

PROSPECTUS

Qualitative Studies of Innovative Pedagogical Practices Using Technology

Research Design for the Second Information Technology in Education Study Module 2 (SITES M2)

The skyrocketing pace of inventions in new information and communications technology (ICT), particularly applications of the Internet and the World Wide Web (WWW), has prompted increased interest in information technology around the globe. Research has established the potential that these new technologies have for improving education and changing schools. Recent reports issued by UNESCO and the World Bank advocate the use of these technologies to promote international socioeconomic progress and educational change, both inside and outside the classroom. Multi-national organizations, such as OECD and the European Parliament, have identified the need to prepare students for lifelong learning in the information society of the 21st century. Countries from Chile to Finland and from Singapore to the United States have all set national goals and policies that identify a significant role for ICT in improving their education systems and reforming their curricula. Major investments have been made to increase the numbers of computers in schools and the networking of classrooms.

Many countries are implementing educational objectives aimed toward preparing citizens for the information society. The pervasiveness of ICT is seen as both the genesis and a potential facilitator of this goal. Many policy documents contain common speculations about potential directions of educational change to create the "School of Tomorrow." These documents envision a future in which ICT is integrated throughout schools and society more generally, a future in which we have moved from the industrial age to the information age.

In this vision of the future, the increased flow of information is associated with more autonomous learning environments, environments rich with people and information that support student learning. The distinction between the traditional educational paradigm and the emerging paradigm constitutes an overarching context for this study of innovative pedagogical practices and students' learning processes. The distinction can be summarized as a shift from the teacher as initiator of instruction for the whole class to a situation in which the teacher acts as a guide and helps students find their appropriate instructional path and evaluate their own learning; from a situation in which students are passive individual learners to one in which students are active learners working in teams; a situation in which schools are isolated from society to one in which they are integrated into society; and a situation in which parents are uninvolved in their students' schooling to one in which they are actively involved.

Most countries, however, have a relatively small number of schools and teachers who are taking the lead in using technology to make changes in pedagogical practices that prepare students for the future. What are these innovative teachers doing, and how are they succeeding in their use of ICT to change the curriculum and what students learn? What school organizational practices, national policies, and other contextual factors are

contributing to their success? What can policy-makers and other teachers learn from these innovations?

These are the basic questions addressed by the Second International Technology in Education Study (SITES) Module 2. SITES Module 2 (M2) is a qualitative study of innovative pedagogical practices that use technology (referred to as IPPUTs). In each participating country, national panels will use common selection criteria, modified by national context, to identify innovative classrooms, as locally defined. National research teams will use a common set of methods to analyze the pedagogical practices of teachers and learners, the role that ICT plays in these practices, and the contextual factors that support and influence them. Implications will be drawn for both improved policy and classroom practices.

Currently, countries from North America, Europe, Asia, and Africa have indicated an interest in participating in the study. At the project's first meeting of National Research Coordinators (NRCs) in Copenhagen in October 1999, 25 countries were represented (see Appendix A for a list of countries). We are particularly interested in extending the reach of this study to include developing countries, to work with them to develop their evaluation capacity, and to look at the unique role that ICT may be playing to advance their socioeconomic development.

Three Modules of SITES

SITES is a study in three modules authorized by the International Association for the Evaluation of Educational Achievement (IEA). Module 2 (M2) of SITES is a series of qualitative studies that identify and describe innovative pedagogical practices that use technology. M2 builds on Module 1 (M1) and contributes to the subsequent Module 3 (M3) of SITES. Conducted in 1997-1999, M1 was a survey of principals and technology coordinators at a sample of schools in 26 countries. The focus of M1 was on the extent to which schools have adopted and implemented pedagogical practices that are considered important to education in the information society. Scheduled for 2000-2002, M3 will be an assessment of teachers and students, focusing on the impact of ICT on the skills and competencies they will need for the information society.

M2 builds on M1, in that it looks at classrooms to examine in more detail the emerging pedagogical practices reported by principals in M1 and tests the validity of some of the M1 indicators. It also examines the contextual factors that influence these practices. M2 will contribute to M3, in that it will begin to identify the competencies for the information society that are emerging from innovative technology-supported pedagogical practices. Findings from M2 will help to shape the design of the M3 instruments that will be used to assess these competencies among teachers and students, competencies that may not be measured through current assessment instruments and indicators.

