

# **National Research Agendas for ICT in Education: A Descriptive Analysis**

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Consider this question: Do we have enough research of adequate quality addressing the right questions to serve as a knowledge base for policy on the use of information and communications technology (ICT) for primary and secondary children and youth? Few reading this paper would be likely to respond in the affirmative. The basis for a negative verdict might involve differences of opinion stemming from appraisals of deficiencies in the questions being investigated, the quantity of available research, or the technical quality of the research. Regardless of the details of the assessment, it is difficult to find people in the United States ICT education community who are satisfied with the current research literature. Contacts and conversations with persons in other nations lead us to feel safe in concluding that the perspective on this matter in the U.S. has analogs in many other nations.

Were we to probe deeper, it would become evident that some may never get the research they wish to have. One group who will be perennially dissatisfied includes those who are looking for the “magic bullet” study that shows that ICT *ipso facto* is beneficial in schools. The desire for such a study stems from the belief that it would lay to rest critics of the use of ICT in schools. Yet, such a study can never be produced because ICT is not a treatment but a large and diverse category of treatments, and effectiveness is not a single outcome but a large, varied and even contradictory array of criteria for judging effectiveness. Moreover, research that is generated from an attempt to prove that ICT is beneficial rather than to investigate empirical questions violates the essence of the scientific enterprise.

Another group whose needs will never be satisfied are those who seek research that provides unambiguous and incontestable policy prescriptions. As we know, research, at best, provides empirically based knowledge that can play a valuable role in the formation of policy decisions. However, policy making inevitably entails judgments about social and political conditions and realities and as such entails more than the knowledge that research produces. In the realm of policy on ICT in school environments, as in any other policy realm, research findings, in and of themselves can rarely be *the* determinant of policy.

Thus, it is fair to refocus the issue – not as whether we have the research literature we might wish to have since no body of research ever provides comprehensive and definitive knowledge - but as whether the existing research literature is quantitatively and qualitatively what we could reasonably expect to have at this point in time. Even on that more focused question, there seems to be rather high consensus in the U.S. that such is not the case.

The tone of the commentary on the need for more and better research on ICT over the past several years is reflected in the following quote from *Education Week's Technology Counts*:

In poll after poll, parents say technology is essential to a child's education. Many educators believe it's the missing linchpin of school reform. Business leaders consider it a mandatory part of a student's preparation

for the workplace. And policymakers at every level of government are spending more money on it each year. With support for technology so strong, people might assume its value for schools has been proven beyond question. In fact, the dividends that educators can expect from this investment are not yet clear. There is no guarantee that technology improves student achievement. Research in this area has produced little hard evidence, and few studies have yet examined the kinds of technology use that experts believe are most valuable to learning.<sup>1</sup>

Haertel and Means (2000) reached the same conclusion after a comprehensive review of research funded by the U.S. Department of Education. They begin their paper "Stronger Designs for Research on Educational Uses of Technology: Conclusions and Implications" with the following words:

No information system or database maintained today, including the National Educational Longitudinal Study (NELS) and the National Assessment of Educational Progress (NAEP), has the design and content adequate to answer vital questions about technology's availability, use, and impacts on student learning.<sup>2</sup>

In the U.S., the *Report to the President on the use of Technology to Strengthen K-12 Education in the United States* (1997) expressed concern about the inadequacy of educational technology research and called for more federal support for more federal support for research in this field: "The Panel believes that much of the promise of educational technology is likely to remain unfulfilled in the absence of a significant increase in the level of funding available for research in this area."<sup>3</sup>

The concern about the making better use of the research that exists and generating additional research has had three consequences. First, there have been efforts to provide better ways to make the research that exists accessible to practitioners and policy makers via a clearinghouse type approach. An example of this approach is the Center for Applied Research in Educational Technology (CARET). This is provided as a service of the International Society of Technology in Education (ISTE). CARET is a clearinghouse for research that is intended to serve as a bridge between researchers and the consumers of research. A second approach is to develop structures that provide for communication between researchers and practitioners and policy makers. The British Educational Communication and Technology Agency (Becta) has developed one of the most comprehensive and active examples of this approach.

The Becta ICT Research Network:

seeks to encourage the exchange of information between all those with an interest in research on ICT in education, in order to inform the national agenda and professional practice. It is especially aimed at the following audiences: Teachers and teacher-researchers; School managers; ICT advisers; Academic research community; Policy-makers - Government

and other agencies; Industry - hardware and software developers and suppliers; Sponsors and supporters of research.<sup>4</sup>

The third approach, and the one which is the focus of this report, is to develop and implement a national research agenda. There have been many expressions of the need for a research agenda in various professional meetings, reports, and other documents about the status of educational technology in the U.S. The many informal expressions of the need for a research agenda in the U.S. have been accompanied by calls for such in various reports and documents.

