
INTEL[®] LEARN PROGRAM EVALUATION FINDINGS

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EXECUTIVE SUMMARY

The Intel® Learn Program is designed to bring hands-on, computer-based learning experiences to young people ages 8 to 16 in informal, community technology settings throughout the world. The curriculum is particularly targeted to communities that have limited access to technology in homes and schools, and serves children of a variety of cultural and socioeconomic backgrounds who would be unlikely to otherwise have the types of opportunities the program provides. Initially piloted in late 2003, during its first 3 years the Intel Learn Program was implemented with more than 422,000 children in 9 countries: China, Israel, Mexico, India, Brazil, Egypt, Russia, Turkey, and Chile. The Intel Learn Program has three primary educational goals:

- Promoting technology literacy.
- Increasing critical thinking capabilities.
- Supporting the development of collaboration skills.

Because Intel Learn has been implemented mainly in noncompulsory educational settings where children typically are free to decide whether or not to attend, program success depends on attracting, motivating, and engaging children even while they undertake serious learning activities. Combined results show a high overall completion rate of 93%, indicating that almost all children who begin the program are motivated to finish.

A HIGH-QUALITY LEARNING ENVIRONMENT

The discussion of impact and outcomes provided in this report starts with an analysis of the Intel Learn Program curriculum and implementation design. This analysis indicates that the program contains many of the elements that experts consider important for providing 21st-century learning opportunities, including: thematic instruction, problem identification and solution, relevance to learners' lives, active exploration, choice and autonomy, cycles of creation, collaboration and communication, authentic feedback, the teacher as facilitator, and the use of 21st-century tools. Evaluation data also show that the program is generally well-aligned with the cultural, social, and practical contexts in which it is implemented. For example, course materials are relatively easy for children to use, translation and localization efforts have largely been successful, and topics for activities and projects are generally appropriate to the local culture. Despite challenges in some of these areas that persist in certain locations, the program has been extremely well-received and has shown itself to be practical and well-suited to the variety of conditions in which it has been implemented.

One of the most ambitious goals of the Intel Learn Program is changing the nature of the relationship between the adults and children in the classroom setting. Program efforts to promote a facilitative approach to instruction have been, by and large, highly successful. Intel Learn classrooms are described as friendly places where learners and

staff feel at ease with a newer, more open set of classroom norms than most have experienced elsewhere.

TRANSFORMATION OF TEACHING AND LEARNING

At the foundation of the program is the 1-week training that familiarizes staff with the approaches taken in the course and provides them with the skills and materials needed for working with the learners. In the training, staff engage in role-playing sessions and other active means of practicing to deliver the program. Staff report that the training prepares them well, and they request more advanced training and additional pedagogical support. They additionally indicate they would like more ongoing interaction with colleagues. Almost all staff report being able to successfully overcome the teaching challenges they face during implementation.

Staff also report overwhelming enthusiasm for the course. Indeed, one of the most powerful evaluation findings is how deeply staff are affected by the children's engagement and joy and by how much they learn. Staff often see the program as life-changing for the children, affecting their behavior both inside and outside the Intel Learn classroom. The program also has served as a catalyst for change in teaching practice beyond its walls. Staff who are school teachers report using the program's techniques in their regular teaching practice, and some administrators have reported that the program is serving as a model for new forms of teaching and learning in the schools, even increasing parent participation and engaging community members in the process. Because the Intel Learn Program does not explicitly target teachers' general pedagogical practice, this finding represents an unintended positive outcome for the program.

POSITIVE IMPACT ON LEARNERS

The powerful endorsement of the program by staff, parents, and community leaders, who see the impact it has on learner's capabilities and lives, is corroborated by evidence from the learners' work. In all countries, analysis of learner work products—the activities and projects they develop—shows that between two-thirds and three-quarters of learners in most cases are performing at the highest levels of accomplishment. SRI International's (SRI's) rigorous analysis of a random sample of 337 of all the learner work produced in Chile during the program's first year there found that 63% of the samples that SRI scored represented work that fully met all the expectations for learner performance, and that many of the samples considerably exceeded expectations for these activities in their originality, quality of communication, use of technology, and other assessment criteria. Another 31% closely approached performance expectations, indicating that 94% of the learners leave the program with at least a basic set of key 21st-century skills. An analysis of learners' final projects—extended multimedia presentations developed by teams on topics of interest and import—found that 83% were at the highest levels of achievement, a percentage that significantly surpasses the target benchmarks the program developers anticipated.

In addition to effectively supporting technology literacy and critical thinking capabilities, evaluation findings show successful collaboration among the learners.

Observational studies indicate that although collaborative project work in an educational setting is new to most participants, they are able to form effective teams for completing activities and creating projects. Observational studies also show that the presentations learners make to community leaders can have significant outcomes. Invariably, learners' presentations are well-received, and, in many cases, the power of the presentations have resulted in changes in the community, including such outcomes as the commitment of substantial public funds to create playgrounds, water catchments, and other community improvements that the learners' have advocated in their presentations.

INTRODUCTION

Since its inception late in 2003, nearly half a million learners in countries around the world have taken part in the Intel[®] Learn Program. The evaluation research conducted to date on the program shows that children who start the program complete it, that they learn new skills and capabilities relevant to life in the 21st century, and that most participants achieve at the highest levels of outcomes. The more quantitative data provide clear indications of an educational program that is successful according to multiple standards, exemplifying the possibility of adapting worldwide initiatives to local conditions to further key educational objectives.

Qualitative examinations of learners' experience in the program tell a richer story of the program's success: the enthusiasm it creates for new ways of learning and new personal possibilities for children from a broad range of backgrounds and for those who need it most, including children who have dropped out of school, are migrant or homeless, or otherwise at the margins of their societies. To reach these children, Intel has entered into partnerships with a wide array of governmental and nongovernmental organizations, creating new strategies for each country or even for regions within the same country, and developing new strategies to meet changing local conditions over time. The result of these efforts is a community-based education program whose reach—from underserved children in orphanages in southern India, to the Bedouin tribes of Israel, to native communities in rural Mexico—and whose scope are in many ways distinct if not unique in the global environment.

As this report highlights, it is the shift to a child-centered approach to education made practicable through the program design that makes the Intel Learn model so powerful. For many staff in the program, the shift has changed their conceptions of learning and is thereby changing their relationships to the children in their classes. A story recounted by evaluators in Egypt typifies the spirit of the program:

A couple of teachers had groups of orphans in their classes, some of whom were not collaborating with their fellow learners. For the orphans, class rules seemed meaningless. The teacher, therefore, showed more tenderness to these children, and only then did they start to respond positively to the course requirements and successfully complete the course.

This report reviews evaluation findings to date and highlights the significant and often poignant effects of the program. The next section provides an overview of the Intel Learn curriculum and implementation strategy; it is followed by a section that describes the data collection and analysis methods of this evaluation. Three outcome sections follow; they address: (1) the quality of the learning environment created by the program, (2) staff training and experiences in facilitating the program, and (3) the opportunities that the program provides for diverse learners around the world. A conclusion section ends the report.

PROGRAM OVERVIEW

Addressing the need for digital literacy and other 21st century skills, the Intel Learn curriculum targets children and communities that have limited access to technology in homes and schools. The program has three primary educational goals:

Promoting technology literacy. Technology literacy involves using technology to communicate; to collect, organize, and share information; to generate solutions to problems; and to design and develop original products. The development of these capacities enables learners to leverage the power of technology to gain a deeper conceptual understanding of subject matter and to produce new intellectual and creative works based on this understanding.

Increasing critical thinking capabilities. Critical thinking involves engaging in clear and precise analysis in order to solve problems. Critical thinking, problem solving, and other forms of “higher order thinking” represent a different level of learning than is typical in traditional schooling, where learning objectives usually center on memorization of facts (e.g., historical dates), of rules (grammatical or mathematical), or of procedures (for doing or making something). Although memorization, rote application of rules and procedures, and other “lower order” activities are important aspects of learning, they are only part of a much fuller set of capabilities that educational environments can and should promote.

Supporting the development of collaboration skills. Collaboration involves individuals’ working with one or more other people in teams to set goals and complete tasks. Whereas traditional educational environments emphasize individual learning and achievement, 21st-century approaches to education acknowledge that human activity, including economic activity, is fundamentally collaborative. In the 21st-century workplace, colleagues collaborate to develop their knowledge, insights, and capabilities, putting them to use for the good of the group.