IPPUTs Defined

As stated above, the focus of SITES M2 is on innovative pedagogical practices using technology. The assumption of the study—one borne out by findings from SITES M1 and other research—is that new pedagogical practices are emerging in schools. These practices involve changes in what it is that teachers and students do and learn in the

classroom. The emerging practices are providing students with skills and competencies that they need as they extend their learning throughout their lives in the information society of the next century. These changes are often supported and enabled by the use of ICT.

In this study, each country will identify and investigate classrooms¹ in which such innovative practices are taking place. The selection of these cases is a key component of this study, and the selection process is discussed in more detail in a later section of this document. The selection will be based on the following set of common international criteria, which will be modified to accommodate the circumstances and cultural differences in each country. To qualify as an IPPUT, a practice must be one:

- In which technology plays a substantial role,
- That shows evidence of significant changes in roles of teachers and students, the goals of the curriculum, and/or the educational materials or infrastructure,
- That shows evidence of measurable positive student outcomes,
- That is sustainable and transferable.

And finally, IPPUTs are those practices:

- That are innovative, as locally defined.

“Innovative” is a difficult concept to specify and operationalize. The notion of “newness” embedded in the definition of the term demands that a study of innovation be open to the unanticipated. Furthermore, innovation is often dependent on the cultural and historical context within which it is observed; what is innovative in one country, may not be in another. Nonetheless, because this is an international comparative study, it is important to provide a common frame of reference for this term. For this study, the frame of reference that we use to define “innovation” is those practices that prepare students for lifelong learning in the information society. Each country will have an opportunity to define what it considers to be innovative, but common examples might include those practices that:

- Promote active and independent learning in which students take responsibility for their own learning, set their own learning goals, create their own learning activities, and/or assess their own progress and/or the progress of other students.
- Provide students with competencies and technological skills that allow them to search for, organize, and analyze information, and communicate and express their ideas in a variety of media forms.
- Engage students in collaborative, project-based learning in which students work with others on complex, extended, real-world-like problems or projects.

¹ The focus is on educational settings within a school context in which learners interact with teachers. These would often be classrooms but are not restricted to classrooms. In this prospectus, we use the term “classroom” in the broader sense of such settings.

- Provide students with individualized instruction, customized to meet the needs of students with different entry levels, interests, or conceptual difficulties.
- Address issues of equity for students of different genders or ethnic or social groups and/or provide access to instruction or information for students who would not have access otherwise because of geographic or socioeconomic reasons.
- “Break down the walls” of the classroom—for example, by extending the school day, changing the organization of the class, or involving other people (such as parents, scientists, or business professionals) in the education process.
- Improve social cohesiveness and understanding by having students interact with groups and cultures that they would not interact with otherwise.

We consider this definition and these examples to be a common starting point for all countries. Later in this document, we specify a process by which each country reviews and modifies this definition—in collaboration with the ICC—to locally define innovation and accommodate country-specific educational goals, concerns, and cultural differences.

Goals of the Study

The goals of SITES M2 are:

- To identify and provide rich descriptions for IPPUTs that are considered valuable by each country and that might be considered for large scale implementation or adoption by schools in other countries.
- To provide information to national and local policy-makers that they can use to make decisions related to ICT and the role it might play in advancing their country’s educational goals and address educational needs and problems.
- To provide teachers and other practitioners with new ideas about how they can use ICT to improve classroom practices.
- To add to the body of research knowledge and theory about the contexts and factors within and across countries that contribute to the successful and sustained use of innovative technology-based pedagogical practices.
- To investigate the measurement quality of M1 indicators and contribute to the development of M3 assessments.

Research Questions

The goals of the SITES M2 suggest the following sample research questions:

Identify and describe IPPUTs:

- What are the ICT-based pedagogical practices that countries consider to be innovative?
- How are these practices similar and different between countries?

Inform policy-making:

- Which national telecommunications policies related to such things as school Internet access, equipment purchase, teacher training, and student Internet use seem to be effective in supporting IPPUTs?
- Which local policies related to staff development, student computer fees, facilities access, technical support, and other issues appear to be effective in supporting these innovations?

