teaching of Sign Language and interpreting plays a larger role in the curriculum.

Visually impaired students also face significant challenges in accessing the school curriculum in its present form. They are unable to pursue Science and Mathematics from the second cycle level thus affecting their selection of courses at the tertiary level. These challenges will be discussed in more detail in Section.

1.5   Inclusive Education Programmes

"The main thrust of the MOE's Special Education Policy is the integration of pupils into the mainstream system. It is also to ensure the provision of adequate resources for special schools. In order to accomplish this, special programmes for teacher training are required" (MOE, 2001 Page 14).

Despite the Ministry of Education's (MOE's; now Ministry of Education, Youth and Sport) policy for inclusive education, there are very few children involved in the programme to date. Approximately 87 children have been successfully integrated through the Sight Saver/MOE programme. There are only three districts throughout the country, which have inclusive education programmes for low vision children and these are supported mainly through the NGO community (e.g. Sight Savers International).

Inclusive education programmes require a minimum of trained teachers who can support children with special educational needs within the regular classroom setting. Districts which have successfully integrated children with low to moderate learning disabilities, have the support of at least two itinerant teachers and one peripatetic officer per district. Currently, the MOE supports the work of at least one peripatetic officer in most of the districts in the country. Most of these

officers do not have adequate transport and are unable to supervise the schools on a regular basis. Thirty-six districts in the country are involved in Community Based Rehabilitation programmes (CBR) run in collaboration with the MMDE to help raise parental awareness and mobilise resources to support children with SEN at community level. Thirty-eight districts in the country are involved in the CBR programmes.

Very few people in the country are able to use sign language proficiently and children have been unable to communicate adequately at the basic levels of education. Training and workshops have begun to train key resource people in selected districts in sign language, but a tremendous amount of work needs to be done to increase the numbers of interpreters.

1.6   Teacher Education and Development

In 2000/2001 there were 216 graduates from the diploma programme and 111 from the four-year Bachelor of Education programme at University of Education, Winneba (UEW). Unfortunately, the vast majority of these graduates do not want to pursue a career as special needs teachers in special schools. According to the SpED and UEW, a large majority of graduate special needs teachers go back to the mainstream schools or find their way to the SSS level pursuing their second area of concentration or leave the teaching profession all together.

Teacher attrition for special needs teachers at a basic level is quite high. Teachers pursue diploma or degree courses but often do not go back to serve at the basic level on completion of the UEW special education programme (Acheampong, 2001). Interviews with experts in the field suggest that most disaffected teachers do not want to teach children with SEN but simply wish to obtain a degree or diploma when they enter UEW.

Dery (1995) found that 77 teachers of the deaf out of a sample of 223 had resigned between 1965 and 1988. The study revealed that the main reasons for the high proportion of special needs teachers resigning were due to:

- Long working hours,
- Poor remuneration,
- New career choices,
- Lack of opportunity for overseas training,
- Pressure from family,
- Lack of job satisfaction,
- Frustration by administrators.

An informal investigation carried out by UEW in 2002 indicated that 90% of the second year students in special needs education (241 in total) admitted that they had joined UEW only for the degree and were not interested in teaching in the special education field (Gadagbui, 2002).

Table 1.3: Graduates from UEW Special Education Division (1995 to 2001)

Type of course	Male	Female	Total
3 year Diploma	195	83	278
2 year Post Diploma	77	30	107
1 year post Diploma (Regular)	26	18	44
1 year Post Diploma (Sandwich)	52	21	73
Total	350	152	502

(Gadagbui, 2001)

1.7   Curriculum, Books and Special equipment

Children with learning disabilities, hearing and vision impairments are following the same curriculum as mainstream schools. Children with hearing impairments are given an extra year at the JSS level to complete their studies. Special schools follow the GES syllabus but lack the equipment needed to carry out a basic quality programme. The Schools for the Blind do not have enough Braille paper, slates and styluses for their students. This prevents children from taking notes, which are essential when books are unavailable.

The institutions and schools catering to children with "mental handicaps" have had to develop their own curriculum. State run special schools, with the assistance of some development agencies, are in the process of developing a curriculum for institutions catering for children with learning disabilities. Assistive technology is often only provided through support by NGOs although this is on an irregular basis.

1.8 ICT Infrastructure Needs

An investigation carried out in 23 special schools in Ghana revealed that the main concern for SpED, Heads and Deputy Heads of Special Schools is the need to complete, upgrade and maintain the existing school buildings. Table 1.4 summarises the basic infrastructure needs of these schools:

Table 1.4: Infrastructure Needs at Basic and Secondary levels

Type of School	Needs at basic level	Needs at Second Cycle
Blind	3 more schools needed (in Central, Volta and Brong Ahafo) Existing structures need completion	
Deaf	Adequate Facilities	1 more SSS needed for the Deaf (northern sector)
"Mentally Handicapped"	5 sheltered workshops should be established to serve as vocational training centres and exit points	
Older children with SEN		5 special units should be built on to existing technical and vocational schools. These should be identified in order to increase the integration of post SSS students with Special needs
Assessment Centres	Need for at least 7 more assessment centres in the regions where there are no public or private centres available The new and existing centres need better resourcing and equipment	

(Special Education Division, 2002)

There are a large number of rehabilitation centres around the country run by the Ministry of Manpower Development and Employment (MMDE). Most of these workshops are ill equipped and in need of renovation. The MOE and MMDE should work together to try to improve the conditions of rehabilitation centres in order to increase the chance of young people becoming employed after basic education. The National Vocational and Technical Institutes (NVTI) should be asked to set up special units to train young people with special

educational needs. The Director General of GES has asked the Special Education Division to prepare a concept paper on the integration of vocational training in the special needs sector.

1.9   Financing

One of the greatest challenges facing the sub sector is the limited resources available for the development and improvement of special education in Ghana. Resources have been woefully inadequate and funding earmarked for the sub sector is inadequate. According to the latest Medium Term Expenditure Framework (MTEF) budget estimates for MOE, the special needs sector receives less than 0.4% to run its entire programme.   The majority of this funding is used to provide institutional care in the form of food for children in special schools. There has been very little funding available for creating and supporting inclusive education programmes for children.

Visits to special schools in the country reveal the poor condition of buildings and lack of books for students. There are endemic problems that the entire sub-sector is experiencing due to lack of basic funding. One of the many cases in point is the inability of the Special Education Division to maintain and repair basic educational equipment and technology currently operating in the system. The Braille press for publishing educational materials for the blind was one case in point which took over two years to replace.

A much higher proportion of the Education Budget must be earmarked for children with SEN to match their numbers. This would make a tremendous difference to special educational institutions and ensure that inclusive education is properly implemented.   The following section considers the key policy frameworks and institutions guiding the special education sector in Ghana.

2.0 Policies guiding ICT in Special Education

2.1 Core Objectives of Special Education Division and ESP

The Special Education Division (SpED) is one of the ten Divisions that make up the GES. SpED is responsible for the provision of educational programmes for the disabled in both segregated and integrated settings. It has national, regional and district level structures with peripatetic officers in 95 of the 110 districts across the country. The core objectives of the Division are to:

- Work towards equal educational opportunities of children and youth with special needs at pre-tertiary levels to promote inclusion, quality, access and participation.
- Increase access to quality education training of children and youth with special needs leading to employable skills for economic and independent living.

The strategic objectives of the Division include:

- Increasing access to and participation of children/youth with special educational needs at all pre-tertiary levels with a focus on inclusion,
- Enhancing quality teaching and learning through the provision of assistive devices and other inputs,
- Strengthening educational planning and management,
- Increasing sources of funding,
- Improving collaboration and coordination of activities of stakeholders,
- Increasing awareness creation.

The Special Education Division is to submit a 4-year strategic plan for 2004 to 2007 to the Director General of GES by December 2003. The Division has a firm commitment to integrating ICT into all its programmes in special needs delivery in the country. The Division wants to take advantage of the recent educational sector review in order to influence policies related to special education, which was for the first time captured in the Education Strategic Plan (ESP) for 2003 to 2015. The ESP forms the basis on which all-new projects and programmes will be financed over the next 12 years.

The Special Education Division has plans to integrate ICT within the Sector by identifying them in its Strategic Plan. Its aims are to:

- Ensure that life long vocational training programmes are started in special schools so that students are prepared and equipped for independent living after basic education;
- Sustain a national awareness campaign to reduce the stigmas attached to children with special educational needs in society through the use of radio and television;
- Place teachers with sufficient ICT skills to take over the training of ICT programmes set up by VSO volunteers;
- Develop a stronger ICT component into the University of Education, Winneba's four-year Special Education Programme in order to build teacher awareness of Assistive Technology and how it can enhance teaching and learning;
- Improve and expand the level of sign language across the country;
- Increase the access of children diagnosed with mild to moderate disabilities into mainstream schools.

2.2   Policies Guiding ICT in the (Special) Education Sector

The Ministry of Education's vision of providing equitable educational opportunities for all children includes persons with Special Educational Needs. The Ministry of Education has incorporated Special Education into their Education Sector Plan but may not be able to provide adequate financing to ensure that this sector is properly addressed.

The ESP is a major initiative designed to provide a strategic framework and will inform development in the education sector over the next 12 years (2003 – 2015). The framework is formulated around the policy goals and objectives of the Ministry of Education grouped into four focal areas:

- Equitable access to education;
- Quality of education;
- Educational planning and management;
- Science, technology and vocational education.

The ESP addresses Special Educational Needs under the focal area of "Equitable Access to Education". This focus area is to provide a foundation for a free compulsory, universal basic education, through the promotion and enrolment of disadvantaged groups, and to provide more opportunities for out-of-school and hard-to-reach children. The Government considers that the special education sector be included within these target groups. The aim of the ESP is that by 2015 all children of school-going age, including those with special educational requirements, will complete primary schooling.

Some of the targets set within the Education Sector Plan Work Programme include:

- Integrating all children with non-severe Special Educational Needs in mainstream schools by 2015;
- Increasing attendance of students those SEN in schools to 50% in 2008, 80% in 2012 and 100% by 2015;

The Annual Education Sector Operational Plan (AESOP) envisages the following activities:

- Providing training for all teachers in SEN,
- Redesigning school infrastructure to facilitate the accommodation of pupils/students with SEN,
- Establishing special education centres in all districts and
- Incorporating training in SEN into all Teacher Training College Courses.

The Policy, Budgeting, Monitoring and Evaluation Division (PBME) of the Ministry of Education, which is coordinating, and responsible for the design and monitoring of the ESP confirmed that 20% of the existing infrastructure in Primary and Junior Secondary Schools (including special schools) is in a deplorable state and will require renovation. Table 2.1 below shows target funding for education under the ESP over the next three years:

Table 2.1: ESP projected expenditure between 2003 and 2005

Year	2003	2004	2005
Funding (in billion Cedis)	15.4	21.6	24.5

The PBME recognises that the proportion of expenditure to be allocated to the Special Education Division is woefully inadequate. The Ministry is committed to the introduction of an inclusive education policy, which gradually mainstreams children with SEN and limits access to special schools only to the severely disabled. PBME Division suggested at the Ghana Special Education Workshop (June, 2003) that Special Schools could make requests to the PBME for expansionary project funding. Each school has been requested to produce an Operational Plan by the end of December 2003.

The ESP has made reference to the provision of Teaching and Learning Materials and it does suggest that by 2005, each pupil should be entitled to one textbook, have access to hearing aids and books in Braille for the visually impaired. It is estimated that between 2003 and

2008, US$ 70 million will need to be spent on the provision of teaching and learning materials for special schools.