Children in the Intel Learn Program follow a structured sequence of learning activities in which they explore software applications, arrive at decisions about what they would like to do, and relate their learning to issues in their everyday lives. Intel Learn is intended to provide children with opportunities to design, create, and solve problems in collaboration with their peers and with the structure, tools, and adult guidance needed to gain new knowledge, arrive at standard solutions, and become proficient in basic skills. Initially piloted in late 2003, the Intel Learn Program has been implemented for more than 422,000 children in 9 countries worldwide.

The Intel Learn Program reflects current education research on how children learn. Over the past few decades, evidence has accumulated that shows that hands-on learning

or “learning by doing” can produce significant outcomes.^{1,2,3} In project-oriented, hands-on approaches, children are provided tools, strategies, and other social and material resources for identifying and creating their own solutions to problems, typically ones that have relevance to their lives. Research indicates that by working on activities and problems that matter to them, children can learn foundational skills useful across settings and situations.^{1,4} Research also indicates that instruction grounded in project-oriented, hands-on experiences can be especially useful for those less successful at school.^{5,6} Moreover, these learning activities prepare *all* children to meet the challenges of an increasingly complex world. This focus on the importance of active and extended learning experiences coincides with researchers’ and practitioners’ recognition that informal, everyday activities often provide children with a richness, complexity, and authenticity that both engages them and develops their capacity for critical thinking.⁷ Learning, as is increasingly acknowledged, is a “life-wide” process; that is, it occurs across all settings and situations. Accordingly, research scientists and funding agencies are paying greater attention to the learning that happens outside of school and to investigating the ways in which experiences both in and out of school aggregate to produce important learning outcomes.^{1,8,9}

The Intel Education Initiative has long been committed to supporting learning outcomes through educational programs that engage children in meaningful learning experiences outside of the school day. The Intel Computer Clubhouse Network, Design and Discovery, and most recently the Intel Learn Program provide children across the globe with learning opportunities in informal, community-based settings that emphasize approaches that are significantly more child-centered, hands-on, and project-oriented than is typical of school day activities. These programs serve both to enrich children's educational experiences and to model pedagogical approaches consistent with current research in the learning sciences. Because of the importance of altering the traditional

¹ Bransford, J. D., Barron, B., Pea, R., Meltzoff, A., Kuhl, P., Bell, P., et al. (2006). Foundations and opportunities for an interdisciplinary science of learning. In K. Sawyer (Ed.), *The Cambridge handbook of the learning sciences* (pp. 19–34). New York: Cambridge University Press.

² National Research Council (NRC). (1996). *National science education standards*. Washington, DC: National Academy Press.

³ NRC. (2006). *Taking science to school: Learning and teaching science in grades K–8*. Washington, DC: National Academy Press.

⁴ Bransford, J., Brown, A., & Cocking, R. (2000). *How people learn: Brain, mind, experience, and school* (2nd ed.). Washington, DC: National Academy Press.

⁵ Brown, B. (2004). Discursive identity: Assimilation into the culture of science and its implications for minority students. *Journal of Research in Science Teaching*, 41(8), 810-834.

⁶ Nasir, N. S., Rosebery, A. S., Warren B., & Lee, C. D. (2006). Learning as a cultural process: Achieving equity through diversity. In K. Sawyer (Ed.), *The Cambridge handbook of the learning sciences* (pp. 489–504). New York: Cambridge University Press.

⁷ Bekerman, Z., Burbules, N., & Keller, D. (2006). *Learning in places: The informal education reader*. New York: Peter Lang.

⁸ Miller, J. (1997). *Public perceptions of science and technology: A comparative study of the European Union, the United States, Japan, and Canada*. Madrid, Spain: Foundation BBV.

⁹ The MacArthur Foundation launched a 5-year, \$50 million digital media and learning initiative in 2006 to help determine how digital technologies are changing the way young people learn, play, socialize, and participate in civic life; see <http://www.digitalllearning.macfound.org/> for further information.

roles and practices undertaken in the educational setting, the Intel Learn Program uses “staff” and “learner” rather than the more common “teacher” and “student.”

The Intel Learn curriculum consists of two 30-hour units: *Technology and Community* and *Technology at Work*. *Technology and Community* introduces learners to skills for word-processing, graphics, spreadsheets, multimedia, and Internet research. Learners use technology to understand, design, and create products relevant to community life (e.g., flyers, calendars, news articles, multimedia presentations). *Technology at Work*, the second unit, provides learners with more advanced experience in using computers as they might be used in a variety of jobs and careers (e.g., designing a survey that a public health worker might use, creating a business plan an entrepreneur might use). The units are typically divided into 2- to 3-hour sessions that meet two to three times per week.

In addition to the curriculum, the program provides structured training for program staff, who are typically community-based educators or classroom teachers working in the afterschool setting. The 40-hour training that each staff member receives mirrors the hands-on, project-oriented approach of the children’s program to a large extent. To understand children’s perspective, in the training participants engage in the program’s learning activities as children would do; they also role-play at facilitating the course after which they receive constructive feedback from their peers.

In each country, the program has been localized to suit the linguistic and cultural context. Using a model similar to the Intel Teach Program, experienced trainers from the global or regional level work with country-level trainers who, in turn, train the staff who work directly with children. In addition to building country-level training capacity, the model includes the cultivation of country-level pedagogical support teams, who further tailor the program during implementation and provide advice, additional training, and trouble-shooting as needed.

Governmental and nongovernmental agencies oversee the training and pedagogical support teams in each country. These agencies provide the staff, the physical facilities, and the technical infrastructure needed to implement the program. The types and combination of Intel’s partners at the national level vary widely from country to country, but in each case the support of ministries of education and local educational agencies is an essential element of the program model. Nonprofit foundations and consultants have also played key roles in the implementation of the program.

Since the inception of the Intel Learn Program, Intel Education has partnered with the Center for Technology and Learning at SRI International (SRI) to lead a worldwide evaluation of the program. Given Intel’s focus on program quality, SRI has undertaken three types of evaluation:

Formative Evaluation: ongoing analysis to provide feedback for use in continuous program improvement.

Process Evaluation: analysis of program delivery and fidelity to monitor implementation quality.

Outcome Evaluation: analysis of outcomes to determine the effectiveness of the intervention.

Consistent with standard practices in the field, SRI's evaluation has used a mixed-methods approach, often relying on indirect indicators to determine the degree to which the program is meeting its goals. This report discusses our evaluation methods and findings about the program through 2006, its third full year, reporting the successes of the program in promoting essential 21st-century skills and suggesting areas for program improvement.

DATA COLLECTION AND ANALYSIS

The worldwide evaluation of Intel Learn Program implementation is being conducted in partnership with local evaluators in all participating countries using a set of instruments that SRI developed. The evaluation organizations in each country are experienced in conducting educational research, but vary in their evaluation focus, resources, and priorities. Country-level evaluators come from governmental and nongovernmental organizations, including universities, nonprofit entities, and consulting firms.

Evaluation plays a dual role in Intel Learn, informing program development and documenting program successes. The exchange between evaluators and program developers takes place both at the country level and at the global level. All countries track the key set of benchmark indicators that are monitored at the global evaluation level, including learner program completion, assessments of learner work, and staff satisfaction with training and pedagogical support. Additionally, depending on the local context and needs for evaluation (e.g., formative evaluation or Ministry of Education reporting needs) as well as the national resources available, evaluators may report on other areas of program impact. For countries that choose to investigate topics or issues outside the basic evaluation, the report includes highlights of their data when they are pertinent to the global program findings.

The introduction of an electronic data template in 2006 facilitated analysis of Intel Learn quantitative results, and increased the consistency of results across countries. Thus, the report's numeric analysis and graphs mainly reflect 2006 data; however, some indicators (e.g., program completion rates) include previous years as well. Qualitative data (observations, quotes, high-level qualitative country reports) are inclusive of all 3 full years of program implementation.

Sources of data on the implementation of Intel Learn from the pilot in late 2003 through December of 2006 include daily attendance records, observations of centers by local evaluation teams, a staff training survey, a final staff survey completed at the end of staffs' first implementation with learners, staff logs, learner logs, and samples of learner work. In addition, some countries' evaluation experts have examined notes from staff support group meetings; quality control checklists; exchanges among staff members and center directors; and records of interviews with staff, parents, and learners.