Contribute to improved classroom practice:

- What new teacher and student roles are associated with IPPUTs? How are IPPUTs changing what teachers and students do in the classroom? How do they affect patterns of teacher-student and student-student interactions?
- How do these practices change curriculum content and goals? What impact do these practices have on student competencies, attitudes, and other outcomes? Have they changed what students are learning and what teachers need to learn? Have they changed the ways student outcomes are assessed?
- How do these practices change the classroom? In what ways does the use of ICT change the organization of the classroom, extend the school day, break down the walls of the classroom, and involve other actors in the learning process (such as parents, scientists, businesspeople, etc.)?
- What are the barriers to using ICT in these innovative ways? How are teachers overcoming these barriers? How do they cope with limited resources?

Advance knowledge and build theory:

- What capabilities of the technology support innovative pedagogical practices? How do these capabilities shape the practices they support?
- What are the contextual factors associated with the use of IPPUTs? Which factors seem to be present across different innovative pedagogical practices? Which ones are associated with different practices? What are the implications of contextual factors for the sustainability and transferability of IPPUTs?

Connect SITES M2 to SITES M1 and M3:

- To what extent do the findings obtained with instruments used in M1 correspond to pedagogical practices and school contexts observed in M2?
- How should changes in teacher and student competencies observed in M2 be assessed in M3?

Advantages of an International Comparative Study

The case studies from a broad range of participating countries will be used in cross-national studies to identify trends and patterns that cut across national and cultural boundaries. The range of countries that are participating in the study will allow each country to identify those other countries that are most appropriate for comparison, based on economic, technological, historical, or cultural considerations. Such comparisons

would allow each country to determine the status of its use of ICT in classrooms, relative to other countries for which comparison—and perhaps competition—is appropriate.

Another advantage of an international study comes from the fact that some countries, such as Finland and Singapore, are engaged in significant national efforts to implement ICT in schools and use these resources to change education. Although few countries may currently be in a position to conduct such national experiments, findings from these countries may help others plan for a future in which technology is more affordable and pervasive. However, even modest innovations may be worthy of adoption in other countries. Each country has the opportunity to examine practices in other countries that may not exist in its own schools, yet may be relevant for the future of its educational system.

The international, comparative nature of this study will also allow policy-makers to see ways in which ICT may be changing education worldwide. Education, like the economy, is becoming global. SITES M2 will allow us to see whether a common international vision is emerging on how information technology can best be incorporated into teaching and learning. Yet the comparative nature of the project will also allow an investigation of the ways in which common trends or visions may be reshaped to accommodate national cultural, political, and historical factors.

Consequently, the SITES M2 study will help policy-makers compare the ICT policies and practices in their own country with those in other countries with similar educational goals, problems, and needs. This comparison might identify new ideas and policies developed in other countries that will help address these goals, problems, and needs.

Advantages of the Qualitative Approach

The qualitative case studies of SITES M2 are designed to complement the more quantitative M1 and M3 studies. The advantage of the qualitative research approach is that it provides much more detailed information on people, events, and practices. This detail is particularly important as we explore some of the trends identified in M1. Furthermore, because this approach examines these people and practices in their natural context, it can identify and describe the complex interactions and interrelationships among factors in a system. This capability is particularly important in an international study, where cultural and other contextual differences can be significant explanatory factors. Finally, the more open-ended nature of qualitative research allows for the emergence of novel findings that may not be anticipated when designing a quantitative instrument. This is a particularly important advantage when examining innovative practices and exceptional situations.

Methodological Approach for SITES M2

Case Selection

Cases in SITES M2 may be selected from one or more of the elementary, lower secondary, and upper secondary levels, with 4 cases used for each level. Consequently, from 4 to 12 cases will be selected for each country, depending on the grade levels chosen for participation in the study. Although more cases may be selected in each

country, only 4 to 12 cases will be examined by the International Coordinating Center (ICC) across countries.

Because only a few cases are selected for study in each country, it is important that these cases be highly compelling. To meet this need, the ICC has specified a set of criteria and a process by which each country will identify a set of cases most worthy of examination. The National Research Coordinator (NRC) in each country will establish an expert panel to review and select the cases for study. The panel will consist of a range of stakeholders that might include policy-makers, teachers, administrators, technology experts, and researchers. The expert panel will start with the international criteria specified above and, in cooperation with the ICC, provide a local definition for innovation and make other modifications that accommodate the needs and situations of that country, if such modifications are deemed necessary. These modifications and deliberations will be shared with other NRCs through the M2 Web site.