The decongestion of special schools was a crucial issue for the designers of the ESP. Children in special schools would be screened to determine their levels of disability or impairment as a method to hasten the inclusive education process. There is also the need to improve on statistics to reflect the situation on the ground and inform planning strategies. The Ministry is in the process of soliciting funds to make special education free.

The Special Education Division has drawn up and submitted a set of "additional inputs" to be included in the ESP to the Ministry of Education. These "inputs" range from public awareness programmes for SEN to the construction of computer laboratories for special schools.

2.3 ICT policy within in the Education Sector

The Government of Ghana has placed a strong emphasis on the role of ICT in contributing towards the country's economy. The Poverty Reduction Strategy and the Education Strategic Plan both suggest the use of ICT as a means to reaching out to the poor in Ghana. The Government's Education Strategic Plan (2003 – 2015) has highlighted the need to "promote" ICT in schools and institutions of higher learning through a series of activities over the next three years (2003 – 2005). These include the following:

1. Finalise the national policy on ICTE including syllabi;
2. Provide necessary infrastructure to support ICTE programmes at SSS level;
3. Train a core team in ICT as Trainers of Trainers (ToTs);
4. Provide appropriate ICT training opportunities at all levels, utilising Science Resource Centres (SRCs);
5. Develop a cadre of trained persons to support the delivery of ICT in schools and institutions (pre-service and in-service);
6. Provide access to the Internet and establish a networking system as a basic part of the instructional environment in selected primary, secondary and tertiary institutions;
7. Construct/rehabilitate computer laboratories in schools and institutions.

The Ministry of Education has a tight time frame to achieve the above activities. At the moment there is no direct reference to ICT within the special needs sector although this is an area where some of the most important advances are being made for the integration of children with disabilities into mainstream education. More awareness building is

needed to ensure that ICT provision is being addressed in the special needs sector.

2.4 Government initiatives to introduce ICT into Education

The Ministry of Education has acknowledged the need for the introduction of ICT into the education system, and has found support from international development partners, NGOs, ICT vendors and Parent-Teacher Associations (PTAs). The recently published policy framework[1] for a broad ICT policy envisages the transformation of the Ghanaian economy to a knowledge-based society by modernising key social and development sectors using ICT.

The setting up of national resources to welcome the introduction of ICT will be the primary objective for the Ministry of Education over the next 2-3 years. One of the main issues challenging the development of this initiative is the problem of achieving equity in implementation. Schools catering to students with disabilities will need to be targeted as a key area of intervention. No reference is presently made to children with disabilities and how ICT intervention can be introduced into their education.

The setting up of computer labs on a national level may fit a secondary school model where teaching practices are broader based. However, this model does not necessarily suit schools where children follow specialised education programmes (e.g. Inclusive Education Programme for the visually impaired) in both special and mainstream schools. The support from NGOs in the past in setting up of computer labs (e.g. WorldLinks, Sight Savers International) should also include the provision of Assistive Technology, and reconditioned PCs for Special Schools.

2.5 Teacher Training – Open Distance Learning (ODL)

Training teachers in special education has been a much-debated issue between Teacher Training Colleges, and persons representing the disability groups in Ghana (e.g. GSB, GNAD, etc.). Results show that there is not enough pre-teacher and in-service training being dedicated to special education.

Out of approximately 155,879 teachers in public and private basic schools, 95,807 or 61.07% are untrained. The percentage of female untrained teachers is much greater than the percentage of male

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[1] GES, Introducing Information and Communication Technology in Pre-Tertiary Institutions: A Policy Framework (May 2002)

teachers. Currently there are approximately 30,000 untrained teachers (EMIS, MOE 2000) with about 3,500 being recruited annually. This represents about 30% of the workforce. The recruitment of untrained teachers continues to be an attractive solution to address the problems caused by inadequate supply and high attrition, especially in the rural areas.

The Education Strategic Plan (2003 – 2015), states that by 2008, "all teachers (will) have access to teaching support materials" and be able to access one of the 50 Teacher Resource Centre by 2015. The Annual Education Sector Operational Plan 2003 – 2005 (AESOP), incorporates special education into all Teacher Training Colleges for trainee teachers intending to work in both the Primary and Junior Secondary Education sectors by 2004. This is a very ambitious goal but it is achievable with the right set of inputs.

The Teacher Education Division Working Group with the support of Imfundo, DFID, has identified five strategic objectives which seek to apply ICT enhanced open and distance learning to help address some of these challenges. These are:

1. Establish a National Accreditation Framework for teacher development;
2. Assist all colleges to adopt an ICT enhanced improved mixed model (open and distance learning and face to face) pre-service training;
3. Upgrade untrained teachers to certificate/diploma level by flexible ICT enhanced modular programmes;
4. Assist all newly qualified teachers to undertake flexible ICT enhanced in-service training;
5. Provide equitable opportunities for serving teachers to have access to accredited professional in-service training through ICT enhanced Open and Distance Learning (ODL).

Newly qualified and untrained teachers need more training in what used to be called "Remedial Education", now termed "Learning Support" in the UK. All teachers need to be able to assess students' strengths and weaknesses by administering reliable, nationally recognised standardized and diagnostic tests. Teachers should be equipped with the skills to provide appropriate remediation to students who require support in key curriculum areas. They also need specific training in identifying and referring young children with developmental delays to assessment centres where full psychological and physiological assessments (e.g. hearing tests) can be carried out and appropriate intervention programmes can be initiated.

The SEN component of this programme needs to be addressed as part of the "curriculum" for the target group e.g. unqualified or newly qualified teachers. The integration of materials on SEN and Learning Support in the form of information videos, tape cassettes, CD ROMs and Braille could be used as a school resource and for the training of all teachers at a national level.

3.0 Prioritisation and Proposals for ICT and SEN

The next section of this report focuses on four main categories of disability: hearing impaired, visually impaired, children with general learning disabilities (mild to severe) and those with physical disabilities.[1] The next four sections discuss the main findings based on field visits to special schools and Government Departments, Non-Government Organisations, University of Education Winneba as well as interviews with key players in the field of special education. The fieldwork and data collection phase present a complex picture of how each disability group is struggling to achieve its own goals. This section also reflects on potential priority projects, which have emerged as part of the study.

3.1. Hearing impaired/Deaf students

There are 13 schools for the Deaf in Ghana – 12 primary and JSS schools and 1 Secondary – Technical School located in the Eastern region. A report published by the Special Education Division in 2000 shows the medium of instruction and the teachers' levels of proficiency in Signed Exact Language (SEE)[2] Out of the 13 schools only 3 schools use sign language effectively. However, a visit to the Secondary/Technical School in the Eastern region shows a greater use of sign language being instructed (Field work, July, 2003).

The only formal teaching of sign language takes place at the University of Education, Winneba (UEW) as part of a 4-year degree in Special Educational Needs. UEW has been the focus of considerable attention and some criticism due to its inability to provide adequate training for trainee teachers wishing to work in the schools for the Deaf. Part of the criticism has been placed on the lack of real exposure trainee teachers have whilst in training college. More emphasis needs to be placed on teaching Ghanaian Sign Language (GSL) with frequent teaching practices in schools for the deaf. Teachers only practise sign language in the fourth year of their degree course, thus leaving them with little time to build sufficient confidence for their actual teaching experience.

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[1] It must be stressed that these broad groups are only being referred to in this way for the purpose of the report and cannot be seen as a true categorisation of those children who may fall into more than one disability group. Educationalists and policy makers should consider the implications of categorising students into specific disability groups, as those within the system who have not been assessed may also need extra provision from other special education needs sources. We should therefore be cautious when assessing children's needs to ensure that we obtain a full picture of the individual's strengths and weaknesses and his/her potential targets and goals.

[2] Signed Exact English (SEE) uses signs for every word in English Grammar e.g. is, a, ing, ed.

The Ghana National Association of the Deaf (GNAD) was established in 1968, with branch offices in all ten regions and 25 district branches with membership of 1000 throughout the country. One of its principal objectives is to raise the status of sign language by emphasising the teaching of sign language as the only medium of instruction in schools for the deaf and integrated schools. There are approximately 180 teachers trained to use Ghanaian Sign Language (GSL); a language stemming from American Sign Language. GSL has evolved considerably over the years and has adopted new signs unique to specific regions in Ghana. Of late there has been a tendency for some teachers conversant in ASL to teach it to hearing impaired and deaf students. A former schoolteacher, now a full time interpreter for the Ghana Association of Sign Language Interpretation, has reported this practice among some teachers working in schools for the deaf.

A group of interpreters who work around the clock interpreting for events, workshops and meetings have formed the "Ghana Association of Sign Language Interpreters". There are currently 5 sign language interpreters working in Accra who are stretched to capacity as a result of the lack of trained professionals who can work in this demanding field.

The teaching of sign language relies on two key factors: firstly, the positioning of the hands (e.g. past, present and future); and secondly, the facial expressions which support the communication. It is therefore exceedingly difficult for learners to depend on sign language books and cards where the hands are static and open to misinterpretation and confusion. The GNAD prefers not to use the published sign language book, which is on sale at the Material and Resource Centre. The use of cards could be used as a follow-up on one-to-one or small group training, but cannot in any way replace the teaching of a living language.

Ghana Television (GTV) sponsored a 30 minute weekly broadcast for the deaf between 1989 and 1999 (approximate dates) entitled "Missing Link". This programme featured events such as the news, a short lesson in sign language and a piece of drama voiced over in sign language. It is understood that this programme was discontinued as a result of lack of sponsorship. Discussions have been taking place to re-launch programmes for the hearing impaired at a national level at least for some simultaneous interpreting of the news. Talks with GNAD and the Director of GTV to introduce some signing into children's TV programmes will ensue once the signing of the news has taken off and become more established on GTV.

A theme running during the workshop funded by Imfundo at the Ghana National Association of Teachers' Conference Room in June

2003 was the lack of media attention people with physical, sensory and learning disabilities were receiving from the state and private sector. The running of a half hour programme for the deaf on state TV would heighten public awareness of this "hidden disability" and provide those living in both urban and rural communities a platform to learn and share information on advocacy and entitlements for people with hearing impairments.

Ideally, the teaching of sign language should be undertaken through a one-to-one exchange. This is not currently possible due to the lack of trained sign language teachers in the country. As previously stated, UEW is only able to teach an introductory course to its students. The course outline describes the module as "practical enabling students to reach an appreciable level of competency to facilitate communication. Only one lecturer at UEW has been teaching this module that includes the acquisition of Ghanaian Sign Language. In spite of this objective, few teachers are proficient enough to use it skilfully in a school at the end of their 4-year B Ed degree course.

The GNAD emphasises the need for trainee teachers to become proficient at GSL by obtaining as much practice as possible in the Schools for the Deaf and not leaving it till the final year of their degree course. The Special Education Division also believes that teachers are given insufficient exposure in schools in order for them to understand and teach the language effectively. It would be highly desirable if trainee teachers, wishing to pursue a teaching career and working with the hearing impaired and deaf, could go to the local school for the Deaf in Winneba on a regular basis to meet and practise newly acquired sign language hand forms with the students under the direction of the current teaching staff.