*The purpose of this paper is to provide background information on national research agendas and to furnish an analysis of several national ICT in schools research agendas.* Our intent in this paper is to provide a descriptive analysis on national research rather than to be prescriptive. In this paper we will provide some background information on national research agendas, provide brief descriptions of examples of national research agendas and identify several salient issues that this analysis brings to light.

## **Expressions of the Need for a National Research Agenda on ICT in Education**

In the U.S. calls for a national research agenda on ICT in education in the United States have been issued over the past several years. In 1997, the Milkin Family Foundation published a document that was titled, "A Call for a National Research Agenda." Their rationale for an agenda makes the case as it is often presented:

Educational technology research is currently fragmented. While outstanding researchers are investigating significant questions regarding education and technology, and while some answers are emerging, these individual efforts will not add up to a coherent national road map for the effective use of educational technology. The \$5 billion a year we are spending on hardware, software, telecommunications and training is in danger of being wasted. A systematic plan for creating research-based guidance on fundamental issue soft technology and education is mandatory.<sup>5</sup>

In 2002, the National Coalition for Technology in Education and Training (NCTET) convened a meeting of leaders from education, industry and government for a half day policy summit. The meeting brought together some of the most influential figures in educational technology in the U.S. The report of this meeting indicated that there was general consensus that "accomplishing the vision for educational technology will require the collaboration of a focused research and development agenda in addition to enhanced collaboration among stakeholders."<sup>6</sup> The report of the meeting provides some general comments about potential topics or broad themes for the research which should be included an agenda.

Most recently, Roblyer and Knezek published a paper titled, "New Millennium Research For Educational Technology: A Call for a National Research Agenda." In this paper they contend that: "The need for a new research agenda has never been more urgent."<sup>7</sup> The high cost of integrating ICT into schools and the disconcerting findings on low usage by teachers and inconsistent findings on impact necessitate, they believe, the implementation of a research agenda that provides a rationale for technology use and furnishes information to "address squarely the question of why teachers should use technology-based methods."<sup>8</sup>

## **National Research Agendas: General Considerations**

The perceived need for a national research agenda exists in many diverse domains. There is no formal definition of the term "national research agenda, but the term itself does a fairly good job defining itself. A Web search of the term "national research agenda" produced about six thousand hits. Some examples: National Research Agenda on the Environmental Influences on Health (Canada); National Research Agenda on Child Abuse and Neglect Prevention; National Research Agenda for the Ambulance and Pre-Hospital Sector in Australia; A National Agenda for Public Health Practice, National Agenda for Research and Development in Adult Education and Literacy; A National Agenda of Transportation Operations and Mobility Research; A National Research Agenda on Ageing; A New National Research Agenda for the New Millennium UK-Archaeology. Our Internet search was biased toward English speaking countries because of our own language limitations, but there is no doubt the list would have been much larger had we included examples in other languages from other nations.

Agenda building as it pertains to research is at the confluence of three traditions. The first of these is agenda building as used by political scientists in policy formation. The concept of "agenda building" in reference to public policy formation is generally credited to Roger Cobb and Charles Elder.<sup>9</sup> Their influential work was directed to using the formation of an agenda as a means of dealing with conflicting priorities and perspectives of stakeholders on public policy issues. The impetus for their research was a fundamental social problem: the management and resolution of political conflict and controversy about the issues which should be priorities for policy makers. Thus, agenda building in the context of the influential work of Cobb and Elder and others who have used and adapted their work is directed to sorting out competing beliefs about what issues being championed by various stakeholder groups matter and should be the focus of policy makers. Within this framework, the issues on a public policy agenda may or may not be issues that are amenable to empirical research.

The second tradition is the conception of a research agenda as it occurs within the community of scientists in a discipline. Active researchers in any field of scientific inquiry have a reasonable amount of consensus about the research agenda of their discipline. The agenda is informal and there can be dissent

about the salience of particular lines of inquiry, but a scientist whose work does not fit within the general framework of the agenda in her/his field is unlikely to be able to secure funding for the work or get it published. In the Cole and Elder/public policy tradition the potential issues for the agenda do not have to be created or generated; rather, they are there at the outset of the agenda building task, there are many of them, and they all clamor for their place in the sun! In the building of the agenda in a scientific field, the formulation of powerful and viable questions, the constituents of the agenda, is recognized as one of the creative aspects of the research process.

The third tradition, most prevalent in industrial R&D, is managed research. In these instances, there is a goal that is typically a product development and the sense of the agenda may be quite explicit and formal. This research is generally done with intramural researchers or in some instances, such as is generally the case in the pharmaceutical industry, with a combination of intramural and extramural researchers. Unlike the agenda setting as it exists in the scientific discipline, the research agenda in R&D organizations is considerably more structured and directed toward a concrete goal.