This report is based mainly on a secondary analysis of evaluation data submitted to SRI by local evaluation experts in the nine implementing countries since program inception. The report is thus a high-level summary of common themes encountered in participating countries: some findings apply to the experiences of all countries, whereas others are particular to a given country, as indicated. In addition to evaluation findings, the report includes "stories of impact," which provide descriptive illustrations of the meaningful impact Intel Learn has had in learners', staffs', and parents' lives. All data and reports from non-English-speaking countries were translated by the participating countries' evaluation teams or by independent professional translators.

IMPACT AND OUTCOMES: QUALITY OF THE LEARNING ENVIRONMENT

CURRICULUM AND IMPLEMENTATION

Advocates of 21st-century approaches to instruction emphasize that the opportunities to learn provided in classrooms should be closely aligned with the real-world activities in which children are preparing to participate.¹⁰ The fundamental characteristics of the activities themselves should therefore be patterned after the target environment—the 21st-century workplace—insofar as possible. Rather than prioritizing students’ accumulation and reproduction of factual and procedural information, and expecting that process to transform into a critical, analytic approach, the learning environment should prioritize engagement in rich, immersive activities. These activities should entail the identification and analysis of problems, creativity and innovation in developing solutions to the problems, communication and collaboration among students in the work process, and information and media literacy. Within a framework of problem solving and creativity, students are naturally motivated to seek, locate, and apply relevant factual and procedural knowledge.

The starting point, then, of the analysis of impact and outcomes is curriculum design. The opportunities to learn that are provided to students determine the degree to which they will be able to learn about and demonstrate 21st-century outcomes. It follows that, to know if students are learning 21st-century skills, we need to analyze the nature of their learning experiences, particularly the types of activities they engage in that are intended to promote 21st-century learning.¹¹ SRI’s analysis of the Intel Learn Program curriculum and implementation design indicates that the program contains many of the elements that experts consider important for providing 21st-century learning opportunities, including:

Thematic instruction. In thematic instruction, a set of activities or lessons focuses on a big idea or broad concept. A theme allows for the application of a wide variety of skills, and for the deepening, integration, and development of new knowledge. Both the Intel Learn Program units, *Technology and Community* and *Technology at Work*, allow learners to develop a thematic and cohesive understanding of key aspects of social life and the use of appropriate artifacts (e.g., maps, spreadsheets, newsletters, planning documents).

Problem identification and solution. “Textbook” problems typically require little to no analysis to achieve understanding of the nature of the problems, and support only the development of low-level skills for solving them. To develop the types of strategic thinking needed to solve real-world problems, students need to understand the intrinsic properties of the problems themselves. In the Intel Learn

¹⁰ See, for example, <http://www.21stcenturyskills.org> for materials prepared by the Partnership for 21st Century Skills.

¹¹ Moss, P., Girard, B., & Haniford, L. (2006). Chapter 4: Validity in educational assessment. *Review of Research in Education*, 30(1), 109-162.

Program, children are presented with complex problems and scaffolded in their efforts to analyze and address each problem.

Relevance. Content that is relevant to the context of their lives leads students to deeper engagement and deeper thinking. Relevance is enhanced by instruction that helps students draw connections between what they are learning and how they can put the knowledge to use, especially in developing solutions to challenges facing them or their communities. Building on existing examples from students' local environments, the Intel Learn Program guides learners to design and create products that directly address issues of concern or meaning in their lives.

Active exploration. Students are better prepared to acquire and remember new information, strategies, and skills once they have spent time exploring a challenge or problem for themselves; that is, without receiving explicit directions or answers at the outset of a lesson. Each Intel Learn Program session begins with a period dedicated to active exploration, after which learners are encouraged to consult resources and one another to gain new skills or find answers to questions. Didactic instruction is kept to a minimum.

Choice and autonomy. An environment that supports the development of 21st-century skills provides students with a measure of choice in the activities they undertake; the strategies and tools they use; and the creative aspects of their plans, projects, or designs. Throughout the Intel Learn Program curriculum, children are given choices about the activities and projects they undertake, the tools they use, and the approaches, designs, and strategies they develop in creating their own, unique content.

Cycles of creation. Students' ability to use technology effectively, to think critically, and to collaborate meaningfully with others is enhanced best by taking place in a *cycle* of generating and improving their work. In each cycle, students plan, execute, revise, reflect on, and share their insights about the product or solution they are developing. The Intel Learn Program leads children through a process of planning, doing, reviewing, and sharing their products for feedback that can lead to further reflection and revisions.

Collaboration and communication. A key requirement of the 21st-century workplace is the ability to communicate effectively with colleagues to set goals, identify and analyze problems, and deliver solutions. Collaboration is built into the Intel Learn Program, with children sharing course materials and computers in addition to working together to create technology products.

Authentic feedback. In 21st-century learning environments, students work on activities or projects that have no single, specific outcomes. Instead, with the help of others, students must assess their own work in relation to how well it serves the purposes for which it was intended. The Intel Learn Program provides a clear structure for feedback from staff and peers that helps learners improve their work and develop critical perspectives on it. The opportunities the program provides for

learners to give useful feedback to other learners also develops their critical-thinking and collaboration capacities.

Teacher as facilitator. Rather than serving exclusively as an expert who provides information, the 21st-century teacher facilitates students' research, development, application of skills, and creation of original work products. The teacher-as-facilitator helps students actively build on their strengths and incorporate their interests into their work. The Intel Learn Program staff training and pedagogical support thus emphasizes techniques for course facilitation that reduce or eliminate didacticism.

Use of 21st-century tools. Educational technology can support change, positively affecting an array of educational outcomes such as improving school attendance, deepening conceptual understanding in core school subjects, and promoting wider involvement in community development.¹² Yet, to achieve positive outcomes, programs that integrate technology into educational practice must be designed in accordance with state-of-the-art understanding of how children learn. The use of technology in the Intel Learn Program is consistent with the goal of having children learn technology skills while creating useful content.

The original version of the curriculum included all these elements, and each has been strengthened through revisions. For example, some characteristics of the course materials initially made them difficult for children to use. Changes in the materials' design based on formative evaluation feedback made them more user-friendly, increasing children's ability to independently find information they needed about activity guidelines or technology skills. In addition, evaluation data had shown that learners viewed certain reflection exercises as redundant and unhelpful, prompting the restructuring of these exercises to make them more useful and collaborative. Evaluation data collected after the materials were revised showed that the revisions solved many of the problems. Overall, the course materials produced and distributed since the 2005 revisions have been very well-received.

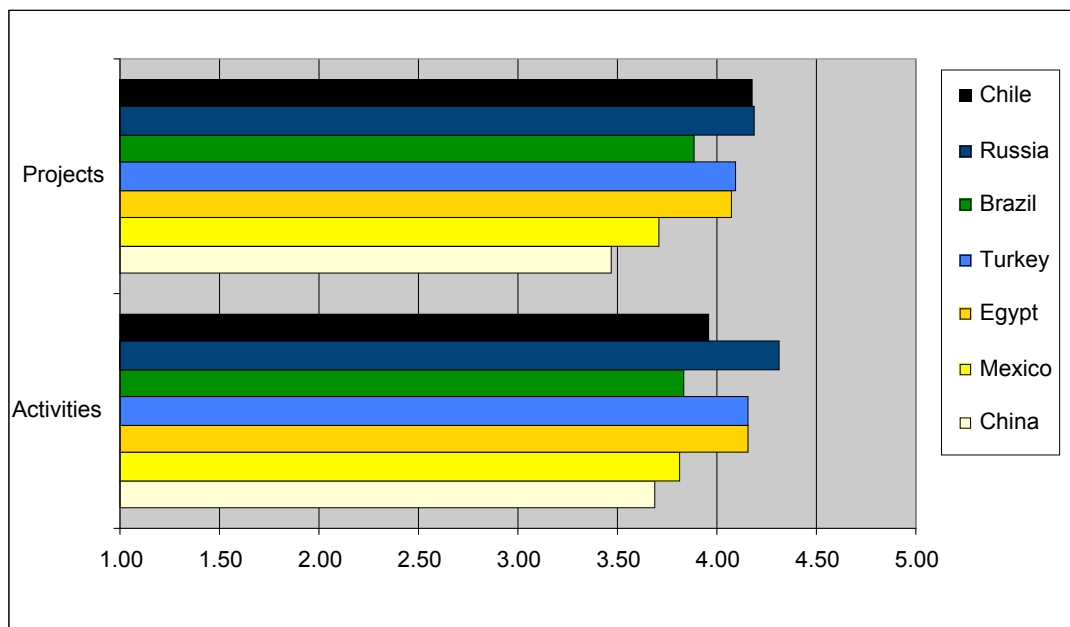
At the same time, all reports from country-level evaluators continue to include suggestions for ways to improve materials. Many of the suggestions regarding materials center on improving translations and localizations. The biggest difficulties for translation have occurred in the area of technical terms; "critical thinking" is one of the most challenging. Occasionally, the language used in the learner materials did not suit its audience, as was the case with the Brazilian version of the *Technology at Work* materials used in 2006. At the end of the year, evaluators quoted one learner who said the vocabulary used in the materials was so difficult that, "[it] looks like it's not my language." Also in 2006, Chinese evaluators reported that certain key terms, such as "community" and "project," are still not well-understood, despite 3 years of program implementation, and other portions of the course materials are still not translated well. In addition to technical vocabulary, the general reading level for the materials still needs to