VSO and the Special Education Division have collaborated and are continuing to work together in supplying experienced ICT volunteers to schools for the deaf and other areas of disability. The placement of a volunteer in Mampong for the School for the Deaf has met with some success in spite of the infrastructure problems and lack of staff motivation. The VSO volunteer has been instrumental in setting up a computer lab in another School for the Deaf in the Volta Region. During an interview at the School for the Deaf in Mampong, he stressed that due to the lack of teacher attendance during computer sessions, he has been unable to find any teachers to train and take over his role once he leaves at the end of 2003. The resourcing of graduate teachers with the necessary ICT skills to set up a lab, troubleshoot problems and repair them, and to teach appropriate ICT skills to sensory impaired groups of students is a major concern for the Special Education Division. There is a strong urgency for the SpED and

UEW to start talking together so that newly trained gain basic ICT skills to use in the classroom.

UEW's Department of Special Education has recently acquired a suite of 18 reconditioned computers from Germany. As part of its commitment to the development of ICT skills for its trainee teachers, the department wishes to give the students following the 4 Year B Ed degree course in SEN, exclusive use of the computers. There is no one presently on the teaching staff who has the necessary skills to teach the students with basic ICT skills. UEW has, recently requested VSO to supply a skilled volunteer in ICT skills to train these graduates.

As with any VSO programme, they are looking for sustainable solutions that can be developed and replicated in other institutions around the country. A serious review of how VSO volunteers are deployed in special educational settings is needed to ensure that all contractual partners are committed to the development and sustainability of any two-year projects.

Key Recommendations for funding and further development:

➢ Develop a video and interactive CD ROM for teaching sign language across the country to be used on television and by teacher training colleges and UEW,

➢ Train teachers in Schools for the Deaf in the use of Ghanian Sign Language,

➢ Continue to develop public awareness videos for the promotion of people with disabilities and reduce the stigma of being disabled in Ghana,

➢ Encourage the Ghana Broadcasting Corporation to sign the news and key documentary programmes as well as broadcast a weekly programme for the deaf on GTV,

➢ Promote the use of videos with captioning in schools for the deaf,

➢ Train teachers to build ICT into the teaching of the curriculum with hearing impaired students.

3.2   Visually Impaired students

There are two Basic schools for the Blind, three Integrated Secondary Schools for the Blind and two Integrated Teacher Training Colleges for the Blind. Material resources for these schools are very thin on the ground and are in need of replenishing. Few students with visual impairments are provided with appropriate academic reading materials in Braille for their studies at Basic and JSS levels. One of the reasons for the poor resourcing of appropriate materials for the Blind was the breakdown of the Braille Press. The introduction of a new state of the art Braille Printing machine, two computers and a renovated printing house, financed by Barclay's Bank (June 2003), will mean that essential materials are finally produced and distributed to schools. The Braille Printing Press will not be able to supply all the country's schools, colleges and universities and other organisations. The Special Education Division is looking for funding to build another press for schools and colleges.

A recent visit to the School for the Blind in Akropong testified that there are currently no computers in the two schools for the Blind and very little use is made of any low to medium technology in its classrooms. The schools' budgets do not cater to the purchasing of tape cassette recorders, headphones, materials in Braille including tactile maps and books in large print. A typical school day starts at 8.00 am and finishes at 2.00 pm Monday to Friday. The afternoons are normally dedicated to "extra curricula" activities which often require extra material resources and equipment as well as a dedicated space or a room with electricity and adequate power points. Special schools like the School for the Blind in Akropong do not have the equipment and resources to help make the students' stay more enjoyable and productive.

Mrs O. Fefoame, a Training Support Officer at the Institutional Development Programme - Africa Office, has highlighted the logistical problems that can arise when equipment is donated to schools during a telephone interview in July 2003. She recounts how large amounts of equipment are not being used including CCTVs, and other print reading equipment. She also states that one of the biggest problems is that equipment arrives without any instruction manuals and is consequently abandoned in the school resource rooms.

One example of poor integration of dedicated technology is at Okuapeman Secondary School. This school integrates blind and low vision students from the School for the Blind in Akropong and the Itinerant Education Programme of Sight Savers/ GES in the Akuapem North District. The students are taught in the same class as their sighted peers. However, when it is time for the students to attend the

computer lab, the low vision and blind students are prevented from attending the computer lab. These students are unable to use any of the PCs due to the absence of screen-magnifier or screen reader software. The students miss out on all ICT sessions timetabled and therefore lose vital contact time with the school curriculum and their peers. Mrs O. Fefoame argues for the training of ICT skills to teachers, the sensitising of all students to what it means to be vision impaired and the need to purchase essential software that can enable low vision and blind to access PCs at the same time as their sighted peers.

The Material and Resource Centre, housed in the same complex as the Ghana Society for the Blind (GSB), stocks Braille paper for all the schools in Ghana. It reports having to wait for up to six months or more for paper deliveries from the USA and is quite often on the brink of very low stock. The Centre also stocks and sells a range of materials and equipment for persons with hearing and vision impairments. Listening and recording equipment such as tape-cassette recorders are too expensive for most people and are rarely purchased. The manager is reluctant to purchase new equipment as it often remains unsold and remains on display for too long, thus increasing costs for the Centre. He would readily purchase and stock equipment that would sell easily. Possible new purchases could include speaking watches, and tape recorders.

Teachers working in the mainstream sector who are often inexperienced in the field of special education will be expected to integrate children with visual impairments into their classrooms should inclusive educational strategies become enforced. Many of these teachers will not have had any real contact with computers or low to medium technology during their training years at the TTCs or In-Service training. Essential skill training in the use of ICT for practising teachers within the mainstream sector would help pave the way to the integration of students with sensory impairments.

The Special Education Division is encouraging the greater integration of visually impaired students into the mainstream. In order for this process to work, teachers need to be supplied with tape recorders and a supply of cassettes so that they can record their lessons and provide the children with the extra support. The Material and Resource Centre should collaborate with the Special Education Division by supplying basic cassette recorders and equipment to both teachers and students. The manager of the Resource Centre has expressed interest in building the capacity of the Resource Centre through linkages with the private enterprise sector so that more home-based solutions are found for material and equipment development.

One successful link has been made with Sight Savers, Ghana. This NGO has been working closely with the Special Education Division and the Ghana Society for the Blind (GSB) in supporting the integration of students with vision impairments into mainstream schools (Sight Savers' Country Plan 2001 – 2003) The Integrated Education Project (IEP) set up in collaboration with the Special Education Division has successfully integrated a totally blind student into a mainstream school in Hohoe District (Volta Region). This programme has been successful because of the support the school, the child and her family have had through the Community Rehabilitation Model - funds for an itinerant teacher to visit the school, provision of free classroom materials (e.g. books in Braille) and regular eye treatment. Sight Savers is wholly committed to the integration of children with visual impairments into mainstream education and supports the Special Education Division in the area of capacity building to enhance its ability to monitor, report and promote the integration of this disability group.

Awareness building is also a main concern for NGOs and people supporting the visually impaired. Insufficient media coverage by the press and the Ghana Broadcasting Corporation is reducing the vital exposure and awareness building that the country must have in order to sensitise the public. People with low vision and blindness are very often excluded from the transmission of news and social events. The broadcasting of a weekly radio programme in Ghana informing the blind of their rights, meetings and social events for the blind would be an effective way for the GSB and the GAB to increase their involvement with the blind in urban and rural areas.

Key Recommendations to assist the Visually Impaired

➢ Support the establishment of another Braille Press,
➢ Introduce tape recorders, dictaphones and large print materials into both Schools for the Blind and Mainstream schools,
➢ Support capacity building for the Material Resource Centre to become a key institution for the supply of Assistive Technology and the support of Special Education,
➢ Train teachers in Assistive Technology usage through regular training programmes organised by the Special Education Division and the Ghana Society for the Blind with the support of outside agencies,
➢ Expand the low vision integration programmes through support by Sight Savers International.

3.3.   General Learning Disabilities

This vast category, which includes students with mild, moderate, Profound and Multiple Learning Disabilities (PMLD) are attending mainstream schools, special schools and psychiatric hospital schools. Those students diagnosed with mild-moderate learning difficulties (e.g. literacy, maths and social skill development) are principally integrated into the mainstream. Teachers are obliged to cope with the needs of these students without any specific training. One of the biggest problems is the under-resourcing of schools with sufficient remedial and learning support materials to help develop literacy-based weaknesses that prevent students from accessing the curriculum.

The trend to segregate students with learning disabilities by placing them in residential schools exacerbates the overcrowding that already exists in the special schools. The institutionalisation of children within these poorly resourced establishments makes it exceedingly difficult to set up a new programme that reverses this trend. Within Ghana, official approaches to the provision of services have been largely based on the medical model. The commissioning of more residential schools through the medical model moves away from the inclusive model of integration (Avoke 2002). A concerted effort is required from the MoE seriously to review this trend and look at a more inclusive, social model of education.

Our report on "Good Practice in the use of ICT for SEN in Africa (http://imfundo.digitalbrain.com/imfundo/web/papers/sen/) points to a number of solutions for those with Specific Learning Difficulties and other related disorders. Content-rich software has been regularly used by teachers in classrooms to help build on the basic skills that too many children are missing. The vast majority of the software available on the market for SEN is culturally biased towards northern hemisphere countries. The use of American or British software can cause difficulties for children who have problems processing language. These programs would be more suitable with local accents and even in some of the languages used in Ghana such as Twi.

Special Schools that have computer labs are unable to use a lot of new software because of the lack of capacity and multi-media requirements e.g. CD Rom drive, sound cards and sufficient RAM. The majority of computers used have only word processor programs and very little else. Students diagnosed with severe learning disabilities are unable to develop basic skills that many teachers prioritise when using more advanced software programs. Teachers require specialised software that can aid the student with responding, attending skills as well as developing hand-eye co-ordination.

When working with ICT, teachers need to look at the student's needs and then see how the tools (ICT) can aid the student to achieve their goals. In our First Study, we discussed the need for planning and structuring ICT so that it can support and stimulate students with SEN throughout the continuum of development. Joy Zabala (2002) has developed the SETT model for considering and selecting technology. The model focuses on four critical areas: the Student, the Environment, the Tasks and the Tools. Data should be gathered in these four areas by a multi-disciplinary team (e.g. teacher, parents, resource teacher, and any other educational service provider). By looking at the student, the environment and the tasks, the team can make an informed decision when selecting the technology. See http://www.joyzabala.com for more information on SETT.

The use of Individual Education Programmes (IEPs) can be a valuable way of building a SETT model. When considering assistive technology, the environment and the tasks must be considered before tools are selected. Once we have prioritised the needs of the student and then the specific targets we can start to investigate how ICT can be introduced into the student's learning programme (See Phase One Report for more details on IEPs, http://imfundo.digitalbrain.com/imfundo/web/papers/sen/)

A new student with a sensory and learning disability who is integrated into a mainstream class setting can only be comfortable when all school staff are in agreement to changes in their own teaching practices. It is a daunting prospect for any teacher to have to admit a SEN student who requires a very supportive environment. Close collaboration with experts in the field of SEN can help facilitate the transition of students into a mainstream environment.

Mainstream schools have a great challenge to face when they accept to integrate students with learning disabilities. If they are to provide "a flexible curriculum" and "adapt routines and the physical environment" they must be prepared to make the necessary changes in staff attitude and access to the materials (e.g. tactile games, text books in Braille, lessons on cassette, materials in large print) that will help the student access the curriculum. Other students in the class will also need to be sensitised and encouraged to help those students with learning difficulties through "peer tutoring".