All three of these traditions enter into a consideration of the development of a research agenda. The way in which the task of forming a national research agenda is approached will certainly vary depending which of the three traditions is the dominant model guiding the development process.

Research is another term which carries multiple meanings. For scientists the term refers to empirical investigation conforming to accepted practices to ensure the integrity of the findings. The ultimate goal of the scientific enterprise is the creation of knowledge and as such entails the construction of theory which constitutes the organizational frameworks for the knowledge structures. While there are those who argue that research in the scientific tradition implies quantitative methods – rather than qualitative method and experimental or quasi-experimental designs, the preponderance of opinion in the behavioral sciences considers qualitative methods and non-experimental designs to be valid research. For others, the term research may mean data collection or fact finding. For example, questions such as: What is the ratio of computers to students in schools? For what scholastic tasks are computers used? How much professional development training do teachers have? For yet others, research also may mean evaluation studies or investigations to ascertain the consequences of a program or practices.

These three conceptions of research have points of convergence, but individuals who are entering into process of development of a research agenda with bias toward one of these ways of thinking about research are likely to have some degree of discontinuity with persons who hold a different bias.

There are two other general considerations pertaining to the issue of research agendas:

- Although there is a considerable volume of literature that is intended to make the case for a national research agenda across many different fields, finding examples of national research agendas which are at play, even when the search is not restricted to a particular field, requires some searching. This seems to be the situation in general, and also as it pertains to national research agendas for ICT in education.
- There is no value, *per se*, in having a national research agenda. A nation that has a research agenda in any particular field may – or may not – have a resource that will, in fact, generate knowledge with the potential to improve policy or practice. Thus, even though it may seem obvious, it deserves to be said that it is the actual content of the agenda rather than the fact of having an agenda that matters in terms of potential beneficial impact.

## The National Research Agendas

In searching for national research agendas for our analysis, we set criteria inclusion. For the purposes here, a national research agenda was:

- developed under the aegis of a national or multi-national agency or organization whether governmental or non-governmental. We looked for indication that the agenda represented a national commitment, whether the agenda was being implemented by a governmental agency or some other national agency, organization, or collaboration.
- included in a significant way research questions about teaching and learning for elementary and secondary school age children.
- identified research as a primary topic of consideration. Therefore, national agendas that focused, for instance, on the need to train teachers or the need to bridge the digital divide were not included in the analysis.
- involved a programmatic sequence of investigations that typically are intended to be executed over a period of several years. We did not include efforts to implement a single investigation even if such were large scale and at the national level. Agendas differ with regard to the degree of specificity of the component investigations, but in each case the agendas we examined provided some degree of specificity with regard to the constituent investigations.
- in the implementation process or about to be implemented.

We pursued a number of leads about instances of purported agendas which proved to be more imaginary than real. We realize that this list may not be comprehensive and it is our hope that other agendas may come to light that we can incorporate into this document.

While, at present, there is no national research agenda for ICT in education in the U.S., there has been work along these lines (some of which has been referred to in the prior discussion) and we will furnish a summary of that work following the summaries of the four agendas.

With these definitions and observations in mind, the following agendas were included in our analysis:

*The Sixth Framework Program, 2002-2006, (2002), and The e-Learning Action Plan: Designing tomorrow's education by the Commission of European Communities*

*Learning in an online world: Research strategy by the Ministerial Council on Education, Employment, Training and Youth Affairs*

*Research Strategy 2002-2003 by the British Educational Communications and Technology Agency (Becta)*

*Masterplan II for IT in Education by Singapore's Ministry of Education*

***The Sixth Framework Program, 2002-2006, (2002), and The e-Learning Action Plan: Designing tomorrow's education by the Commission of European Communities, 2001<sup>10</sup>***

The European Union, through the European Commission (EC), has defined its research, technological development and demonstration goals in a series of five year "framework programs." These frameworks constitute the ongoing development of the ICT educational research agenda and the EU's primary method for funding the research in Europe. The European Council and Parliament adopts the frameworks, which are drafted by the European Commission in consultation with participating country representatives. The *Sixth Framework Program (FP6), 2002-2006* like other framework programs before it, organizes its research agenda for educational uses of ICT within the "Information Society Technologies Program (IST). \*

\*See <http://www.cordis.lu/ist/> for more information about IST activities and priorities

A companion document by the EC, *The eLearning Action Plan: Designing Tomorrow's education<sup>11</sup>*, covers the period 2001-2004 and addresses issues related to lifelong learning and creating the conditions necessary for schools to use ICT effectively. The purpose of the eLearning Action Plan is to provide a framework specific to education which links multiple programs and efforts related to education, including *FP5*, the predecessor to *FP6*. The objectives for *FP6* is "to develop advanced systems and services that help improve access to Europe's knowledge and educational resources ... and generate new forms of cultural and learning experiences." <sup>13</sup>

The objectives of FP6 research program focus on improving the efficiency and cost-effectiveness of learning and demonstrating next-generation learning solutions in large-scale field experiments.” The focus of funded projects addresses a range of age-groups and does not appear to have a disciplinary focus, i.e. math and science are not state as a priority over other subjects.\* The research priorities of the eLearning Action plan reiterate those found in IST programs. However, the Plan also identifies three subject areas of “strategic importance.” 1) modern languages; 2) science, technology and society; and 3) art, culture, and citizenship.