¹² Kozma, R. (2005). National policies that connect ICT-based education reform to economic and social development. *Human Technology*, 1(2), 117–156.

be adjusted in some cases. Reading level remains a challenge for the youngest learners in Egypt, Mexico, and several other countries, including Brazil as noted. Undoubtedly, many translation and localization problems have been solved in successive waves of curriculum implementation, but it is difficult to determine consistently across countries whether the materials have been retranslated and reprinted, rather than being subject to *ad hoc* solutions by staff during implementation. In our analysis of 2007 data in 2008 we will seek to answer this question, which is an area worthy of ongoing attention.

Evaluation data show that most activities and projects are appropriate to the local culture. But there are a few exceptions. Stamps and business cards, for example, are unfamiliar and not culturally relevant for Bedouin learners in Israel. Brazilian evaluators reported similar challenges for their Native Indian populations for activities involving stamps, street signs, and addresses. Turkish staff reported that the reference guide, article, and statistics activities were not relevant to their learners' everyday experiences. Seven countries provided data in 2006 on how well-suited staff thought activities and projects were to learners' interests and ages. As shown in Figure 1, activities were generally seen as well-suited to learners' needs (average rating of 3.98 out of 5), as were projects (average rating of 3.94 out of 5).

Figure 1. Suitability of Activities and Projects to Learners



Legend for the scale of 1 to 5: 1 = not at all suited, and 5 = extremely well-suited. Data on the suitability of activities and projects are not available for India or Israel.

In addition to continuing issues about translation and localization, evaluators have noted a few persistent problems during the 3 years of program implementation through 2006. The major one is time: learners do not have sufficient time in some situations to delve deeply into or complete the recommended activities. This problem is most pronounced in the *Technology at Work* unit, but other circumstances (e.g., the speed with

which younger children in China can write characters) also make time constraints difficult to manage. Staff have responded to this difficulty in various ways, including reducing the number of required activities, simplifying activities, or having learners work on their activities outside of session time. Some staff recommended adding additional sessions to the course.

Staff reported that learners often lacked the mathematics skills needed to complete the spreadsheet activities, and staff recommend more information in the course materials to scaffold learning in this technology area. Another suggestion is to add mathematics calculation activities, which would have the added benefit of helping learners with their schoolwork. Some staff recommended that the curriculum be made easier to use by adding pictures of button icons to the text. Other suggestions included: emphasizing the larger goals of the program repeatedly to learners; adding a checklist to the beginning of each activity, including “alerts” for staff regarding concepts in *Technology at Work* that pose particular challenges for learners; and adding basic computer skill training for learners with no computer experience.

Although the *Skills Book* generally was found to provide valuable information and to have improved in format over previous versions, the size of the printed version makes it difficult for learners to search, and evaluations from several countries recommended that the book be divided into separate books, each containing one section from the existing *Skills Book* or made available electronically in their country if it was not already. Countries pilot-testing the CD version of the curriculum materials in 2006 reported varying results. The size of the PDF file often froze or severely slowed computers in China, and 45% of staff surveyed in that country reported that children had difficulties switching among windows. Low levels of use of the electronic version of the curriculum in Russia were attributed to technical problems (particularly with opening PDF files when changing operating systems) and to the high interest that children had in looking at the hard copy version of the skills book together. In Brazil, however, staff reported high levels of success using the CD version of the materials, despite the slowness with which content opened.

Several countries’ evaluation reports suggest that learners need more opportunities to exercise initiative and creativity. Some staff in China find that the numerous examples and steps to follow in each activity constrain learners in thinking as creatively as they might. Reports from Brazil, India, and Mexico recommend that learners be allowed to propose project topics, which would make them more authentic and personally significant.

Although evaluation findings show that staff have many ideas for improving the curriculum, evaluation data from all participating countries show that the curriculum is, in general, very useful and well-suited to its purposes. SRI’s evaluation also indicates that many of the difficulties with implementation result from limited staff understanding of, or experience with, implementing the program skillfully, rather than resulting from characteristics of the course materials *per se*.

THE RELATIONSHIP BETWEEN STAFF AND LEARNERS

One of the most ambitious goals—and the biggest challenges—of the Intel Learn Program is changing the nature of the relationship between the adults and the children in the classroom setting. For most people, education is equated with didactic, transmission-oriented teaching, with the teacher imparting knowledge to students. The Intel Learn Program is built on the idea of instructor as facilitator and of students as active participants in learning.

By and large, program efforts to promote a facilitative approach to instruction have been highly successful. The 40-hour training for the program allows staff to role-play many of the specific actions they will undertake as facilitators, and to observe and critique other staff as they do the same. When staff begin implementation, most continue to rely and build on the methods they practiced while in the training course. In Mexico, when a learner asks a concrete question about how to do something, the staff typically respond, “How do you think it can be done?” In China, more than 80% of staff implementing the program report doing so according to the guidelines presented in the training. For the ones who report varying from the method, most note that they made revisions to adjust the course to meet the individual needs of local learners or to suit the local culture better.

However, some traditional teaching remains. Both Russia and Turkey reported that staff found it hard to break down learners’ conceptions of what a teacher should be and should do. A staff member in Russia said, “I’m trying to convince [the learners] that the independently obtained knowledge and joint problem-solving are much better than the teacher’s prompting.” Staff also have trouble resisting the urge to answer learners’ questions directly. A staff member in Turkey said, “it is so hard to keep your mouth shut when the answer was right there in front of [the learner’s] face...telling or demonstrating how to do it is so much easier than directing them to the *Skills Book* or other students.” In Egypt, staff members who are teaching the course for the first time tend to resort to traditional teaching, and making the change is also difficult for younger learners. The switch to a nontraditional pedagogical style remains a challenge for some staff, and many countries recommended increased and ongoing training to support staff as they learn new ways of teaching and learning.

Classroom management is a common concern among new staff, but, turning to the case of China again, we see significant drops year by year in the percentage of staff struggling with classroom management problems. (2004: 43.8%; 2005: 22.4%, and 2006: 15.8%). This finding suggests that as the program matures and staff gain experience, their ability to manage learners effectively increases as well. Many staff face their greatest difficulties in promoting collaboration among those few learners that tend to stay outside the social mainstream. Staff note that they cannot force collaboration. Yet, because the majority of children in the program actively engage in the activities and projects collaboratively with peers most of the time, it seems appropriate to reassure staff that the occasional child who is uninterested in working with others does not undermine other successes in facilitating the program.

Overall, all countries reported positive interactions between staff and learners. Intel Learn classrooms are described as friendly places where learners and staff feel at ease. Learners feel comfortable going to their peers for help, and staff encourage them to find answers to their questions either by asking peers or by consulting the *Skills Book*. Israel evaluators reported that the program succeeded in breaking down traditional classroom mores, resulting in egalitarian relationships between learners and staff and authentic learning opportunities. One learner from Israel said, “I felt that the instructor was not like a regular computer instructor who dictates what we should do.”

Other examples abound. Egyptian evaluators reported that several classrooms had two staff members, which provided learners with a good opportunity to see a model of collaboration. Staff in Brazil were quite comfortable with the informal learning environment, and observers said that staff members skillfully encouraged learners to collaborate and work independently of them. When problems arose, it was generally because a learner did not want to participate, and the problem was resolved in consultation with the school guidance counselor or family members. Staff in India said that because they act as facilitators, rather than traditional teachers, the learners grasp more of the content. Evaluators in India reported that they saw a friendly classroom environment when they visited *Technology at Work* sessions, which they believe fostered a spirit of collaboration in the learners. *Technology at Work* learners in India already knew their facilitators from *Technology and Community*, and evaluators said that positive interactions between staff and learners were even more evident in *Technology at Work*.