The UNESCO Teacher Education Resource Pack has been used to train teachers at Teacher Training Colleges to help prepare teachers for the integration of students with SEN. There is a need for all trained teachers to have access to such packs as well as information on how to use low – medium technology and see how it can be used in the classroom. Demonstration videos are an excellent way of showing how

a specific Assistive Technology can be introduced into a classroom and these can be obtained through NGOs[1]. The Special Education Division is in the process of requesting donor agencies to recommend and provide samples of resource materials.

Key Recommendations to improve training and form links with software companies

➢ Include Assistive Technology resources in terms of hardware and software in the teacher resource centres across the country;

➢ Promote simple methods of adapting Individual Educational Plans for children with SEN using agreed templates;

➢ Promote the training and usage of UNESCO teacher resource packs for training teachers for the integration of students with SEN;

➢ Call on private sector ICT training companies to provide initial In-Service training in how to use computer software to teach or supplement curriculum areas in SEN.

3.4. Physical Disabilities

Students with physical disabilities are often omitted from basic schooling because of the inadequate facilities provided for them in structural terms. The Ghana Society of the Physically Disabled (GSPD) has raised concerns about the poor provision made for students with physical disabilities in schools. They estimate that approximately 30% of students with physical disabilities attend school. They are only particularly concerned by the attitudes of teachers and how they can affect the confidence and learning of students with physical disabilities. A firm recommendation is to encourage teachers to refer students who are having difficulties within the fine motor (e.g. gripping pencils) or gross motor (e.g. balancing correctly, general clumsiness) domains so that they can be addressed by clinical staff in hospitals and clinics.

When exploring the inclusion of students with disabilities at all levels of society it is important not just to see how the individual disability or impairment prevents participation, but how the educational environment itself excludes students with disabilities. Traditionally, there has been a focus on a medical model of disability which views all disability as the result of some physiological impairment due to damage or a disease. As Marks (1999) states, this model interprets "learning disabilities as caused by some organic brain damage". There is a strong need to move away from a medical model towards a social model of disability where ICT is used to help educators and non-

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[1] Non-Government Organisations distribute free demonstration videos and CD ROMS to inform civil society of specific intervention programs and services they provide.

disabled students in mainstream environments to include students with disabilities rather than focusing on a "stop-gap" response to matching ICT to the disability and placing the student into an existing education system. The NGO Action on Disability and Development (ADD) has built a five year strategic programme (2003 – 2007) which focuses on the "breaking down of barriers and achieving lasting social inclusion for all disabled children and adults" This NGO works on a social model with NGOs representing disability groups and is strongly in favour of including children with disabilities into the mainstream classroom.

The Ghana Society of the Physically Disabled (GSPD) feel ill equipped to give advice and information to the public, as they are unable to access up-to-date information on the Internet. The Organisation is often contacted for key medical information from the general public and is expected to have details about medical advances and treatments for disabilities. Without accessing important new advances in the field of medicine and surgical supplies, the organisation's role as an advocator for the physically disabled is considerably diminished.

The GSPD has a VSO volunteer working on a part-time basis as a fundraiser. It has recently launched an educational fund aimed specifically at disabled girls where they received 1 Billion Cedis. It is considering a fundraising exercise to build and equip a computer centre for the blind.

Key Recommendations to build greater awareness and accessibility in schools

➢ Increase public awareness of the rights of people with disabilities through the development of videos and television programmes,

➢ Build greater accessibility to and within public institutions for the physically disabled,

➢ Encourage schools to refer students experiencing physical difficulties in schools to clinical staff in hospitals and clinics.

➢ Install a fast Internet connection to the complex where all disability groups are represented in Accra. (e.g. GSPD, GNAD, GSB, etc.)

4.0. Integration of ICT within Special Schools

The following section is based on a questionnaire survey, which was carried out with the support of 22 Special Needs Institutions in Ghana. This section will specifically consider the ability of ICT to reach special schools in the country. The purpose of the survey was to identify the challenges that Public Special Schools are confronted with in their bid to deliver quality education and to determine their preparedness to embrace Information and Communication Technology (ICT) as an integral part of teaching and learning. Questionnaires were given to head and deputy head teachers of the schools at a workshop organised by the Special Education Division of the Ghana Education Service in Kumasi, April 2003. Head teachers and deputy head teachers were requested to fill out a three-page questionnaire after a short presentation on ICT.

Responses from the questionnaire reveal that although special schools are willing to embrace ICT, they are grappling with the problem of inadequate basic infrastructure, and to a large extent the provision of basic teaching and learning materials such as books and other low technological devices. The survey results also indicate that there is a strong need for trained teachers with adequate knowledge of Ghanaian Sign Language in schools for the hearing impaired. There is also a strong impediment to inclusive education as a result of the stigma some mainstream colleagues, parents and even teachers attach to students with disabilities.

The survey reveals a need for the government clearly to embed Special Educational Needs into its education policies and encourage other stakeholders not only to provide material resources but also strengthen the human capacity of schools. It would also be worthwhile to involve the Special Education Division (SpED) and the Association of Heads of Special Schools in formulating educational policies. The Division needs to be well resourced to carry out its planning, implementation, monitoring and evaluation activities. The survey revealed that the main challenges that special schools face in the country include the following which are in alphabetical order:

- Community apathy;
- Encroachment on school land;
- Financial constraints;
- GES delays in releasing funds;
- Inadequate classrooms and dormitories for students;
- Inadequate or no Information and Communication Technology (ICT);

- Inadequate teaching and learning materials and equipment;
- Lack of In-service training for teachers;
- Lack of potable water;
- Lack of Braille machines, writing slates and styluses;
- Limited number of trained teachers;
- Limited infrastructure;
- Minimal parental involvement in children's affairs;
- No on-campus accommodation for staff;
- Poor academic performance;
- Poor enrolment;
- Teachers unable to master of sign language.

(Survey of Headteachers and Deputy Head Teachers, Kumasi Workshop, May 2003)

The survey revealed that the underpinning factors accounting for the poor or low performance of special education institutions are finance or teaching related. Most schools complain about inadequate accommodation for staff and students, unavailability of vehicles for transportation as well as the under-resourcing of teaching and learning materials. Not only are basic facilities inadequate in some schools but also they are in poor condition. For instance, the Gbeogo School for the Deaf is not connected to the national electricity grid. There is clear evidence that Information and Communication Technology is either inadequate or unavailable in schools.

All of the 22 institutions lack one form of learning material or another. The low provision of Braille machines, writing slates and styluses is common among the schools for the Blind. Often, new teachers do not exhibit adequate knowledge of essential communication skills. Their training curriculum fails to capture communication with children with sensory impairments.

4.1 Integration of children into the mainstream

The most striking challenge that special school authorities encounter related to the integration of students into the mainstream is student stigmatisation. The survey reveals a negative attitude of peers, some teachers and even parents towards children with disabilities. Their peers mock children with disabilities, confirming the fears of parents, while they receive less attention from teachers. Some parents of mainstream children also believe that their children's learning capabilities may be slowed down if special children are integrated. This was a common occurrence in several schools for the deaf. The following box highlights some of the opinions expressed by teachers working with students with hearing impairments:

- Colleagues and teachers reject or neglect deaf/mentally handicapped children;
- Lack of specialist teachers - - mainstream teachers lack adequate knowledge of the "mentally challenged";
- Less attention to children with SEN in large size mainstream schools – leading to inefficiency in student management;
- Negative attitude of able students towards deaf peers;
- Unavailability of assistive devices such as hearing aids;
- Unavailability of vehicles to transport children;
- Parents of deaf children feel that able peers will ridicule deaf peers;
- Parents of children disfavour integration as they believe that their children's education may be impeded;
- Some children with SEN do not easily understand purely academic subjects.

(Survey of Headteachers and Deputy Head Teachers, Kumasi Workshop, May 2003)

The special schools indicated their need for assistive technologies ranging from hearing aids to other basic educational materials. The Wa school for the Deaf in the Upper West Region and the Demonstration School for the Deaf at Akropong do not have sufficient vehicles to take children to and from school.

4.2   Teaching and Learning materials

One of the questions asked respondents to "describe the challenges related to production of and/or access to teaching and learning materials". The responses in alphabetical order include:

- Faulty Braille recording machines;
- Inadequate textbooks and sign language books;
- Lack of funding;
- Low knowledge of teachers using TLMs and their usage e.g. Teachers at the Volta School for the Deaf have access to toys, jigsaw puzzles, pictures etc. but find it difficult to improvise and exploit materials;
- Poor storage facilities for materials;
- Production of local materials are rarely done;
- Some materials are expensive and scarce;
- Teachers draw on apparatus cards only;
- Untimely distribution and insufficient supply of materials.

(Survey of Headteachers and Deputy Head Teachers, Kumasi Workshop, May 2003)

The special schools surveyed are faced with limited funds for the production of local Teaching and Learning Materials (TLMs) or the purchase of international materials. Existing TLMs are either not distributed on time or faulty. Some institutions have poor storage facilities for the materials, which leads to rapid wear and tear.

4.3   Access to Assistive Technology Devices:

The questionnaire asked teachers to describe how students use Assistive Technological devices. Responses included:

- Inadequate - only a few children have access outside the classroom,
- Our teachers use many locally produced ones;
- Children using hearing aids enjoy usage e.g. body type, placed behind-the-ear;
- Not available in our school;
- Pupils wear them in class only;
- Use of simple writing slates/frames, Braille paper and styluses;
- Blind students are introduced to basic Braille.

(Survey of Headteachers and Deputy Head Teachers, Kumasi Workshop, May 2003)

Of all the institutions covered in the study, 47.6% have no Assistive Technological Devices (ATDs) (See Table 4.1 below). The schools for the mentally handicapped appear to be the most affected in this regard. The remainder (52.4%) have few children who have access to the tools.

Among the schools for the deaf, hearing aids are the most widely used Assistive Technology Device. Most hearing-impaired children in these schools make use of the hearing aids only in the classrooms. Those who have access to aids at the Volta and Bechem Schools for the Deaf use them both inside and outside of the classroom. Parents of children using hearing aids in the Wa School for the Deaf provide the batteries for the hearing aids. Most blind students in special schools have been introduced to the basics of Braille and how it can be produced using slates and styluses.

Table 4.1: Schools: (1) Without Assistive Technological Devices (ATDs);

(2) Do not use ICT; and (3) Staff are familiar with ICT

Name of school	(1) Without ATDs	(2) Not using ICTs	(3) Staff familiar with ICT
Akropong School for the Blind	X	X	
Ashanti School for the Deaf			X
Bechem School for the deaf		X	X
Cape Coast School for the Deaf			X
Demonstration School for the deaf	X	X	X
Dzorwulu Special School for the Mentally Handicapped	X		X
Garden City Special School for the Mentally Handicapped	X	X	
Gbeogo School for the Deaf	X	X	
Savelugu School for the Deaf	X	X	
Sec./Tech. School for the Deaf	X		X
Sekondi School for the Deaf		X	X
Shalom Special School			X
State School for the Deaf	X	X	X
Three kings Special School		X	
Twincity Special School for the Mentally Handicapped	X	X	
Unit School for the Deaf, Kibi			X
Unit School for the Deaf, Koforidua		X	X
Volta School for the Deaf		X	X
Volta School for the Deaf, Mentally Handicapped Unit	X		X
Wa School for the Blind		X	X
Wa School for the Deaf			X
Total	10 out of 21 (approx. 47.6%)	13 of 21 (approx. 62%)	15 out of 21 (approx. 71.4%)

(Survey of Headteachers and Deputy Head Teachers, Kumasi Workshop, May 2003)

Sixteen schools, representing 71.4%, have staff that have knowledge of ICT. This includes some schools that do not have access to ICT such as the Volta School for the Deaf. As might be expected, all the schools that have access to ICT have at least one member of staff who has a basic knowledge of ICT. Foreign volunteers have been teaching staff and pupils in special schools to use computers. A German volunteer at the Ashanti School for the Deaf is in charge of ICT there and a Canadian volunteer from Crossroads International has succeeded in introducing all staff of the Shalom Special School Nkoranza in the Brong Ahafo Region to basic computer applications. There is a wide disparity in access to ICT and their usage. In all, 62% of the

institutions surveyed have not been using ICT. The greatest determinant is the availability of funding for such technology.

