Note for CABE Meeting March 18 2011 - Why ICTs in education programs fail or succeed and implications for policy – Gurumurthy K. IT for Change, Bangalore

1. ICTs in the business sector (where ICTs were first used)
    1. First generation computer applications in business sector related to simple areas like payroll and financial accounting, they were driven by the CIOs, due to low awareness amongst managers.
    2. Second generation applications pertained to the core business areas – production, supply chain management including inventory management, computer aided design and manufacturing etc, they were driven by line managers.
    3. First generation projects were of limited value, while second generation created substantial business benefits – lower costs of operations, higher quality of products and services, scalability etc. MRP, ERP were second generation applications that have transformed the business world

2. First generation ICT programs in school system
    1. *Curriculum* pertains to basic computer literacy (Windows and MS Office)
    2. Program is *transacted* by computer teachers – who are trained in computer science and not in regular school subjects.
    3. Teachers do not feel ownership over program and hence are not committed, nor is their capabilities to use ICTs in their regular transactions built, and hence the novelty of ICTs wears off, and has caused widespread failures (hardware musuems and graveyards) due to the disconnect between the program and the school.

3. Second generation ICT programs in school system
    1. Curriculum pertains to regular school subjects and issues of education (Kerala, Bangalore)
    2. Curriculum is transacted by regular teachers (Kerala, Bangalore)
    3. Teachers use digital tools to create learning resources (Kerala, Bangalore)
    4. Use of a large variety of public digital tools/resources helps move from a 'scarce/minimalist proprietary digital environment' to a 'rich/diverse public digital environment' – *digital resources are non-rivalrous and hence promoting public creation/sharing of resources most important*
    5. Teachers use digital networks to learn from one another and support one another (USRN)
    6. High level of ownership and commitment of teachers and institutions leading to depth and breadth of use of ICTs by teachers in teaching-learning *with good impact on educational processes and outcomes*
    7. **ICTs no longer seen as an isolated 'subject' but as an integral curricular resource, creating a new discipline 'techno-pedagogy'**

4. Suggested way forward
    1. First and Second Generation no longer needs to be seen as sequential, we should start seeing ICTs as an integral pedagogical resource rather than a standalone subject
    2. Intgrating ICTs into regular subject teaching-learning creates ownership and commitment amongst teachers which also creates desire to learn computers/Internet. Computer literacy need be standalone but can be a small part of a computer aided learning program
    3. Cheap computers need to be promoted on large scale – even now schools purchase desktops – expensive, inefficient and obsolete. Netbooks – cheap, light, 8 hour power backup need to be provided to all teachers (interest free loans to teachers to buy as personal computers – already done in Kerala, and being considered in Gujarat)
    4. *Virus free operating system* essential to promote use of Internet and widespread sharing of digital resources, vulnerable operating system big obstacle to free sharing and Internet access
    5. Move to 'maximalist' free educational software tools environment from 'minimalist' proprietary environment which showcases computer as a mere 'sophisticated typewriter'. (Gujarat, Kerala), in almost all school subjects and covering all classes in high/middle school.
    6. Promote large scale creation of digital resources in different school subjects (Kerala school wiki, NMEICT for higher education) – bilingual resources shared across states

5. Implications for policy on ICTs in education
    1. ICT seen as a pedagogical tool and not a technology device. Do not outsource core area of curriculum and pedagogy. See ICT as a vital component of teacher education and not as a standalone issue
        1. Regular subject teachers (and teacher educators in DIET-BRC-CRC) should participate in program design and implementation, with techno-pedagogical experts
        2. Clear educational aims, principles and priorities need to drive program design. This means program design structures need to have educationists, teachers, teacher educators. Technology experts may need to be consulted but should not have prime role in design. The challenges are not technological but pedagogical in nature.
        3. No seperate 'computer teacher' needed. Basic computer literacy can be taken care of by the teacher educators and teachers
        4. Hardware supply, maintanenence could be outsourced (hence we can have a private 'lab attendant' but not private teacher for computer aided learning)
    2. Focus first on teachers (and teacher educators) and reach children through teachers (as is done in every other case of learning). Do NOT bypass teachers, program will not sustain
    3. Ensure access to inexpensive hardware on a 1:1 basis for teachers. Cheap netbooks, weighing 1 kilogram, offering 8 hour backup, costing around 13000 available (Kerala). Provide interest free loans to teachers to buy against pre-agreed contract terms (low prices, good features)
    4. Promote 'maximalist digital environment' by using freely shareable tools. Public education system should not be locked into 'private educational resources'**. In all cases, public education system uses educational resources that are in public domain**. Same needs to be enforced for digital resources (both software and resources). This is a must for promoting collaborative construction of digital resources on a very large scale (NMEICT and Kerala)
    5. Budgetary norms – focus on capacity building and not on hardware and software. Using inexpensive netbooks will keep hardware costs low, using only free software will avoid license fees on software. More than 50% of funds should be invested on in-house teacher education on a continous basis (Kerala has mature plans and programs for year after year of training)
    6. Create in-house or outsourced maintenance models which work
    7. Encourage setting up of teams of teachers and teacher educators to create large volume of digital resources (which are easy to share across) in different subjects using amazing variety of free software tools created by teachers world over. Make India a global powerhorse for digital educational resources.

6. Expected benefits
    1. Teachers and teacher educators part of the new/emerging 'digital society' as full participants
    2. Teachers connect to one another and teacher educators for sharing, peer learning, mentoring. Isolation between teachers and schools reduced
    3. Teachers create digital educational resources using software tools (collaborative constructivism)

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7. Gurumurthy Kasinathan

- Five years in management consulting (KPMG) and twelve years in IT business sector – application design, development, testing, support, architecture, project and account management etc. (Oracle Financial Services)
- Last seven years in education – Education Policy, Research, Leadership and Management (Azim Premji Foundation, Policy Planning Unit (Government of Karnataka and Azim Premji Foundation), and ICTs and social change (IT for Change)
- Three years in ICTs in education, research, program and policy advocacy (IT for Change)
- 5 years - Visiting faculty at TISS MA Education program (blended learning program)

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