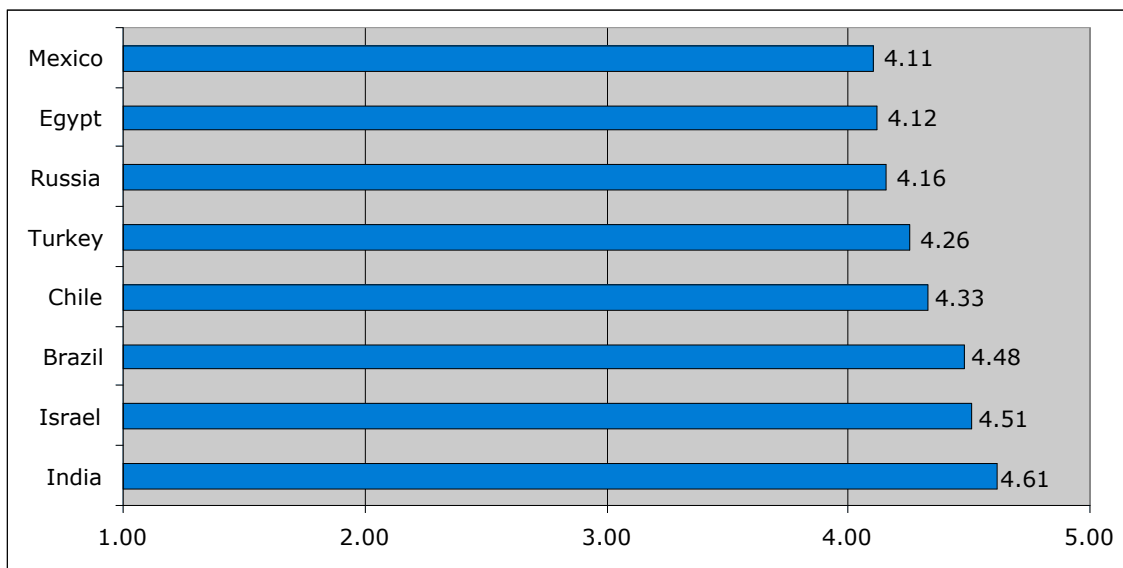
The following quote from a Russian teacher suggests the potency of the program in altering traditional relationships between teachers and learners:

Thanks to the Intel Learn Program, we were able to discover new aspects about some of the children’s personalities. Those children who had a reputation for being behaviorally challenged turned out to be able to find very imaginative solutions to the tasks. Thanks to the program, they’re learning collaboration. But the most interesting thing for the teacher is to learn children’s views on local community and what they think are the main problems it has.

IMPACT AND OUTCOMES: STAFF TRAINING AND RESPONSE TO THE PROGRAM

Immediately following the training, staff are asked to rate its usefulness. In 2006, as in previous years, staff were asked how well the training had prepared them to facilitate the course. Staff in all the countries that reported data rated their preparedness at higher than 4 out of 5 points, indicating that they felt well-prepared. Some variation did occur by country, as displayed in Figure 2, with staff in India, Israel, Brazil, and Chile giving the highest ratings for their preparedness as a result of the training. Data were not reported from China.

Figure 2: Usefulness of Training (as rated immediately following training, 2006)

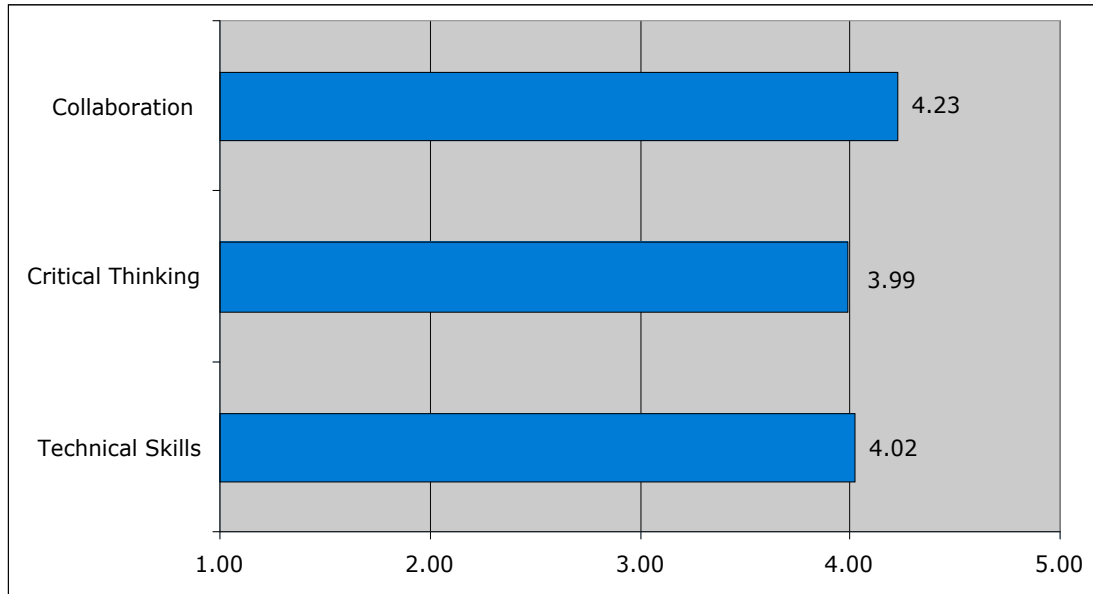


N = 2,330 staff in 8 countries. Legend for the scale of 1 to 5: 1 = not at all prepared, and 5 = extremely well-prepared.

Staff were also asked about the usefulness of the staff training in the final survey, shortly after they had facilitated the course; that is, after one or more rounds of implementation with learners (see Figure 3). Staff were asked to rate their preparedness to facilitate learning in each of the three main Intel Learn skill areas: technical skills, critical thinking, and collaboration. Staff collectively rated their preparedness in technical skills at 4.02 out of 5, critical thinking at 3.99, and collaboration at 4.23, suggesting that facilitating the course may have been more challenging than they anticipated. However, we know from research that teacher self-report on program satisfaction immediately following any professional development training tends to be high. Also, the differences may be due to the way the questions were worded in the new instruments introduced in summer 2006. Generally, these data show that staff appeared to be satisfied overall with their preparedness level, especially in regard to their ability to encourage learners to

collaborate. However, the data suggest that room for improvement exists in staff's preparedness to facilitate learning of technical skills and critical thinking.

Figure 3: Usefulness of Staff Training (as rated after facilitating the course)



Legend for the scale of 1 to 5: 1 = not at all prepared, and 5 = extremely well-prepared.

Although staff expressed general satisfaction with the training, staff across countries felt that the training should include:

- New, active pedagogies to reduce the amount of lecture and passive learning in the training.

- More models of skilled facilitation for staff to emulate and more time for staff to practice.

An important goal of the Intel Learn Program is to help staff move from a traditional to a more student-centered pedagogy. Evidence suggests that staff members' approaches to teaching change as a result of their participation in the program. Immediately following the staff training, staff in all countries rated their preparedness to facilitate classes according to nontraditional methods at 4.30 out of 5. After facilitating the course, staff across countries rated the degree to which they had actually changed as a result of participation in the program at 3.99 out of 5, still indicating a high degree of change. (Israel did not provide data on these outcomes.)

SUPPORT FOR STAFF

On completion of the course, 80% of staff reported that they had faced significant challenges, but most (65%) said they were able to overcome those difficulties. Nearly half of staff (47%) reported that they received sufficient support to address their difficulties, another 36% said they received some support but would like more, and 17% said they did not receive the support they needed.

Those staff who reported challenges in facilitating the course were asked to explain the nature of the challenges. Table 1 summarizes those challenges, which are also discussed in the previous section:

Table 1: Challenges in Implementation

Type of Challenge	Percent of Staff Reporting
Helping learners with critical thinking	26
Helping learners collaborate with peers	20
Helping motivate learners to engage actively in the program	16
Helping learners use the technology	15
Managing the classroom and the learners' behavior	9
Using the curriculum as shown during training	9

Two of the major learning goals for the program—critical thinking and collaboration—appear to be more challenging for staff than the third, technical skills. (However, this finding runs somewhat counter to the finding that staff felt the training prepared them better for facilitating collaboration than for critical thinking or technical skills; see the discussion above.) Staff did not appear to have great difficulty with classroom management, but they did face some challenges in motivating learners to engage actively in the program. It is worth noting, however, that 84% of staff did not report having difficulties motivating the learners in their classes to engage actively, and for the remaining 16% of staff, it can be assumed that only some of the children in their classes presented challenges. Overall, this finding indicates a very high percentage of children who are actively motivated and engaged in the program.