4.3 Knowledge and Training of ICT

Only two schools (Three Kings Special School at Battor in the Volta Region and the Wa School for the Blind in the Upper West Region) representing 9.5%, of the 21 institutions surveyed had not seen or known of any ICT that may enhance teaching and learning in their schools. The rest (90.5%) reported having seen or known about ICT. The institutions surveyed also have a satisfactory knowledge of how to use ICT as a complementary pedagogical tool. They need operational guidelines as to when and how to use ICT as well as the correct handling, and maintenance of hardware.

How would you go about using these technologies?

- Tuning hearing aids to amplify sound, especially speech;
- Screening documentaries as part of class lessons;
- Teaching blind students to type and to operate computers;
- Giving teachers in-house training;
- Guiding pupils to learn to seek information using the appropriate devices;
- Showing and asking children to describe items/equipment.

(Survey of Headteachers and Deputy Head Teachers, Kumasi Workshop, May 2003)

4.5.   Experience in Using ICT in Education

Students in the rest of the institutions who have access to computers enjoy using them and are eager to explore software programs. This has built an appreciable level of children's confidence in the learning process. The Cape Coast School for the Deaf appears to be relatively well resourced with computers. The school has a computer laboratory with five computers and a printer. The Dzorwulu special school for the mentally handicapped is the only school with Internet access; however, the computer laboratory is not fully functional.

Some of the schools anticipate that the high maintenance cost, inability to procure high quality ICT and poor maintenance may inhibit their use over the long term. Hearing aids used at the Unit School for the Deaf at Kibi are said to be very susceptible to breakdown.

If you have been using ICTs such as computers and other equipment, describe your experience and some of the challenges and benefits?

- A few students have access to computers borrowed from neighbours to prepare lessons;
- The few hearing aids available are often faulty;
- Maintenance will require the services of a computer specialist at a high cost;
- Computers are used to control hyperactive children;
- Students enjoy computer lessons and are ready to learn;
- Using computers make printing and picture reading easy.

(Survey of Headteachers and Deputy Head Teachers, Kumasi Workshop, May 2003)

4.6   Infrastructure to support this ICT

The availability and functionality of electricity and telephones at the schools determine, to a large extent, the preparedness of schools for the introduction and development of ICT. Table 4.2 reveals that most special schools are prepared to embrace ICT if they have a reliable electrical supply.

Table 4.2: Availability and Regularity of Telephone and Electricity in Special Schools

	Electricity Availability		75% of time regular	Telephone Availability		75% of time regular	
	Yes	No	Yes	Yes	No	Yes	No
Response Number of schools	20	1	20	16	5	14	2
Percentage	95.2%	4.8%	95.2%	76.2%	23.8%	87.5%	12.5%

There are a high proportion of schools with the basic infrastructure to support technology but the reliability of this infrastructure is questionable. There are frequent power outages in the rural areas, which could also cause damage to equipment.

4.7   Challenges in preparing students for Post JSS

One area of concern for the Special Education Division is the transition of students from special schools into society. Their plan is to help children prepare themselves through Vocational and Technical Education programmes.

The Blind are the most prepared for senior secondary schooling since the deaf children often have a disadvantage due to their language and communication difficulties. Three schools for the deaf (the Volta School at Hohoe, the State School at Ashaiman and the Unit School at Koforidua) have students furthering their education at the Mampong Secondary/Technical School for the Deaf - the single second cycle institution for the deaf in the country. As a result of over-dependence, the Mampong Secondary/Technical School for the deaf is under-resourced.

The Volta School for the Deaf indicated that those who do not pass their Basic Education Certificate Examinations are trained in vocations leading to the award of a National Vocational Training Institute Certificate. However, the State School for the Deaf at Ashaiman revealed a contrasting situation where JSS graduates enrolled as apprentice-artisans left after a brief starting period. The blind and the mentally handicapped have no special schools at higher levels of education i.e. secondary and tertiary.

The blind are integrated at the second cycle levels after JSS. Three regular SSS offer programmes for the blind in the southern, middle and northern zones of the country.

Challenges in preparing students for post JSS and Senior Secondary School.

- Computer illiteracy;
- Giving vocational training to profoundly deaf students who may not gain admission into secondary school;
- Inadequate Junior Secondary Schools, particularly the blind;
- Inadequate secondary schools and other higher educational institutions;
- Most children enrolled as apprentice-artisans drop-out after a brief starting period;
- Non-availability of interpreters at higher levels of education;
- Offering extra tuition demands extra funding;
- Other students are trained in vocations leading to the award of a certificate at the National Vocational Training Institute (NVTI);
- Poor parents cannot afford children's education;
- Students do not understand purely academic subjects such as Mathematics, Social Studies etc;
- Students gain admission at Secondary/Technical School at Mampong (e.g. Volta School for deaf, Unit School for the deaf, Koforidua);
- Unfavourable pupil-teacher ratio;
- Unsupportive parents.

(Survey of Headteachers and Deputy Head Teachers, Kumasi Workshop, May 2003)

4.8 Prioritising needs for various disability groups

Findings from the Ghana workshop held with local stakeholders in Ghana in June 2003 revealed key approaches to the integration of ICT within the SEN sector. Each disability group was considered and discussion groups met to examine the development of ICT taking into consideration cost effectiveness, sustainability and relevance. The table below illustrates the results from the discussions.

Disability Group	Cost effectiveness	Sustainability	Relevance
Visually Impaired	The Ministry of Education, Youth and Sports should produce Braille and Braille sheets locally Government should give company contacts that show interest in the production of Braille and Braille sheets The Special Education Division of the GES should produce TLMs with support and encouragement from government	Procure moulds (plastics) for writing frames to be produced locally so as to reduce cost Experts should be attached to institutions and trained to repair and maintain machines	Continuous supply and maintenance of computers Provision of software for students with low vision
Hearing impaired	Solicit funding from NGOs Interactive video tapes or CD ROM for teaching sign language at the University, TTCs etc. Telecommunication devices for the deaf Speech auditory tests at Assessment Centres Puppets and picture books for teaching sign language especially in the lower classes Other teaching and learning aids	Produce videos for Ghanaian Sign Language for teachers of the deaf and TTC	
Children with general learning disabilities.	Picture reading, sorting, matching flashcards, video ear phones, AT Big MAC, switch operated appliances, joys sticks, tracker balls, communication outputs	Maintenance Establishment of a Teacher Training College solely for Special Educational Needs	

Disability Group	Cost effectiveness	Sustainability	Relevance
Teachers	ICT Strategy and Assistive devices for TTCs and UEW --- produce software for UEW, TTCs, National Science Resource Centre and School for Social Work as well as assisting Institutions e.g. GSB, GNAD	Training personnel in ICT and SEN in Assistive Devices --- UEW to map out the existing capacity within the institutions in the use of low tech and also research into needs of schools and low tech materials Creating awareness on the use of low tech materials – UEW to collaborate with TTCs to produce standardised low tech materials to enhance inclusion Equipping and training Assessment Centres and UEW with medium and high tech materials	

The main challenge facing the training of children with hearing impairments is the lack of resources available for them to learn. Textbooks are supplied to schools for the deaf and these are given to students in limited numbers. There is an under-resourcing of media based resources whereby students can learn in a more visual form. The students at the Secondary/Technical School watch non-captioned videos whenever they can. They do not have access to videos with sub-titles, which are now widely available for Teaching English as a Foreign Language (TEFL) and produced by a handful of video production companies.

5.0. How can the Special Education Division best use ICT to support its ongoing programmes?

The Special Education Division plays a pivotal role in initiating the integration of ICT into schools for students with SEN. It has a firm commitment to encouraging change through forging partnerships and the organisation of regular interaction with key policy makers at the GES and MOE. It is also striving to build capacity for new assessment centres and the better resourcing of existing schools; this can only be accomplished through creating a positive strategic vision. The Special Education Division is also a victim of the poor provision and resourcing within the GES. It is unable to build capacity and lead the way as a result of a number of factors: inadequate building for offices, lack of communication facilities, no Internet access, no materials or books on special education and general poor communication channels between District Directors and within the Division itself.

These challenges do not create a conducive environment for the integration of ICT into school and ongoing teacher education programmes. The Division's staff are unable to advise schools on assistive technology applications and the suitability of such products for a specific disability. There is a tremendous need for the Division's staff to become aware of the strengths of AT and to look at ways of building ICT into its own strategy. In a Strategic Plan, drafted in collaboration with VSO in September 2002, the SpED lists a number of low to medium technology that it requires for the Division as well as for special schools including radios, television sets and audio-visual cassettes and videos. In order for the Division to meet its strategic vision by the end of 2007, it will have to make radical changes to the attitudes within GES and the budgeting of the Division's schools.

5.1   Examples of "Good Practice" in Ghana

Ghana has pockets of existing good practice where ICT is being used in special schools, particularly within the Non-Government sector. These examples are unfortunately few and far between. However they show signs that there is growing awareness and support for sustainable long-term projects based on commitment to providing funding, appropriate trained staff, infrastructure to expand and positive media coverage. Most of the examples witnessed during visits in 2003 are the result of pioneering individuals who have a strong commitment to Special Education in Ghana and wish to build on the existing capacity to include persons with disabilities so that they gain their rightful place in basic education and training.

One key example is the Computer Learning Centre, which provides basic computer skills training for the Ghana Society for the Blind (GSB). The management team has been resourceful and daring in its mission to train individuals who have an interest in ICT or need it for their work or studies. The box below details the pioneering work of this NGO.

Ghana Society for the Blind (GSB)

One exciting example of "innovative practice" is the computer-training programme that has been set up by a small team of visually impaired staff at the Ghana Society for the Blind (GSB). It has a mission to ensure that adaptive technology will be provided to the blind and visually impaired. It sees the potential growth that this technology can have on producing books and other educational material that could be Brailed or put onto tape. It acquired screen reading software for its Computer Learning Centre so that it can provide training to small groups of vision impaired and blind persons in computer literacy skills.

The GSB has a primary goal to train vision-impaired persons to become proficient enough in order to help them participate in educational and employment opportunities offered to their sighted peers. The GSB has managed to set up a series of training courses with the strong support of Jean Wright, a visually impaired instructor, who holds a Masters degree in the Rehabilitation of the Adult Blind. She has created a five-week course with the purpose of providing the students with a good knowledge of a Windows Operating System, a screen reading software (JAWS) and word processing skills using Microsoft Word.

There are plans to expand the capacity of the training centre, which currently comprises one room and to purchase additional PCs so that there can be two parallel sessions thus increasing the number of participants in each training session. There is a high demand from visually impaired teachers for this resource centre since hardly any teachers have any computer knowledge or access to a PC but recognise the importance of this technology in opening up their world.