The EC is responsible for the implementation of the framework programs. The EC, through Information Society Technology Program , manages research funds in ways analogous to the National Science Foundation in the United States. The IST issues various calls for proposals, which stipulate the particular terms of grant competitions that address framework objectives related to ICT. Evaluations of proposals regarding the quality and technological relevance of projects are based on external reviews of independent experts.

Funding for the frameworks comes from the EU. The EU only funds projects that involve several partners from different countries. FP funds are allocated following competitive “calls for proposals” published by the Commission on a regular basis. The EC budget available for the research, development and dissemination of technology enhanced learning at IST is approximately € 41.2 million for FP6. The eLearning Action plan does not stipulate the provision of new funding; its goal is to facilitate the coordinated and coherent use of those funds which have been awarded.

\*Additional information about projects funded under FP6 can be found at [http://www.cordis.lu/ist/directorate\\_e/telearn/projects\\_fp6.htm](http://www.cordis.lu/ist/directorate_e/telearn/projects_fp6.htm).

## **2. Learning in an online world: Research strategy by the Ministerial Council on Education, Employment, Training and Youth Affairs**<sup>14</sup>

The Ministerial Council On Education, Employment, Training and Youth Affairs (MCEETYA) has as members Australian State, Territory and Commonwealth and New Zealand Ministers with responsibility for education, employment, training and youth affairs portfolios. Representatives from Papua New Guinea and Norfolk Island have observer status in the organization. MCEETYA has organized an ICT in Schools Taskforce, which “has responsibility for ensuring that the nature and role of ICT in contemporary learning is investigated and understood.”<sup>15</sup> The Taskforce put forward its research agenda in *Research Strategy: Learning in an Online World*. The *Research Strategy* states that it is the result of a “consultative process” with the Australian commonwealth, national school sector initiatives and publicly recognized research associations.

The Agenda has two goals: “1) establishing research principles and priorities and establishes a framework for evaluating ICT research; and 2) using ICT to make all school related educational research accessible to teachers, parents, educational leaders, politicians, and the community.”<sup>16</sup> The MCEETYA *Research Agenda* at a relatively general level and lists five related priorities without providing much detail about them. These five research priorities are:

- The changing nature of schooling;
- Student learning;
- Equity issues;
- Teacher development;
- Monitoring progress.

According to the agenda, these topics are consistent with other Australian strategic initiatives, including Australian National Research Priorities (2002) and MCEETYA National Fund for Education Research.

No specific funding or funding level is provided by *Research Strategies*. It suggests that its priorities will be used to “inform” the allocation of related government funds, although it does not describe a mechanism for accomplishing this. However, governments do provide funding to MCEETYA for educational research, and so it is possible and perhaps even likely that many of the priorities will become elements of MCEETYA’s research programs.

The Agenda calls for the creation of a website to disseminate Australian and international ICT research to the public in accessible formats. This does not appear to be operational at the time of writing.

### ***Research Strategy 2002-2003 by the British Educational Communications and Technology Agency (Becta)***<sup>17</sup>

The British Educational Communications and Technology Agency (Becta), is Britain’s lead governmental agency for ICT in education. Becta created the “Learning Directorate” in 2000 to “establish an evidential base about ICT and Education, which identifies effective practice and disseminates it in such a way that it influences policy and professional practice.” Development of the annual agenda appears to be a process internal to Becta.<sup>18</sup>

Becta’s “key evidence themes” for the directorate in 2002-2003 are:

- ICT and effective pedagogy
- ICT and teacher workloads
- ICT and attainment
- Managed Learning Environments

- ICT and cost effectiveness
- The impact of broadband
- Safety on the Internet
- Wireless and portable technologies
- Equality issues and the 'digital divide'
- ICT and continuing professional development
- The factors which support effective ICT
- Whole class teaching and interactive whiteboards.

Becta's research management strategy relies heavily on its partners to gather necessary data around its priority themes. Partners include the Department for Education and Skills, the ICT Research Center, and other government agencies. The Learning Directorate manages longitudinal studies, provides thematic literature reviews, analyzes governmental data related to ICT use in schools, conducts short-term project evaluations and develops dissemination vehicles for findings.