In open-ended responses, staff across all countries expressed the need for a user-group or other forum for sharing best practices and experiences in supporting line staff and on-going professional development experiences.

STORIES OF IMPACT

Intel Learn in Irshad, India*

Ms. Gupta, the social studies teacher and Mr. Singhvi, the science teacher of an English Medium School, find the nature of their classes has changed. It all happened after the majority of their students attended the “special” (as they call it) afterschool program in computers in the school lab, Intel Learn. “Students were often reluctant to come up with answers to the questions asked in the classroom and the concept of sharing was unknown to them,” remarked the teachers. Today, these two teachers said students are becoming more confident and comfortable in working in groups assigned as part of the curriculum.

**Story told and translated by local evaluators in India. All names have been changed to protect the confidentiality of participants.*

RESPONSES TO THE PROGRAM

Despite facing some challenges, the overall experience of staff facilitating the program has been consistently positive, especially with regard to learners' responses to the program. Many staff who teach in the program have shared their thoughts about its outcomes. The learners' enthusiasm for the program is one of its most readily evident outcomes. As one Russian staff member said:

I would like to mention the fact that parents were glad to see their children so enthusiastic about what they do.

In addition to learner enthusiasm, staff members note program specific changes in learners' behavior. An Egyptian staff member offered:

When I compare the Intel Learn students with other students I teach at my school, I find that the Intel learners are more independent, more collaborative at school and at home, and better behaved in class.

A staff member from India noted the relationship of the program to 21st-century workforce goals:

I personally think that the beauty of this program is not only to teach technology literacy but also to take learners beyond it, thereby exposing them to think, brainstorm, share, and then write in their own words. This is the need of today, when we step out of our schools to the real workplace.

Similarly, a volunteer staff member working in a rural district of Brazil explained:

In a community like ours, where the habit of sharing, giving ideas, and speaking out is not part of the culture, the program came at the right time. Since the program was established, I have been able to observe that the change in the behavior of the students is quite apparent. Thus, the program is very good for the learners and also for the staff.

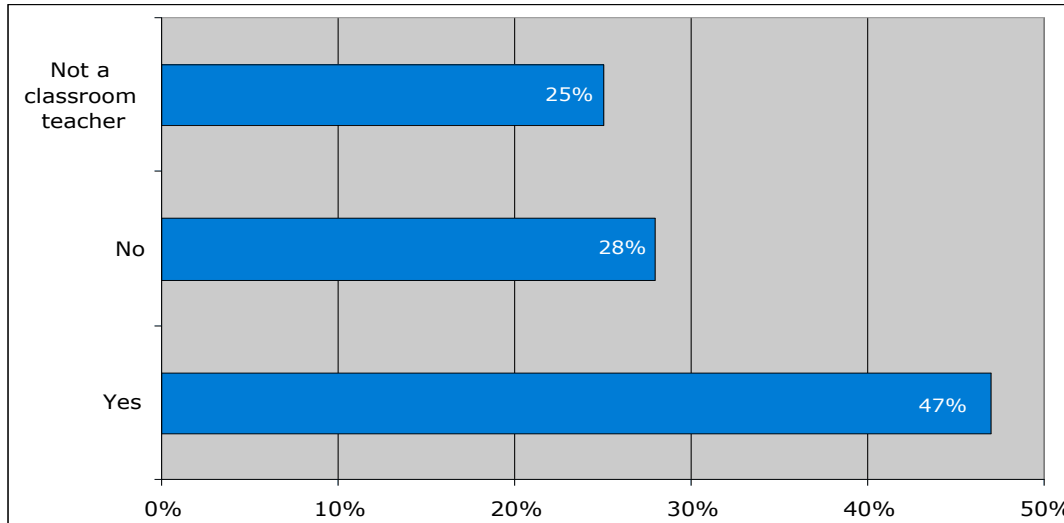
An evaluator in Mexico summed up her observations of children's experience with the program as follows:

I have been working for more than 15 years in programs for children, and this is the first time that I have seen so much enthusiasm, commitment, and joy among the children... I am touched even more when I see the children's ragged clothing and their shoes with holes in them, and know almost certainly that their stomachs are empty.

The program also has a clear secondary effect: it serves as a catalyst for broader change in educational practice. A high-level Chinese education official during an interview with SRI in 2004 explained that the Intel Learn Program exemplifies the type of reform for in-school education that she hoped to see instituted. Her view has been echoed repeatedly over the years by other program stakeholders, who see its value not only as a community-based program or a technology-training program, but also as a model educational program. In 2006, 56% of Intel Learn staff were current or former classroom teachers. Many of these classroom teachers indicated that participation in the program had influenced their subject matter teaching during the school day. As shown in Figure 4, approximately half (47%) of these staff said they had found themselves using facilitation techniques acquired in the program when teaching other subjects. This response represents nearly two-thirds (60%) of those who identified themselves as

classroom teachers. Because the Intel Learn Program is intended to train staff specifically to implement the program curriculum and, unlike other Intel professional development programs, does not explicitly target teachers' general pedagogical practice, this finding represents an unintended positive outcome of the program.

Figure 4: Use of Facilitation Techniques in Other Subjects



The story of one staff member, also a classroom teacher, from Turkey helps illustrate the impact of the program on teachers:

He was quite experienced as a public school teacher but was very enthusiastic about the new role he had to play in the class and looked forward to opportunities to encourage students to ask questions and seek for their answers. He wrote us that he was giving a small prize such as a candy bar to the student who asked the best and most useful question. He also mentioned that he had been thinking about retirement before the staff training. In fact he went to staff training to relax and spend several days out of his daily duties and environment. But starting from the training he felt the difference of the program that helped him remember something he had lost years ago: the joy of helping students learn. Now, he is not thinking of retirement.

Other program staff from around the world describe their experiences teaching in their regular classrooms:

I am using this method for my other classes also. The children like and learn more with this method.

I used to have students work in groups before, but with this program I believe I am doing things in a well-planned manner, and I feel more comfortable.

I think staff should realize that this method is not only the matter of this program, but it is the matter of a more contemporary way of teaching and learning.

I widely apply everything I learned during my trainings and workshops, and my professional growth has become very noticeable to me and to everyone I work with.

The program also has a positive influence on many sectors in the community, involving parents, government officials, and interested citizens in the program's processes and outcomes. In some instances, the program has even changed the relationship between the community and the school:

During the site visit to a primary school, it was impressive to see that, even during the summer holiday, the school operated as if it were a busy semester. Maybe one of the good things about this program is that school buildings open their gates like never before. We are used to seeing closed school gates during summer. They are like deserted western towns with no one in the buildings or even in the gardens... After the Intel Learn Program, that is not the case anymore. Not only students but also parents have an idea now that schools are a part of their community and may well be open any time. Not only students but parents also have many things to gain from schools.

In addition to redirecting children's behavior, community members in Mexico, as in India and elsewhere in the world, appreciate the program for the more significant outcomes in supporting good citizenship. As one child offered:

The facilitator lets us make graffiti, but now this is on the computer, and parents and the mayor are pleased that we are not painting the walls of the city hall... They even give us paper on which to print the things we make so that we can put them in our binders.

One evaluator's experience during a public presentation in Mexico reflects a common sense of the program's role in communities around the world:

When I was in contact by e-mail with the facilitator, Iliana¹³, I asked her about her center and she invited me to the presentation of their projects because they were going to receive a visit from the authorities from the City Council, so I went there on August 11 at 9 in the morning. As happened in the other visit, some parents and the Mayor's secretary were present. The awards for participation in the library workshops were presented and then those for the Intel Learn Course. When it was my turn to speak, I asked some of the children to comment on what they thought about the course, and their comments were about their happiness and surprise because they did not even imagine what they were going to learn. They also thanked the people who made it possible for them to have it. There was no projector for these presentations, which at first caused some difficulties, but later the parents showed their interest in seeing their children's projects, and they gathered around the computer of the team that was presenting the project and were happy and surprised to see what their children had done, particularly in the prevention projects. I again felt very moved when the parents thanked me for making it possible for their children to learn these things. For his part, the City Council's secretary said that they would be on the alert to continue supporting the course however they could.