The School for the Blind in Akropong has expressed a strong interest in sending 4 teachers to the Computer Training Centre to follow an intensive training programme during one of the longer holiday periods. There are no computers in this school for teachers to learn even rudimentary skills. It is therefore vital that any training is supported by the purchase and installation of PCs into the school along with the required screen reader software being installed onto all the PCs.

The funding of the training programme must be increased seriously considering more and more teachers both visually impaired and sighted teaching visually impaired students show a willingness to be trained in ICT. Part of the GSB's role is to build awareness into the community through sensitivity training, demonstrations and meetings with educational institutions, government departments and private enterprise. This is an essential role that requires expertise and strong inter-personal skills. The team at the GSB (James Sambian, Peter Obeng-Asamoa, Peter Korley and Jean Wright) demonstrate an eagerness to share their experiences/ knowledge, providing an excellent promotional team for Ghana. They are the first of its kind in Western Africa and have plans to become a principal distribution centre of equipment and adaptive technology for vision impairments and training in West Africa.

Other Programmes showing great potential are the British Council School Link programme which links schools in the UK with schools in Ghana. A few of the special schools in Ghana have been linked to UK

schools through this programme. The programme demonstrates the potential for assisting not only children but teachers learning more about how things work outside their own contexts. The New Horizon School in Accra is an example of how a special school has linked to a school in the UK. They have set up a small computer lab for children with mild, medium and severe learning disabilities and are seeing the benefits that daily exposure to ICT has in aiding students to learn and communicate more effectively.

A young Ghanaian woman who has a personal interest in the field of visual impairments has been innovative and brought together a group of people who wish to develop the tradition of African literature to those who are "print disabled". The box below summarises a new project that is currently being set up between Ghanaian and international partner organisations.

Enabling Technology Audio Partners – (eTAP)

One innovative activity that has captured the imagination of two NGOs in Ghana is the "Enabling Technology Audio Partners (eTAP) Ghana. The GSB and eTAP Ghana have developed a strategic alliance with African broadcasting corporations and key African publishing and media organisations to enable vision impaired people in Africa to access information independently using media communication technology. The main objectives of the project are to create a wide variety of high calibre audio books and digital audio products and provide a national web-based access via the Internet, in community telecentres, to books and audio programming in digital formats designed for people with vision impairments.

eTAP services could enable more Africans to benefit from the information revolution by providing leadership and relevant content. The production of African audiobooks would be an invaluable resource for both teachers and students, and provide a medium for the vision impaired to share their own experiences and build a community of learners both on a regional and sub-regional basis.

The Material Resource Centre (GSB, Accra)

The Material and Resource Centre is the only supplier of Braille paper and devices for those with vision impairments in Ghana (e.g. Braille watches, Braille writing frames, tactile games in wood and Perkins Braille Writers). It is increasingly difficult to order materials and devices from international catalogue companies because of the soaring prices in Europe and the USA. Few customers are able to afford most of the devices stocked in the show room, thus reducing the turnover for new stock. The Centre has the capacity to expand and is ideally located in the centre of Accra on a ground floor building. It is striving to become self-financing in spite of poor sales to date.

One example of a low cost resource that is very popular with families is the board game – *Ludo*. Visually impaired children can play with the tactile counters and enjoy the experience of being included in a family centre activity. Dominos are also a very useful teaching and recreational aid for the vision impaired. A recent link has been established between the Material and Resources Centre and a private entrepreneur to build Ludo boards with recycled plastic and sawdust. This project could be extended to other tactile aids including dominos

5.2 Recommendations for ICT and Special Education:

Consultation with special school heads and deputy heads revealed that there are many avenues and strategies, which can be taken to improve the use of assistive technology in the Ghanaian school system. Most of these strategies require a focus on the root problems, which many of these schools face and at the same time ensuring that the human resources are motivated and trained in using new technologies. Most of the solutions are related to the improvement of the teaching and learning environment. Suggestions made by the Special Needs Institutions are widely related to the improvement in their infrastructure base, the provision of Information and Communication Technology (ICT) and Teaching and Learning Materials. The solutions also require a level of teacher competency in the usage and maintenance of ICT (Annex 2 identifies key recommendations which address some of these endemic issues).

Special schools participating in the survey identified possible sources of financing related to the use of ICT. These include donations from parents, District Assemblies, Non-Governmental Organisations and the Government. Some of them specifically request the Ghana Education Service to ensure prompt and adequate supply of TLMs. The institutions indicated that teachers should be involved in the formulation and implementation of education policies in order to address challenges in such schools properly.

What could change the situation and improve conditions to address the challenges of Special Educational Needs in Ghana?

- Donations from parents, District Assemblies, Non-Governmental Organisations and Government'
- The Ghana Education Service (GES) should be involved in the supply of TLMs,
- Prospective teachers could be trained in vocational skills to teach at Junior and Senior Secondary Schools or prospective vocational skills teachers should be recruited,
- Proper infrastructure and adequate teaching and learning aids should be developed;
- The introduction of teachers to modern teaching techniques'
- The printing textbooks and production of other materials locally;
- Prompt supply of materials,
- Provision of ICT in schools,
- Storage facilities for Teaching and Learning Materials
- Education policy makers should collect and collate views from teachers so as to address challenges accordingly,
- Teachers should learn to exploit Teaching and Learning Materials,
- The provision of water tanker,
- Parental education on the need to support children,
- Specialist teachers for the blind,
- Resource personnel (e.g. Art students) to help produce materials.

1)   Public Awareness Campaign

Both the workshops in Ghana and the UK revealed the need for a much greater force in developing public awareness and media tools, which can reduce the stigma of disability and open up society to integrating children and adults as valued members of the society. The VSO and SpED video "Protect Yourself", which teaches the general public about HIV/AIDS, is an excellent example of how such a public awareness campaign can be developed. Using children and teenagers with disabilities to teach the public about issues facing the entire population can break stigmas and pre-conceptions about abilities and disabilities.

Ghana National Association of the Deaf partnering with Ghana TV.

The GNAD have just managed to get a commitment from Ghana Television to start signing the news for the deaf. They also agreed to promote "International Week for the Deaf" in September 2003 as part of their commitment to this often media excluded group. There are also plans to introduce GSL into kids programmes in the afternoons. The GNAD will be expected to play a major role in the successful implementation of these proposals and ensure that the GTV directors and producers acknowledge the importance of television in increasing public awareness and bringing essential information and news to the deaf community. The very successful HIV and Aids awareness video "Protect Yourself" produced by and for deaf people in Ghana is a good example of North South collaboration. The production is the result of an international collaboration between the Deaf students from Mampong School for the deaf and Remark!, a Deaf Film Production Company from London, UK. It has been broadcast on GTV and has been heralded by the Ghanaian public as an excellent contribution to sex education for all, not only the deaf.

There is a general consensus, resulting from detailed interviews with the Special Education Division, GNAD and Head teachers working with the hearing impaired that two instruction videos in Ghanaian Sign Language would increase the spread of this widely used language. The first video should teach the grammar, the hand forms, the facial expressions and location of the hands. The second video will instruct the teacher on how GSL can be taught in schools for the deaf and in the mainstream. This video could also give practical advice to class and resource teachers on how to facilitate children with hearing impairments into the mainstream. Lastly, the video could show some samples of hand songs, and games that can be used in classrooms.

2) Teacher Education – Pre-teacher and In-Service

The Ghana Education Service has set up 110 Resource Centres, one in every district in Ghana to serve as satellite schools as well as a National Computer and Science Resource Centre located at Cantonments, Accra. The principal aims of the centres are to run in-service training programmes for teachers of science at Junior and Senior Secondary Schools and Technical Institutions. They will also serve students to engage in the development of science and technology projects.

The Accra Based Resource Centre has just been equipped with 50 Pentium 4 PCs with CD ROM and 17" monitors donated by the Japanese Incorporation Society. The main teaching lab will hold all of these PCs, which will be linked to the Internet via Broadband (fast line Internet access). They plan to start teaching courses at the beginning of September 2003 when 3 trainers will initially introduce Microsoft Office skills using "Professor Teaches"[1]. These teacher resource centres should be provided with software and technical advice in order to assist teachers or students with disabilities. Teacher Resource centres should also be made totally accessible to teachers with disabilities by providing specially adapted benches for wheelchairs, screen reader software and peripheral devices (e.g. joystick, tracker ball, etc.).

Another recommendation would be for a "loop system" to be installed into the teaching lab so that teachers and students with hearing impairments can participate. The "loop" is a wire that picks up sound from a microphone and transmits it to an earpiece, or hearing aid, within a loop. (See Phase One Report at http://imfundo.digitalbrain.com/imfundo/web/papers/sen/). The

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[1] "Professor Teaches" is a Microsoft Teaching package which takes the student through a step-by-step instruction on how to use Office e.g. Word, Excel, Power point.

centre will also house "Schoolnet" and create a "Centre of Excellence" for students to become more informed on state of the art software programmes for architectural drawing and device conception.

The National Computer and Science Resource Centre should be provided with the necessary equipment to enable persons with disabilities to access the training programmes provided by the Centre. The Resource Centre co-ordinators should seek advice from the Ghana Society for the Blind (GSB) and the Ghana National Association of the Deaf (GNAD) when planning to purchase any assistive technology devices for students.

3)   Inclusive Education Programmes

The first step of ensuring that students with sensory impairments are successfully integrated into a mainstream system is to set up adequate sensitisation activities through key media agencies and NGOs working in the field of disability (e.g. VSO, ADD, etc.). Collaboration with the Department of Social Welfare and the CBR is essential coupled with a major campaign to demystify the stigma attached to the pejorative labels as well as the magical or religious models of disability placed upon individuals.

The Special Education Division with the help of key NGOs (e.g. VSO, Peace Corp) need to target the training of teachers in mainstream schools with the necessary ICT skills that will enhance their teaching ability to work with students with mild/moderate learning disability or sensory impairment. British and Irish educational and technical agencies (e.g. Becta in the UK and the NCTE in Ireland) have carried out research into the inclusion of students with learning and sensory impairments and provide training and guidance on what assistive piece of technology can be used with a specific learning difficulty. The SpED should seek advice from key agencies in the field of training and the provision of technical services in the UK (e.g. Becta, abilitynet, Inclusive Technology, Semerc, The DARE Foundation, etc.).

The Special Education Division has already requested the aid of one of the UK's leading special educational needs software producer, Semerc to choose and supply both hardware and software for its schools. There is a danger that this equipment will easily become lost if it is not carefully logged and distributed to schools where it will be used with students who need to access the curriculum. Annex 6 in the Phase One Report, "A Review of Good Practice in ICT and Special Educational Needs in Africa," provides some information on how to set up a resource   room   and   library   checking   system   (See http://imfundo.digitalbrain.com/imfundo/web/papers/sen/).

There are ways of negotiating reduced prices for essential software for the blind and visually impaired which can be undertaken by NGOs in Ghana. The Material Resource Centre through the assistance of Sight Savers International, are able to obtain copies of screen-reading software through reputable suppliers. The Special Education Division needs to be in the position to act as a mediator between the school that needs the technology and the supplier. SpED should be in a position to bulk purchase essential electronic equipment (e.g. tape recorders) and supply all the special schools under its supervision. There should also be a minimum delay in getting the equipment to the school so that installation and training can take place as soon as possible. Long delays in assessment of individuals need and the supply of correct pieces of hardware or software can make the inclusive process for both the student and teacher more difficult.