Although classroom practices are the focus of the study and classrooms are the unit of analysis, the identification of IPPUTs is quite likely to begin with the identification of innovative schools and/or national or regional programs. Within these units, classrooms can be selected that exemplify the changes associated with these schools or programs. The NRCs and their national panels will engage in a three-step process to select the cases for study in their countries. First, they will use a variety of sources to build an inventory of potential IPPUTs. These sources might include SITES M1 data (for those countries that happen to have participated in this study), recent national awards programs, practitioner journals, web sites, and personal knowledge of panel members. Second, the NRCs may need to collect additional information on potential cases that can be used in making a final determination. This might include a screening survey, telephone interviews, or school visits. Finally on the basis of this information, the panel will select the 4 to 12 cases for study that will be submitted to the ICC for inclusion in the international study. The final selection process will also be described for the ICC and other countries through the project Web site.

Data Collection and Analysis

Case studies of selected classrooms will be conducted by national research teams, using a common set of data collection instruments and analysis protocols. Research teams will spend at least five days of study at each site, which may be conducted over two separate visits to each school. Sources of data will include:

- Surveys (including M1 indicators) and interviews of administrators, teachers, and students, and, where relevant, parents and other community members.
- Archival or historical data, such as project proposals, progress reports, or annual reports.
- Program materials, such as teacher lesson plans, instructional materials, curriculum guides, software, reports, assessment instruments, etc.
- Students' products, such as reports, projects, tests, and student-generated Web sites, as well as teachers' analyses of these.

- Classroom observations that describe teacher and student activities, teacher-student and student-student interactions, seating arrangements, computer placement and resource allocation, etc.

Classroom observations will be made of at least four class sessions over the two visits to each school. Every attempt will be made to collect data on a set of sessions that constitute at least one extended curricular unit or project.

The collected material will be coded by the national research teams, using a common set of codes provided by the ICC, derived from research and pilot cases. At the core of the coding scheme will be emerging practices identified in SITES M1 and other similar research projects. The ICC will make provision for the submission and review of additional codes by national research teams as they encounter the need for them in their analysis. Case write-ups will describe and analyze the uses of ICT and the innovative pedagogical practices found in these classrooms. The analyses in these cases will focus on the way practices are changing the roles of teachers and students, the kinds of learning and student products that are associated with these changes, and the role of ICT in bringing these changes about. The influence of contextual factors will also be analyzed—factors such as school organization and leadership, community involvement, and national policies and programs related to educational improvement and ICT implementation. Cross-case analyses conducted by the ICC will allow statements to be made about trends in these findings and similarities and differences within and across countries.

Quality Monitoring Plan

One of the primary responsibilities of the International Coordinating Committee is to monitor the quality of the research as it is conducted in participating countries. Five activities are planned to assure quality throughout the project:

- NRCs will coordinate with the ICC on the composition of the expert panel and on the review and modification of the international criteria for case selection.
- NRCs will coordinate with the ICC on the selection of cases for study.
- The ICC will hold workshops for the NRCs on both data collection and data analysis.
- The NRCs will conduct pilot tests in which they try out data collection and analysis techniques and report on these to the ICC.
- The NRCs will translate all the raw data and notes from one of their cases for recoding by other NRCs to build coding reliability.

NRC Level of Effort

Each country should plan a project budget according to the following estimated levels of effort and expenses. At the lowest level of participation in the study and with the minimum of four cases, it is estimated that the level of effort may be as low as .75 person-years over the 3 years of the project. At the high end and for the maximum number of cases, it is estimated that it would take 1.5 to 2 person-years over the 3 years, with the following breakdown:

- Formation of expert panel, panel meetings, and case selection; estimated 20 days.
- Information collection needed to select cases; estimated 20 days.
- Meeting with ICC, estimated 25 days (5 meetings at 5 days each).
- Pilot study; estimated 20 days.
- Case study data collection, analysis, and case report; 2 people, 5 days of visiting per case; estimated 20-30 days per case, total.
- Recoding of data from case study in another country, estimated 10 days.
- Coordination with the ICC, review of report drafts, etc.; estimated 20 days.