One staff support team member from Mexico explained his feelings about the program as follows:

I believe that the Intel Learn Program is very... How can I say this? Revolutionary. It seems to go against the current of the present-day world: Shouldn't we be individualists in order to be successful in the new century? What is the community in these times? I really am delighted with the program because I think that it goes in the direction of integrated education and retrieves local elements to compete at the world level.

¹³ All names have been changed to protect the confidentiality of participants.

IMPACT AND OUTCOMES: LEARNERS

LEARNER PARTICIPATION

From orphaned children in India and Egypt, to native peoples in Brazil and Mexico, the Intel Learn Program has served learners from a diversity of backgrounds and geographic areas since its inception. Most come from working-class or poor families and attend schools with few resources. In all participating countries, the program is serving children who have dropped out of formal schooling, who are homeless, or who otherwise face highly constrained opportunities. Many of these children have never before seen a computer or touched a mouse. Yet nearly all engage with the program activities and gain valuable 21st century skills.

During its 3 years of implementation, 422,877 learners ages 8-16 have taken part in the Intel Learn Program. The countries with the greatest numbers of learners participating in the program have been China, with more than 170,000 participants, and Israel, with nearly 108,000 participants (see Table 2). Chile, which began implementation in 2006 and is the most recent country to adopt the program, served approximately 4,500 learners in its first year.

Table 2: Number of Learners Over Time

	2003/4	2005	2006	TOTAL
Brazil	—*	3,170	7,994	11,164
Chile	—	—	4,585	4,585
China	35,882	67,993	68,524	172,399
Egypt	—	4,834	50,420	55,254
India	2,500	10,442	16,000	28,942
Israel	13,066	41,146	53,598	107,810
Mexico	2,555	9,113	15,787	27,455
Russia	—	1,000	10,165	11,165
Turkey	—	990	3,113	4,103
TOTAL	54,003	138,688	230,186	422,877

* A dash indicates that the program had not yet been launched in this country.

In addition to the number of learners who have participated in the program, an important indicator of program success is the completion rate (i.e., learners who begin the program and subsequently participate in most or all sessions). Because Intel Learn has been implemented mainly in noncompulsory educational settings where children freely “vote with their feet” about whether or not to attend, program success depends on attracting, motivating, and engaging children even while they undertake serious learning activities.

STORIES OF IMPACT

Intel Learn in Mexico City, Mexico*

There is a Center for Street Children in Mexico City. While the Intel Learn course was being given, when it came to the project stage, Ms. Reyes' group was discussing how to do the final project. The children were very familiar with the streets, because that is where they live, and they proposed to Ms. Reyes:

“Could we do a project on signals?” “Well, what about the signals?” Ms. Reyes asked them. “Yes, teacher, the thing is that there are a lot of accidents on the corner of Dr. Erazo Street, next to the Centers. Cars don’t stop and everyone wants to cross at the same time.”

-“So we want to put up signals that say: ‘Stop, Wait,’” explained 11 year-old Maria.

-“It also hurts us, teacher, because it is really difficult to get them to let us cross; you have to dive out into the street in order to get the cars to stop. Didn’t you say that the project has to do with what goes on in our neighborhood?”

-“Well, I think it is a good idea. Go ahead with the project,” the facilitator told them.

The final project was presented at the closing of the course and afterwards the idea came up of making it a reality:

“What if we go to the precinct so they can see what we did?”, one learner asked. There was a request for a hearing. Now on Dr. Erazo Street, thanks to the “signals” project, there is a traffic light and a speed bump that have contributed to preventing accidents, and as one child said, “Now we don’t have to be late when we come to the Center because the cars stop at the red light and the speed bump.”

<p>PROBLEMA</p> <ul style="list-style-type: none"> Los automovilistas no respetan los semáforos y provocan accidentes máximo 3 veces a la semana por ejemplo: Choques Accidentes Atropellamientos en donde la gente puede llegar a morir. <p><small>Información: Autor: Amanda López Fecha: 10/01/2010 Iniciador: Amanda López</small></p>	<p>Ubicación de semáforo</p>  <p><small>Información: Autor: Amanda López Fecha: 10/01/2010 Iniciador: Amanda López</small></p>	<p>SEMAFORO</p> <ul style="list-style-type: none"> Es importante que las personas sepan el significado del semáforo. El verde es para avanzar El amarillo para disminuir la velocidad del auto. El rojo para alto total  <p><small>Información: Autor: Amanda López Fecha: 10/01/2010 Iniciador: Amanda López</small></p>
<p>Solución:</p> <ul style="list-style-type: none"> Ir al municipio para comunicar este problema y así que puedan haber más policías en las avenidas y calles para poder prevenir los accidentes y choques y evitar muertes de personas que viven en nuestra colonia.  <p><small>Información: Autor: Amanda López Fecha: 10/01/2010 Iniciador: Amanda López</small></p>	<p>Soluciones:</p> <ul style="list-style-type: none"> Poner más policías en las avenidas para que los automovilistas respeten los semáforos  <p><small>Información: Autor: Amanda López Fecha: 10/01/2010 Iniciador: Amanda López</small></p>	<p>LOS TOPES</p> <ul style="list-style-type: none"> Poner topes si los automovilistas continúan pasándose el alto.  <p><small>Información: Autor: Amanda López Fecha: 10/01/2010 Iniciador: Amanda López</small></p>

*Story told and translated by local evaluators in Mexico.

All countries have reported data on the number of learners who started and finished the program in a sample of their centers since the program’s launch in their country. Combined results indicate a high overall completion rate of 93%. Completion rates ranged from 80% up for all countries across all years, with results as high as 100% in Israel where the program takes place as an elective during the school day. Although it still operates mostly as an afterschool program in China, including the program as a supplemental activity in the school day also contributed to the high completion rates in that country (see Table 3).

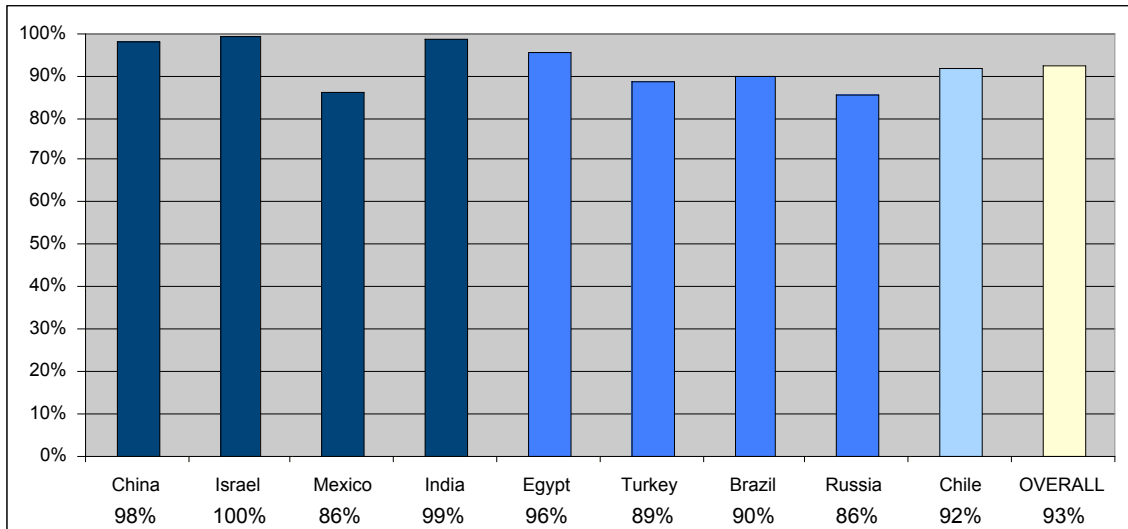
Table 3. Completion Rates since Program Inception

	2003/04	2005	2006	Average Across Years
China	Not reported	98%	98%	98%
Israel	99%	Not reported	100%	100%
Mexico	88%	80%	90%	86%
India	98%	99%	99%	99%
Egypt	—	93%	99%	96%
Turkey	—	92%	85%	89%
Brazil	—	Not reported	90%	90%
Russia	—	82%	89%	86%
Chile	—	—	92%	92%
Average Across Countries	95%	91%	94%	93%

In cases where learners did not complete the program, reasons cited typically related to family and school circumstances, rather than problems or dissatisfaction with the program. Reasons commonly cited were conflicts with family vacation or school schedules, problems with severe winter weather conditions, safety concerns over sessions held after dark, and learners’ need to study during school exam periods. Exam times at school had a particularly strong effect on attendance in some countries. Many of these problems, including conflicts with school demands, were easily solved by changing scheduling or other implementation factors to fit local needs better.