4)   National Assessment Centres

Ghana's National Assessment Centres are in need of urgent attention as they are unable to meet the needs of individuals with physical disabilities due to lack of ramps to the building and appropriate acoustics to carry out hearing tests. The absence of any ICT in the form of PCs renders them incapable of keeping adequate files on individuals who have been assessed. The 9 assessment centres are only located in 4 of the 10 regions and are poorly resourced and in need of replenishing with assessment tools that are not culturally biased and are completely reliable and valid.

To help reduce major transportation difficulties for parents and children attending assessment centres, the introduction of mobile assessment clinics could increase the rate of assessment for children in districts that are receiving hardly any coverage. These mobile clinics would be suitably equipped with the correct testing materials and equipment to carry out first and second assessments.

Multi-Disciplinary Teams (MDT) (e.g. paediatricians, child psychologists, speech and language therapists, occupational therapists, etc.) often collaborate closely when building assessment kits. These can contain low-tech materials such as puzzles, soft balls, dolls, and children's cutlery. Instruction manuals and checklists are either provided by the Assessment Test Publisher and can be photocopied for professional use. Many of these materials are perishable and can become ineffective when damaged especially when assessing young children. Local supplies of wooden puzzles, toys and other test materials should replace old and out-of-date products in assessment centres. It is vital that all screening and assessment materials are kept in excellent condition and be used for these purposes solely. The creation of local tools (e.g. wooden puzzles and

shapes) would also reduce dependence on imported tools which tend to cause problems for children because of significant differences in culture.

5)   Special Schools

This study has revealed that special schools should attempt to reach out to the private sector to provide basic computer equipments in some of the schools particular those with interest and access to electricity. This can only be done if SpEd provides a set of guidelines for all special schools on how to source basic computer equipment and resources from each special school's community.

Communication centres already available in the localities should also be seen as a potential resource for the special schools as they build their capacity to introduce ICT. One example of this is presented in the box below.

Providing "Screen Reader" Software at Internet Cafes

The GSB has contacted the biggest and most successful Internet Café in West Africa to install JAWS version 4.5 on at least three of its PCs. Visually impaired users are unable to use the PCs in any of the Internet Cafes in Ghana. This is very frustrating for those who have training in screen reader software.

GSB and Busy Internet are investigating a joint venture where morning classes can be provided for vision impaired in how to use the Internet with a screen reader. Experienced blind trainers would provide training from the GSB. The management of Busy Internet have noticed an increase number of deaf users attending Busy Internet and are becoming conscious of the need to be as welcoming as possible to people with disabilities.

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6)   Transition to the World of Work

There is a tremendous need for special schools to link with existing well equipped vocational and technical schools in order to ensure that the disabled have more access to well equipped centres. There are already several under utilised vocational training centres across the country which could integrate children with SEN provided the training and support are managed by the Special Education Division. Basic computer skill training (e.g. International Computer Driving Licence) could be an integral part of these training programmes and assist with the integration and increase of computer assisted training centres based on the same model as the one initiated by the Ghana Society for the Blind.

6.0 A Way Forward

There are numerous ways in which the Special Education Division can move ahead in building partnerships with UK or Ghana based partner organisations. One of the main areas for collaboration appears to be in the building of training and awareness. The Imfundo workshop held in the UK in September yielded strategic linkages with like-minded agencies able and willing to support initiatives in Ghana in the area of special needs provision.   The following box outlines some of the main pilot initiatives, which could begin immediately:

Possible Pilot Activities

- Public Information and Media Collaboration – TV programmes for the deaf and radio programmes for the blind (see GTV for the deaf and Unique FM for the blind),

- Hearing Impaired – Ghanaian Sign Language videos 1) the importance of teaching sign language and 2) how to teach sign language,

- Vision Impaired – More computers with screen readers and trainers with vision impairments for post JSS and books in Braille for schools,

- Teacher Education – insert modules on SEN and ICT onto ODL course exposure through the Distance Teacher Education programme,

- An introductory 20-hour course in using ICT with students with SEN, from the National Centre for Technology in Education.

There is a critical need to build a strong network and resource base in Ghana for the promotion of Assistive Technology. This could begin by supporting existing institutions such as the Materials Resource Centre, which is the main supplier of key ICT materials for the hearing and visually impaired.

The Imfundo Workshop on ICT and Special Educational Needs held in Accra in July 2003 with particular reference to Ghana, highlighted three main areas for future work towards:

➢ Building Private Public Partnerships,
➢ Supporting programmes for teacher education, inclusion and special schools,
➢ Considering issues of cost effectiveness and sustainability.

The details of the workshop findings are contained in Annex 3.0. Some of the ways that ICT could be introduced using various partnerships were explored including private partnerships, non-governmental initiatives, joint government/private sector support, and school-to-school initiatives. One of the suggestions was the need to build private partnerships between Time and Granada Learning in the

UK, and EPP Books in Ghana in order to support the production of digital books, software and other assistive technology for PCs.

Non-governmental initiatives, such as the work of Sight Savers International and Computer Aid international in the Caribbean where a system of computer accessibility for the blind has been developed, should be developed in parts of Ghana and Africa. This programme involves the low cost shipping of reconditioned computers supplied through Computer Aid International and Geest Line and J.P. Shipping to the Caribbean Council for the Blind.

Other promising areas include the consideration of appropriate and feasible ICT solutions given the context of Ghanaian Special Schools. Here again participants suggested that model school approaches be used to introduce software applications such as Clicker (Crick, a software producer in the UK) and screen readers (e.g. Supernova and JAWS). Other suggestions include:

- Email and linkages to existing communication centres as an alternative to developing in-house computer labs;
- TV and videos with sub-titles should be used more often in special schools
- CD ROMs as an alternative to Internet;
- Using existing media channels e.g. TV stations and radio.

Cost effectiveness and sustainability issues were considered in all the programmes developed by the Special Education Division. These should take into account the following:

i. Equipping special schools with sufficient low to medium technology;
ii. Networking with NGOs in order to build a sustainable model, similar to Sight Savers International's approach which involves the identification of good quality recycling/reusable PC's, and ensuring quality checks;
iii. Using existing software which is well tested;
iv. Building partnerships with special schools and technical colleges for maintenance of ICT equipment.

6.1   Conclusion

Integrating ICT into ongoing policy programmes and the work of the Special Education Division will require primarily a greater awareness surrounding the needs and potentials of the disabled in Ghana. It will also require that Special Education Division begin building stronger linkages with the private and non-governmental sector both within and outside Ghana.

Assistive technology in the form of low cost technology should be developed in Ghana by firms in the country. Building capacity of existing resource centres will be key to this process as well as encouraging entrepreneurs to become involved. The training and introduction to the fundamentals of assistive technology and how it can be implemented in the special needs sector is particularly important at the University and teacher training college levels. The distance education programme for teachers is an excellent vehicle for this process to begin.

The overall message coming from key stakeholders in schools, Teacher Training Colleges, NGOs and Government departments is the need to work towards a common goal of meeting the needs of individuals with disabilities. Nearly all agencies and schools visited showed some understanding of how technology can change the way teaching and learning take place in the classroom. Many head teachers, deputy head teachers and teachers interviewed during the consultants fieldtrips are aware of the potential benefits ICT has on their performance. However, they feel powerless against the daily struggle of working within a system that is so poorly resourced in Teaching and Learning Materials.

The Special Education Division, under the strong leadership of its Director, is beginning to empower teachers and students by bridging and strengthening links between NGOs dedicated to the dissemination of ICT and training skills in Ghana. The outcomes from the two workshops held in Accra and London testify to the level of commitment that agencies have in the development, education and advocacy of individuals with disabilities. It is now time for these agencies to become more involved and lend their support either through training, software development, media coverage or fundraising campaigns.

The consultants are pleased to see the fruit of partnerships beginning to take shape between the Special Education Division and NGOs as a result of the workshops and Imfundo's (DFID) commitment to meet this objective. To ensure that this momentum is sustained, the Ghana Education Service must be prepared to accept responsibility in the process by incorporating the Special Education Division's core objectives within the Education Sector Plan. The SpED has a firm commitment to integrating ICT in all its programmes in special needs delivery in the country. We have made a set of key recommendations for SEN in Ghana (based on the Education Sector Review) included in Annex 2. The eight sections map out the key areas that should be addressed over the next twelve years if the GES is to meet some of its aims.

The Government of Ghana places a strong emphasis on the role of ICT in contributing towards the country's economy. The Government has a duty to listen to the needs of its own Divisions and its people. If it is going to try to achieve some progress in meeting its "Vision 2020 and Persons With Disabilities" (National Disability Policy Document, 2000), of "integrating persons with disabilities in the mainstream of social and economic life of the communities," then it will have to take heed to the recommendations put forward from NGOs representing persons with disabilities.

Finally, Assistive Technology should not be seen as a quick fit answer to the inclusion of children and adults into mainstream settings. As the report points out, its measured use with sound policy and firm recommendations can change the world of a person with a disability from one of disenfranchisement and marginalisation to one of empowerment and participation. Assistive Technology can play a major part in achieving core objectives in the Special Education Division provided it has the full support from the Government of Ghana. Ghana's Poverty Reduction Strategy commits resources to achieving these aims and should be used as a first step to resourcing these proposals.

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Annexes

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ICT Based Solutions for Special Educational Needs in Ghana

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Annex 2: Key Recommendations for SEN in Ghana (based on the Education Sector Review)

Key Recommendations and The Way Forward

The Special Education Division has requested assistance for the development of a strategic plan, which will provide donors and MOE with the key priorities for input.

1.   Increasing the thrust for inclusive education

The Special Education Division should focus its efforts on implementing inclusive education programmes. The Division should be provided with adequate financial support to ensure inclusive education programmes are implemented. At least 2-4% of the budget should be allocated to children with SEN. One region of the country should be identified for an intensive programme for an inclusive education each year for the next 10 years. This would include the selection of 5-10 schools per district for inclusive education using itinerant teachers based at these schools. This would require:

> ➢ Teacher Training Colleges in all the regions mainstreaming the UNESCO Special Education Training Packs in order to prepare and familiarise all teachers before posting them to schools.
> ➢ Special In-Service programmes using the UNESCO pack to upgrade teachers at the cluster level using the Whole School Development programme In Service model.
> ➢ Each district education office in the selected region should draw up district plans for inclusive education with assistance from the Special Education Division. These plans would identify (5-10 selected schools) where mainstreaming would be concentrated and ensure that itinerant teachers are posted.
> ➢ UEW graduates from the Department for Special Education should be bonded for a five-year period following the degree programme.
> ➢ A large number of UEW graduates in special education should be posted as itinerant teachers to the region where mainstreaming is intensively being focussed.
> ➢ UEW and selected TTCs need to develop programmes for the training of interpreters to support deaf students after basic education.
> ➢ UEW needs to develop a programme to train speech and language therapists to assist students with hearing impairments and speech disorders in the mainstream.

2.   Assessment and Equipment

Priority must be given to the establishment of at least 4 fully equipped and staffed assessment centres outside of Accra, and Kumasi. These assessment centres should be placed in all the regions where there are currently no assessment centres. This would ensure that children and adults with SEN are properly assessed before admission to programmes or institutions, which the MOE or the Ministry of Manpower Development and Employment are running. The assessment centres require the expertise and equipment for testing hearing, sight and learning disabilities.