Funding is provided to Becta through grants received from the Education Departments of England, Wales, Scotland and Northern Ireland. Further funds are derived from specific contracts with a range of other bodies. Becta coordinates its activities with its partner organizations, which may in turn provide funding either to Becta to conduct activities or fund activities with other stakeholders.

***Masterplan II for IT in Education by Singapore's Ministry of Education – FY2003 - FY2007***<sup>19</sup>

Singapore has followed up on its first *Masterplan for IT in Education* (FY1997 - FY2002) with a second plan *Masterplan II for IT in Education* (FY2003 -FY2007) (MP2). The development of the plan is being led by the ministry of education, and no further information regarding the development process was available.

MP2 addresses a number of issues including strategies for improving curricular integration of ICT, teacher professional development, national leadership, research and development, and infrastructure and support. With regard to research and development specifically, MP2 articulates three thrusts: 1) a research program within the ministry that addresses the impact of IT in teaching and learning, 2) research on emerging technologies, and 3) international research and benchmarking studies.

The Educational Technology Division (ETD) was established to lead the implementation of the first Masterplan. ETD is expected to continue leadership responsibilities under the MP2. The plan identifies the need for strategic partnerships with schools and industry. Funding is provided to ETD through the national government via the Ministry of Education. Specific initiatives and funding levels have yet to be determined.

This agenda proposes a dissemination model that resembles Becta's in that a team would be established to identify, collate, and disseminate local, national, and international research findings, including an online repository.

### ***The Status of Agenda Development in the U.S.***

The United States represents a unique case regarding both the scale of research and development activities and dispersed responsibility for managing this research. The U.S. probably invests more than another country in the research and development of ICT for education and training, and these sizable programs are managed by at least 4 federal agencies: the National Science Foundation, the Department of Education, NASA, and the Defense department all manage sizable investments.<sup>20</sup>

In fact, several groups have attempted the creation of research agendas, including the President's Committee of Advisors for Science and Technology Panel on Education Technology, the Learning Federation, and the Markle Foundation. The formation processes for these three agendas relied heavily on the participation and leadership of scientists with expertise in education, technology or specifically the intersection of the two. Both PCAST and the Learning Federation conducted extensive outreach efforts to include federal policy makers as well as individuals from the private sector. The Markle Foundation effort did not involve policy makers in the deliberations.

*The Report to the President on the Use of Technology to Strengthen K-12 Education in the United States* was when it was written and remains the highest level body in the U.S. executive branch to express the need for a research agenda dealing with ICT in education. , (PCAST Panel on Education Technology, 1997), made several recommendations, including:

- Focusing on learning with technology, not about technology
- Emphasizing content and pedagogy, not just hardware
- Giving special attention to professional development
- Engaging in realistic budgeting
- Ensuring equitable, universal access
- Initiating a major program of experimental research

The report suggests that the program should be overseen by a "distinguished board of outside experts appointed by the president"<sup>21</sup> and should include a) basic research in various learning-related disciplines and on various educationally relevant technologies; b) early-stage research aimed at developing new forms of educational software, content, and technology enabled pedagogy; and c) rigorous, well-controlled, peer-reviewed, large-scale empirical studies designed to determine which educational approaches are in fact most effective in practice. The report does not address how research would be disseminated or how researchers could or should be linked to education policy makers or practitioners.

A multimillion dollar research program, the Interagency Education Research Initiative (IERI), was born out of the PCAST recommendations. Until recently, IERI was jointly managed the Department of Education, the National Institutes of Health, and the National Science Foundation. Now these agencies independently manage portions of the portfolio – NIH addresses reading research; NSF focuses on research in math and science education that does not have to use experimental design, and the Department of Education which emphasizes experimental research in reading and math. For several years, the program maintained its emphasis on experimental research, but drifted from its technology focus. This year, only the NSF program requires the use of technology either as part of an intervention or for the conduct of research. The other programs identify technology as a focus, but they fund research on interventions that are not technology-based,

More recent efforts in the U.S. to generate a national research agenda were done by the Markle Foundation (2000) and the Learning Federation (2003). Both of these efforts approach the formation of an agenda from a broader perspective than ICT in school, but both encompass schools use of ICT.

The Learning Federation calls their agenda a *Learning Science and Technology R&D Roadmap*. The Learning Federation's R&D roadmap was developed over an 18 month process that included literature reviews, interviews, and thematic workshops that brought together national leaders in education and/or technology. Policymakers from the National Science Foundation attended select workshops.

With the formation of the Digital Promise Project, the agenda proposed by the Learning Federation may have come close to implementation. The Digital Promise Project, an organization founded by Larry Grossman, Newton Minow, and Anne Murphy with the support of several US foundations, seeks to establish a quasi-governmental organization analogous to Becta and its Learning Directorate in Britain. This would be funded by the income generated through regularly scheduled spectrum sales. The Digital Promise Project\* seeks to instantiate the Learning Federation's roadmap through federal legislation.