In addition, the following out-of-pocket expenses are anticipated:

- Travel and honoraria (if appropriate) for expert panel members.
- NRC travel to ICC meetings, 5 at international locations.
- Translation (if necessary) of some survey instruments, some raw data from pilot study, raw data for 1 case study for use in quality monitoring, 4-12 case reports.
- Local travel for 1 pilot study and 4-12 case studies, with 2 people making up to 2 visits per case.

Reporting and Dissemination

The following reports will be issued by the SITES M2 ICC:

- A technical report that summarizes the reports from each country on their criteria for selecting IPPUTs and describes the processes for selecting such innovative practices.
- A final report that summarizes the most salient cases from each country and examines themes across countries to address the research questions stated above.
- Reports on optional studies that will be defined by the International Coordinating Center and that individual countries may or may not join.

A project Web site will be maintained that will support collaboration and the exchange of information, that will disseminate findings, and that will support the customized search of the case study database. The audiences for these studies and resources are educational policy-makers, researchers, administrators, practitioners, and the general public around the world who can use the findings to implement technology-based education improvement.

Optional Studies

In addition to the required core or main study, SITES M2 will offer two optional studies, if funding permits. Countries participating in the core study may also choose to participate in one or both of these studies:

- A video study that supplements case data with video footage of selected ICT-related classroom practices.

- A teacher professional development study that examines the relevant professional development activities and programs that were influential in preparing innovative teachers.

OECD Cooperation

The Organization for Economic Cooperation and Development (OECD) is also conducting a set of case studies in ICT. The OECD study focuses on the effects of ICT on school culture and organization, whereas the IEA study focuses on its effects on classroom practices. The two focuses on school culture and classroom practice are both important individually and complementary together. Their complementary relationship presents the possibility of a more powerful impact of the studies when countries participate in both and when the studies are coordinated. The SITES M2 ICC is cooperating with the OECD research group to coordinate the two studies, minimize conflicts, and maximize the potential payoffs of these two studies when they are conducted in a coordinated fashion in the same country.

SITES M2 Organizational Structure

IEA-sanctioned studies are designed and directed by an International Coordinating Center. The ICC for SITES M2 is a consortium of four institutions headed by the Center for Technology in Learning (CTL) at SRI International (USA) and directed by Dr. Robert Kozma. The other researchers and organizations collaborating in the ICC consortium are: Dr. Ray McGhee, SRI Center for Technology in Learning (USA); Dr. Joke Voogt and Dr. Willem Pelgrum, the Center for Applied Educational Research at the University of Twente (NL); Dr. Ron Owston, the Center for the Study of Computers in Education at York University (CA); and Dr. Richard Jones, the Education Quality and Accountability Office (CA). Dr. Ronald Anderson, University of Minnesota (USA), and Dr. Tjeerd Plomp, Twente University, are ex-officio members, as co-Chairs of the IEA SITES Steering Committee. Other members of the SITES Steering Committee are Nancy Law (Hong Kong), Ryo Watanabe (Japan), Fred-Arne Odegaard (Norway), and Chris Dede (USA).

SITES M2 Study Schedule

The SITES M2 study will be conducted from 1999 to 2002. The following schedule has been adopted:

1999-2000: ICC issues final design for the study, raises funds, recruits participating countries; NRCs establish national panels, review and localize selection criteria, establish selection procedures, and select cases; ICC develops protocols and instruments, pre-pilots them, and makes revisions; ICC conducts NRC workshop on data collection; NRCs conduct pilot studies.

2000-2001: NRCs conduct case studies; ICC conducts NRC workshop on case write ups; NRCs write up case analyses.

2001-2002: ICC conducts cross-national analysis of data, writes report; ICC conducts NRC meeting to review draft of report; ICC revises and disseminates report.

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Appendix A

Countries Participating in First SITES M2 NRC Meeting

October 12-14, 1999

Copenhagen, Denmark

Belgium (French)

Canada

Denmark

Finland

France

Hong Kong

Hungary

Israel

Italy

Japan

Korea

Latvia

Luxembourg

The Netherlands

Norway

Philippines

Portugal

Singapore

Slovak Republic

Slovenia

South Africa

Taiwan

Thailand

United Kingdom

United States