A national statement and policy directive should be issued directing all institutions to begin using "Ghanaian Sign Language" as the medium of instruction for severely hearing impaired or deaf children.

High priority must be given to repairing, maintenance and purchase of equipment for special needs schools. Funding to support the purchasing of the Braille press and potential purchase of a standby machine must be forthcoming in order to ensure that visually impaired children are not deprived of the vital books they need for study.

3.   Increasing access of children with SEN to education

➤ Inclusive programmes should be supported by the MOE in all the districts in the country. Approaches to inclusive education developed for low vision children in the Eastern region of the country should be used. This model involves itinerant teachers being posted to school clusters or special units attached to some schools where ongoing assessment and monitoring can take place. Children with mild to moderate disabilities should be mainstreamed in these districts and UEW graduates in special education should be posted to support this process.

➤ Children with low vision, mild to moderate hearing impairments and mild learning difficulties should not be admitted to special schools when there is an inclusive education programme running in the district. Special schools and institutions should be restricted to children diagnosed as having a Profound/Multiple Learning Disabilities.

➤ There is also a need to establish more integrated secondary and vocational institutions, which can provide programmes for children with SEN. This is particularly important for children with hearing impairments who have been unable to enter higher levels of education due to limited communication skills.

4. Curriculum

The Curriculum Research and Development Division (CRDD) should explore ways of incorporating issues of special needs into the mainstream curriculum so that all children in the country come to appreciate the contribution children with disabilities make to society. Just as gender and the issues of girls' education have been mainstreamed across the curriculum, there must be an all out curriculum review to introduce stories and examples of how children can accept and help one another. This will help in the implementation of the inclusive education policy.

5. Teacher education

By subscribing to online special educational supplements and journals (e.g. British Journal of Learning Support, British Journal of Special Education and Closing the Gap, USA) Teacher Training Colleges will gain more in-depth knowledge of international practices in the field of inclusion. All teachers in the country should be trained in the UNESCO pack, which provides basic approaches to helping children with SEN. A more comprehensive module in special education should be developed for Teacher Training Colleges.

Teachers enrolled in the special education programme at UEW should commit to teaching a minimum of five years in basic schools or at district level as itinerant teachers once they graduate from the UEW. The MOE should ensure that these teachers are bonded.

6. Public awareness

A great deal of public awareness is needed to change the negative attitudes towards children with SEN. Financial support should be allocated to NGO's and media practitioners to develop radio and television programmes (e.g. A day in the life of a blind lawyer or teacher), which promote positive attitudes towards children and adults with disabilities. This will help with the integration of children with SEN into society once they complete schooling.

7. Entering the world of work and higher education

> ➤ More community rehabilitation centres and vocational workshops for youths with SEN should be attached to existing vocational/technical institutions. At least five such workshops should be developed across the country in collaboration with NVTI.

➢ There is also a need to provide special scholarships for students with special educational needs who are able to enter higher educational institutions.

➢ More research should be conducted to assess the degree of disability, scope of the problem particularly among children and youth, the best approaches to implementing inclusive education in Ghana and other issues identified by UEW and SpED.

8. Financing and Capacity building;

A larger proportion of the national education budget should be dedicated to the Special Education Division in order to implement inclusive education strategies, which require more resources in the form of teaching equipment, learning materials and In-Service training for teachers at the basic level. The Special Education Division should be better resourced to ensure that basic equipment and Assistive Technology are provided for children with specific motor, sensory or learning requirements to promote effective teaching and learning.

Conclusion

Considerable work is needed at the basic education level to ensure that the majority of children with SEN receive basic education in order to become fully productive and integrated citizens. The ESR team found that there is limited access for children with SEN through the special schools since they are often urban based. Estimates from the Ministry of Manpower Development and Employment suggest that less than 2% of children with SEN and/or a disability are serviced through special schools. One problem, is the low numbers of female students enrolled at all levels of the special school system.   Average participation rates reveal that girls remain under represented as they make up only 30% of special school intake.

The schools that do exist are able to assist a few children but there is a critical problem with the teaching children with hearing impairments. Teaching and learning has not been effective for the majority of hearing impaired children since appropriate communication models have not been adequately implemented. Ghanaian Sign Language has only recently been introduced and should be developed through a concerted effort by teachers, families and the wider community. Teachers are only beginning to adopt this approach into their teaching practices and its use should be intensified in schools to enhance the level of understanding for most children with hearing impairments. The main problem for the visually impaired has been the inability to access materials in Braille at all levels in the system. Blind children continue to simply listen to their teachers. Despite these setbacks children who are visually impaired have achieved remarkable scores on

their Basic Education Certificate Examination and many gain admittance to the SSS level and a few move onto University.

One cost effective approach in reaching larger numbers of children with SEN will be the implementation of a systematic programme for inclusive education. This will involve preparing all trainee teachers in simple approaches to identify, support and assist children with special educational needs in mainstream schools. The Salamanca Declaration signed by Ghana in 1994 states "the practice of mainstreaming children with disabilities should be an integral part *of all national plans for achieving Education for All (EFA).* Even in those exceptional cases where children are placed in special schools, their educational need not be entirely segregated." We have a long way to go in helping children with SEN in Ghana feel like valued citizens. The challenge is for the MOE to ensure that the needs of all children be seen as an urgent priority. The MOE's policy thrust towards inclusive education is clear; the main challenge is for the MOE's strategic planning process to develop cost effective plans, which can be easily implemented within the current context of Ghanaian education[1]

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[1] This has started through the establishment of a Special Education Task Force set up to review the ESR recommendations and help the Special Education Division plan implementation programmes.

Annex 3: Education for Three Identified Groups and Teacher Education

Education of Visually Impaired

Level of technology	Strength(s)	Weakness(es)
Low tech e.g. Writing frames, tactile maps, musical instruments	Instruments for sound training (multi-sensory training at pre-school level) Students studying special education courses at University of Education, Winneba (UCEW) are encouraged to produce multi-sensory devices, most of which are produced from local materials e.g. texture boards, jigsaw puzzles, reading stands, educational toys and games, etc. UEW has a material library	Difficulty in obtaining moulds for locally manufactured stylus and hand frames Over-dependence on imported materials High cost of imported Braille sheets Lack of motivation for teachers to produce requisite materials Schools have low capacity to produce materials
Medium tech	Electronic devices used from the SSS level to University level Most SSS students use Braille through to the University level Thermoform machines are used in duplicating exercises and textbooks	High purchasing and maintenance costs Use of outmoded machines
High tech	Existence of a Computer Learning Centre at the Ghana Society for the Blind UEW ready to set aside 4 computers with voice synthesisers for use by the visually impaired	Computer illiteracy among visually impaired Non-availability of computers. Computers not affordable

Education of the Hearing Impaired

Level of technology	Strength(s)	Weakness(es)
Low Tech e.g. cut-out pictures, alphabets of the sign language, other objects	Ordinary classroom teachers produce these easily Materials are readily available Children are familiar with materials Easily moveable	Takes long time to prepare Susceptible to breakdown overtime -- not durable No standardisations Some teachers lack sign language skills No guidelines for preparing apparatuses Teachers make little use of sign language Few interpreters
Medium Tech e.g. hearing aids (including loop system), speech trainers, computers,	Standardised Reliable Children with residual hearing can access information Users find it more comfortable Gives users independence Easier to manipulate	Expensive Frequent modification Computers received from donors are Outmoded High cost of maintenance Noisy environments Some batteries types are not readily available

		Not readily available
	Highly standardised	Sometimes unreliable
	Versatile	Requires specialists handling
High tech	Easy access to information	Antiquated notations
e.g. audiometers/ diagnostic impedance sound analysers, vibrators,	More job opportunities	Fast changing pace of technology
	Boost of confidence and morale	High cost of maintenance
	Make communication easier	Frequent hydro-electrical power outages, in the face of no alternate sources of power renders them useless

Education of the persons with general learning disabilities

Level of technology	Strength(s)	Weakness(es)
Low Tech

e.g. Soft balls, drum sticks, batik making designs | There is proven evidence that intellectually challenged children can use ICT as learning tools | Existing materials are under-utilised

Unfavourable public perception of children with learning disabilities |
| Medium Tech

e.g. Sewing Machines, Ovens, Gas Stoves, Alternative and Augmentative Communication (AAC) | | Poor parental support |

		ICT materials are not readily available
High tech e.g. Switch operated software		Non availability of teacher-trainees High maintenance cost

Teacher education

Level of technology	Strength	Weakness(es)
Low Tech Chalk and black board Print materials, textbooks, rattle, styluses and frames	Capacity to produce materials locally	Little or no funding Limited market
Medium Tech Overhead projectors, public address systems, audio meter, speech trainers, sign language	Equipment is standardised	Non-availability of funds
High Tech Screen reader softwares, Internet	Favourable policy environment	Few people with technical know-how Expensive

Annex 4: Statistics on Public Special Schools in Ghana

Ser. No.	Name of school	Region	Number of students			Type of School					Type of Students		
			Total	M	F	Prim.	JSS	SSS	Voc.	Other	Deaf	Blind	Ment. Hndc.
	Cape Coast School for the Deaf	**Central**	**285**	**158**	**127**	X	X				X	X	
	Sec./Tech. School for the Deaf	**Eastern**	**134**	**78**	**56**			X			X		
	Wa School for the Deaf	**Upper West**	**180**	**101**	**79**	X	X		X		X		
	Savelugu School for the Deaf	**Northern**	**218**	**150**	**68**	X	X				X		X
	Unit School for the Deaf, Kibi	**Eastern**	**160**	**95**	**65**	X	X				X		
	Demonstration School for the Deaf	**Eastern**	**240**	**140**	**100**	X	X				X		
	Wa School for the Blind	**Upper West**	**175**	**114**	**61**	X	X					X	
	State School for the Deaf	**Greater Accra**	**228**	**142**	**86**	X	X				X		
	Volta School for the Deaf	**Volta**	**169**	**105**	**64**	X	X				X		
	Akropong School for the Blind	**Eastern**	**286**	**200**	**86**	X	X					X	
	Unit School for the Deaf, Koforidua	**Eastern**	**150**	**100**	**50**	X	X				X		
	Bechem School for the Deaf	**Brong Ahafo**	**313**	**183**	**130**	X	X		X		X	X	
	Volta School for the Deaf, Ment. Handc. Unit	**Volta**	**35**	**23**	**12**	X							X
	Twincity Special School for the Ment. Handc.	**Western**	**110**	**60**	**50**					X			X
	Dzorwulu Special School for the Ment. Handc.	**Greater Accra**	**125**	**70**	**55**					X			X
	Sekondi School for the Deaf	**Western**	**240**	**147**	**93**	X	X				X		
	Garden City Special School for the Ment. Handc.	**Ashanti**	**150**	**95**	**55**	X							X
	Ashanti School for the Deaf	**Ashanti**	**289**	**150**	**139**	X	X		X		X		
	Gbeogo School for the Deaf	**Upper East**	**124**	**80**	**44**	X	X				X		
	Three Kings Special School	**Volta**	**87**	**57**	**30**					X			X
	Shalom Special School	**Brong Ahafo**	**77**	**53**	**24**					X			X
Total			3,775	2,301	1,474	16	14	1	3	4	13	4	7

Key: M – Male; F – Female; Prim – Primary; JSS – Junior Secondary School; SSS – Senior Secondary School; Voc – Vocational; Sec/Tec – Secondary/Technical