The Learning Federation is considering other options for implementing the Roadmap as well, some of which include a federal agency such as the departments of education or commerce, or the National Science Foundation, developing a program around key objectives. The National Science and Technology Council\*\* is exploring related issues through its Working Group for Advanced Technologies in Education and Training\*\*\*. The NSTC, a Cabinet-level Council, is the principal means for the President of the United States to coordinate science, space, and technology across diverse parts of the Federal research and development enterprise. The President chairs the NSTC.

The Markle Foundation report, "Children and Interactive Media"<sup>22</sup> involved a comprehensive review of the literature of children and the media. Similar to the PCAST and the Learning Federation, the Markle Foundation effort involved a number of leading researchers. The experts involved in the development of this

report would generally be defined as researchers on media. Yet, their focus was not on mass media but was specifically on interactive media. The report made a strong argument for a U.S. national agenda pertaining to children's use of interactive media and their role in cognitive and social development. Questions about home use comprise a dominant aspect of the agenda they propose.

There are four themes proposed for an agenda. The first is research on media use and access with questions such as: "How do families incorporate rules regarding interactive media into their child rearing practices? How do children's early experiences with interactive media influence later interests, technological literacy, and career opportunities? How do families use blocking devices and rating systems to guide their child use of interactive media? The second proposed research theme is research on interactive media and cognitive outcomes. This research would involve investigations of critical aspects of interactive media and their influence on cognitive engagement and learning outcomes. The third research theme deals with the nature of interactivity. This would involve research to provide further refinement and conceptualization of the "interactivity" as it applies to media. The fourth theme pertains to interactive

\* <http://www.digitalpromise.org/>

\*\*NSTC- [http://www.ostp.gov/NSTC/html/NSTC\\_Home.html](http://www.ostp.gov/NSTC/html/NSTC_Home.html)

\*\*\* <http://www.technology.gov/Events/2003/WkGp1023/Info.htm>

media and social development. Questions such as: The consequences of communication and collaboration via the Internet on children's self-expression and communication capabilities; and, are interactive games more potent in fostering aggressive behavior than non-interactive violent media.

The report addresses the concern about the dissemination of results. It notes that research that is published in academic journals often does not reach the broader community of parents, children's media producers, and policy makers. The report speaks to the importance of providing funding to enable labs involved in implementing the research agenda to develop linkages with the press, develop a speakers and consultant's directory, and sponsor newsworthy events pertaining to the research that has been done.

When the Markle Foundation began the work which led to the report, "Children and Interactive Media" there was the expectation that this report that would shape the formation of an agenda that would be implemented with funding provided by the Markle Foundation and perhaps other foundations as well as from federal sources which would collaborate in the accomplishment of the agenda and in the activities efforts to disseminate and make use of the findings. Although the report was well received by the research community the Markle Foundation decided not to continue their involvement in this work

## **Issues in the Formation, Implementation, and Use of a National Research Agenda on Educational Technology**

The Milkin Family Foundation document lays out the tasks involved in the development of a national research agenda in ICT in four steps:

- Catalogue what is known, and identify significant gaps in knowledge
- Formulate and prioritize the appropriate research questions
- Mobilize necessary resources
- Disseminate the results (Milkin Family Foundation, 1997, p.3)

Ascertain what you know, determine what you don't know, get the answers to what you need to know, and then spread the word of what you have learned! Yet as seemingly obvious and straight forward as this formulation presents the task it in no way confronts a myriad of issues which need to be tackled in the development, implementation and use of a research agenda. What follows are six salient issues in involved with the formulation, implementation, and use of the products of a national research agenda.

### **1. What is the domain for the agenda?**

One of the first issues in the formulation of a national research agenda is the delineation of the knowledge domain that the agenda is intended to cover. The terms "educational technology," "ICT," and "media" are all common language terms but are fuzzy in terms of their referents. They can, and often are used, in a seemingly interchangeable manner but they also can be used to label rather different domains. Despite the fact that convergence of technologies is a fact-of-life, in the U.S. they also define two distinct research communities one of which is oriented to school use of computers and the other which is oriented toward mass media as well as computers in school but also particularly out of school since that is where young people encounter the mass media. A determination of the domain can be tested with the answers to several questions:

- Will the agenda deal with computer technology?
- Will the agenda deal with other forms of technologies such as broadcast television, DVD, radio, etc?
- Will the agenda deal with technology use primarily or exclusively within the context of schooling or will non-scholastic, in-home use of technology be included in the formulation of the agenda?

- To what extent is the agenda expected to make contributions to the theory and generalized knowledge pertaining to ICT vs. fact finding data collection?

A perusal of an agenda reveals the domain decisions that have been made whether or not there was explicit consideration of them when the agenda was being created.

While science and math are often clearly articulated as priorities in the United States, and this emphasis was not reflected in the agendas examined here. While the EU documents do make a brief reference to the importance of science and technology, modern languages, art, culture and citizenship are also included. The other documents are silent on the issue of research topic domain.

There is also no clear priority given to particular age groups in most of the agendas, although there is a tendency to focus on K12 education. The implied beneficiaries of the other three agendas in Britain, Singapore, and Australia are K12 students and schools, and the PCAST report targets K12 education exclusively. The Learning Federation chose to focus on undergraduate education because of the entrenched politics in K12 education, but they also reference the likely relevance of tools developed for higher education to elementary and secondary education. The EU explicitly addresses life long learning.

## **2. What is the process used to create the agenda?**

The Scylla and Charybdis of the process consideration is this: A research agenda which is developed by a small, self-contained group is likely to be understood as the agenda of those who created it and the sense of ownership beyond that small, self-contained group is likely to be quite limited. However, the time and complexity of creating the agenda can be held within relatively tight constraints. On the other hand, as more and more persons and groups become involved in the process of creating the task of managing the process of becomes more difficult and the potential for the resulting agenda to be either a series of platitudes which can serve as an umbrella for anything one might wish to do becomes more likely. If these two approaches are considered as undesirable polar types on either side of a continuum, the task becomes one of finding the appropriate place between them.

The discussion of the work of agenda building in the political science context is relevant in the consideration of process. When the formation of a research agenda is done specifically in reference the expected value of the agenda in terms of policy formation, there is no reason to expect that the nature and obtained value will be the same if one starts from the policy perspective and works back to the research perspective as it will be if this is reversed. The fact

that researchers may consider a question to be important does not mean that a policy maker will see it as relevant.

The genesis of the agenda before scientists in mature scientific fields entails less formal agenda building, but it is no less real and involves a process of communication among the involved scientists about what needs to be studied and what questions need to be answered in order to build the structure of knowledge in the discipline. Vested interests of individual researchers play out in the dialogue about what the research agenda, but serious researchers in any field have a sense of the research agenda in their field. The process of building a research agenda with researchers is not easy – especially when the agenda will affect funding decisions, but the process of building a research agenda for ICT in education from the point-of-view of policy makers is likely to be even more complex.

The process of developing the agendas and the involvement of various stakeholder, and research and policy-maker constituencies was not generally evident in the documents which we studied. The pan-Australian plan, however, make reference to the input from the scientific community as well as the broader in-school constituency. It is impossible to conclude whether the lack of information about the nature and extent of involvement in the development of the agendas was an artifact of the documents or reflected a more restricted involvement of individuals and agencies in the development of the agendas. The two documents we described from the United States describe processes of obtaining input from the research and policy-maker community (Learning Federation) and the research community (Markle).

Differences in attention to outreach and consensus building in the development of agendas may have something to do with the governance of education at the national level. Where the federal government has a strong role in education, there may be less perceived need to reach consensus across stakeholders. The number of agendas at our disposal and the recognition that the documents may not have provided information about processes and procedures for getting involvement in the development of the agenda make it impossible to determine whether such is actually the case.

### **3. What conception of research management is embodied in the implementation of an agenda?**

Any research agenda carries with it implicit and explicit conceptions of how the work to accomplish the agenda will be accomplished. The case of managed research in R&D enterprises may be the closest approximation to the situation pertaining to the management of the implementation of a national research agenda There is a quite extensive literature pertaining to the methods of managing large basic and applied research programs. Among the questions which frame this issue are:

- Is the research to be done extramurally or intramurally?
- How much autonomy or control will be given to the investigators in shaping the questions to be investigated? That is, will the agenda provide the specifics of the questions to be investigated or will the agenda provide the themes that are intended to generate the focal questions which will shape the individual investigations?
- How will the individual investigations be monitored?
- What latitude, if any, is provided for dynamism in the agenda to reflect changes in the agenda as it is implemented?

In the agendas examined in this paper, research management is in all cases concentrated at the national, or international, level. Determining the process of administering the agenda was not always clear. In the case of the EU, the bulk of research appears to be extramural. Becta, on the other hand, takes a more blended approach. Most of Becta's agenda appears likely to be conducted internally, but they rely on research partners who may manage research differently. Other agendas did not specify details about research management.

#### **4. How is the agenda funded?**

The issue of securing funding is certainly one of the obvious stumbling blocks in moving to implement an agenda. The funding to accomplish an agenda as a multi-year program comprised of a number of individual investigations requires a fiscal agency, or collaboration of agencies, which has substantial resources. It also requires an agency which has a mission that is compatible with the sponsorship of investigations that have more general value across the entire nation. While the agencies that fit this bill may vary from nation to nation, it is clearly the case that the number of candidates for the honor of funding the agenda, in any specific nation, are most likely rather limited.

In the U.S., the Federal government is often seen as the appropriate agency to fund educational research and thus is often seen as the likely candidate to support the development and implementation of a research agenda. A position paper developed by the Consortium for School Networking and the International Society for Technology in Education in 2000 dealing with the Federal Role in Educational Technology expressed the position that the national agenda was a responsibility of the federal government, "The federal government must develop and pursue a national research agenda that includes non-vendor-specific research into cognition and learning sciences, national assessment strategies and tools and the identification of best practices in the area of ed-tech."<sup>23</sup>

Although it is not axiomatic that the national government plays the decisive part in the development and implementation of the national agenda, typically such is the case. The Milkin Family Foundation document called for a national agenda

but did not specify a role for the federal government. The Markle Foundation report, mentioned above, called for significant involvement of private foundations along with support from federal agencies to fund the agenda and NCTET (mentioned above) called for funding from government agencies and corporations.

For the agendas we examined, funding is generally provided from the national or international government. (Although the EU and MCEETYA are international bodies, these also appear to provide funding at the most centralized level). However, the MCETTYA agenda does not furnish much information on how the agenda will be implemented and what funding will be provided. With regard to the EU, Britain, and Singapore there are designated agencies – or at least a designated department within an agency (the case of the EU) – entirely and clearly focused on issues related to educational technology.

## **5. What is the process for providing linkage or transference of the research to policy makers and practitioners?**

There is little reason for anyone to expect that the accomplishment of potentially useful research which an agenda might generate will in actually be used simply because the research findings exist. While more and better research needs to be produced, one could argue that the useful and sound research that is currently available finds far less use than is warranted. Even as the needed efforts to expand and improve the research base continue, explicit attention should be given to the issue of the limited use which is made of the existing research base in the formation of policy and the execution of practice.

Over the years, the issue of the disconnect between researchers and policy makers has received considerable attention. A substantial and quite valuable literature exists that help to understand the nature of the disconnect between these two communities. The titles of these papers convey the sense of the problem of individuals who had experience in contending with this issue. For example, “Policy Researchers and Policy Makers: Never the Twain Shall Meet?”<sup>24</sup>, “Closing the Gap: New ways of strengthening the link between educational research and decision making on educational policies”<sup>25</sup>; “Connecting Research and Policy”<sup>26</sup>; “Scientists and Policy Makers – Toward a New Partnership.”<sup>27</sup> Thus, the terms “linkage” and “transference” used in the heading were selected advisedly. They are intended to convey as sense of the engineering of a process rather than the transmittal of reports that the term “dissemination” may convey.

It is beyond the scope of this paper to provide a review of this literature. The key point is that it is clear that the impediments to linkage are structural. It is equally clear that the solution to getting research (at least) used and (at best) used effectively is not simply to add more research to that which is not being used at present. Rather, it is necessary to design structures which are implemented in direct response to the impediments to effective linkage of the research and policy communities.

Few of the agendas articulate a process for “closing the gap” between researchers and their findings and parishioners and their tasks of decision making about policy and practice even though there is generally acknowledge that connecting the two communities is a priority. Both the U.K. and Singapore Agendas express an interest in making research results comprehensible to non-scientific audiences. Most efforts rely on web-based information and internet-based communications. The EU has a well developed website that highlights research programs, and their eLearning action plan calls for schools to be linked to research networks. However, the mechanisms for how this connection should take place are not specified.

By way of summary, the following table provides a comparison of the 4 national agendas reviewed for this paper with regard to themes identified above.

Table 1: Thematic Overview of the Four National Agendas

	<b>European Commission</b>	<b>MCEETYA</b>	<b>Britain</b>	<b>Singapore</b>
<b>Process for Developing Agenda</b> Community Outreach Described in Agenda	Yes No	Yes Yes, briefly	Not specified No	Not specified No
<b>Domain of Agenda</b> Age Group  Subject Domain	Lifelong Learning  Multiple	Implied K12  Not specified	Implied K12  Not specified	Implied K12, also Ed Schools Not specified
<b>Research Management</b> Extramural/intramural Investigator Autonomy Revision Procedures Specified	Extramural High 5 yr. cycle	Not specified Not specified Not specified	Both Not specified Annual	Not specified Not specified 5 yr. cycle (?)

In conclusion, our intention with this paper is to contribute to the dialogue about the nature and value of national research agendas for ICT in education as a means of generating research that will serve as a resource for those who make decisions affect policies and practices pertaining to the use of ICT in education. We fully recognize that what we have produced is certainly not a definitive statement on the matter. At best, it may serve to make somewhat more explicit aspects of the process of creating an agenda for those who are considering constructing one and as a catalyst to elicit and share the experiences and reflections of those who have been involved in developing and implementing a national research agenda for ICT in education.

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