The notably high completion rates suggest the possibility that the data are reported inaccurately or based on different understandings of what should be counted as program completion. However, since the beginning of the program, the worldwide evaluation team has engaged in numerous discussions that emphasized a standard definition. During this time, completion rates have remained consistently high, even improving in some countries as the program matured. At this point, we believe that the uniformly high completion rates give strong indication of program success—particularly with regard to the attractive and engaging qualities of the learning experience. Figure 5 shows completion rates for the nine countries.

Figure 5: Program Completion Rate by Country, 2003/04-2006



China, Israel, Mexico, and India (dark blue) started the program in 2003/04. Egypt, Turkey, Brazil, and Russia launched the program in 2005. Chile launched the program in 2006. The overall average represents the completion rate for the program across the nine countries.

Beginning in 2006, all countries reported more detailed and comprehensive data about the characteristics of learners in the program. An analysis of gender reveals that at the global level, there was no difference between the number of male and female learners completing the program: 50% were female and 50% male (see Figure 6). However, some variation did occur by country; the number of females was higher in Israel and Russia (56% and 55%, respectively), and the number of males was higher in India and Egypt (59% and 56%, respectively). In India, evaluators reported that the program had an especially positive impact on the girls who participated, given that girls tend to have lower reading and writing skills in the regions served and are more likely to drop out of school. The Intel Learn Program provided these girls with the opportunity to gain confidence in technology and collaboration skills.

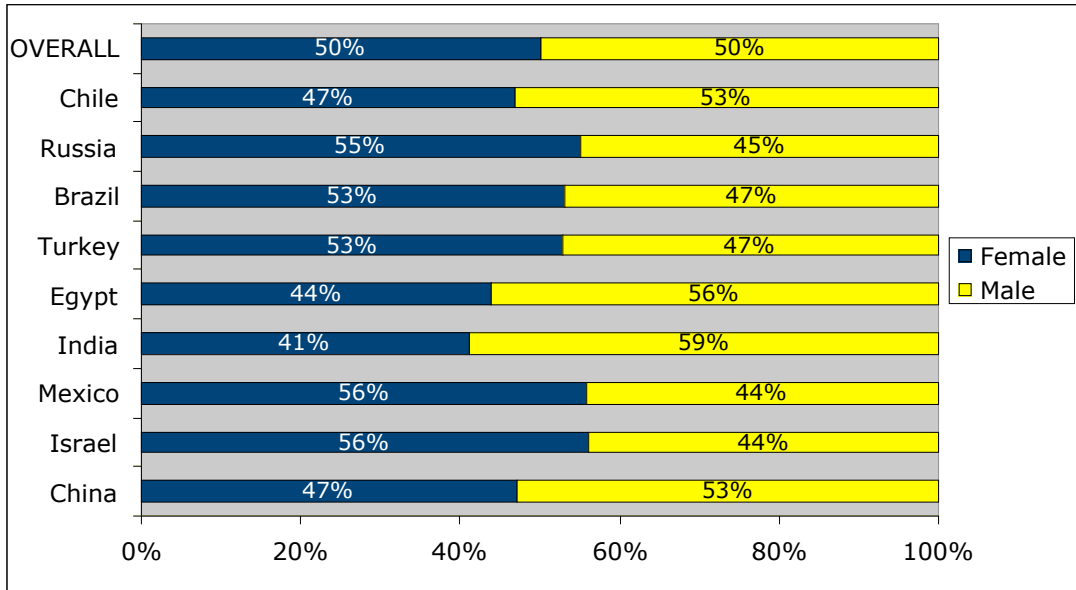
STORIES OF IMPACT

Intel Learn in Talka, Egypt*

In Talkha, a learner made an inventory count of the goods in his father's shop, using an excel sheet, to help his father improve his shop. "My dad", 15 year-old Ahmed said, "had a problem counting and recording the food that comes into his grocery store. On my computer at the Center I used the spreadsheet learning that I received in Intel learn to make a sheet and record of all my dad's inventory. I now update it for him on weekly basis and he wants to buy a computer for the store and wants me to teach him how to work on it by himself. There is more possible in his store now because he has things more organized and he can now tell which goods sell and which do not."

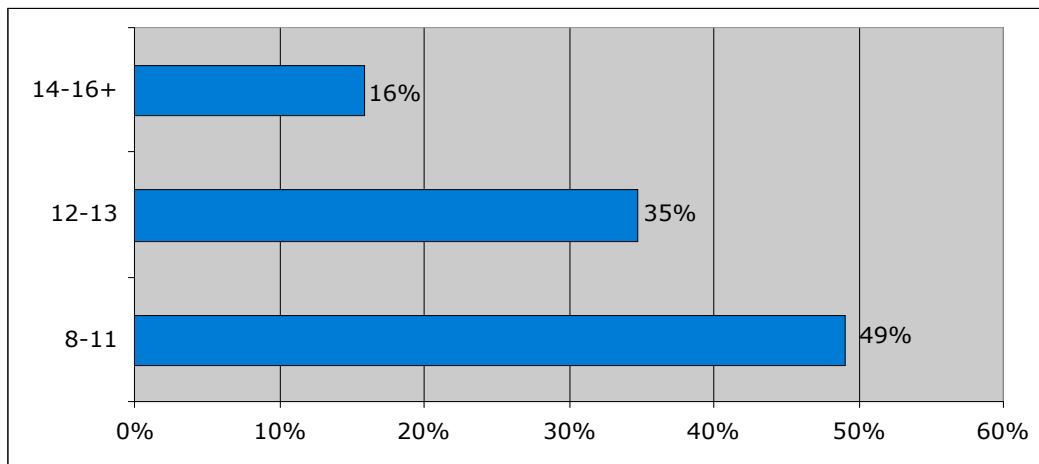
**Story told and translated by local evaluators in Egypt.*

Figure 6: Gender of Learners (2006)



Learners in the program fit within the target age range of 8 to 16. Learners were primarily between the ages of 8 and 13 in a sample of 205,958 learners from the 9 countries, with some 14- to 16-year-olds and a few learners above age 16 also participating in the program (see Figure 7).

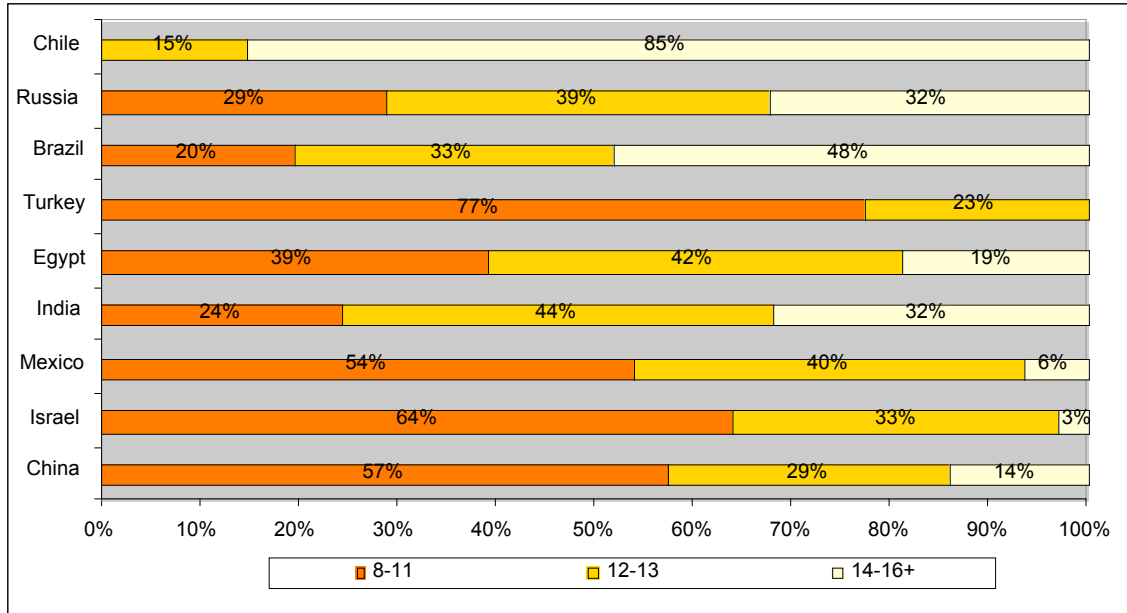
Figure 7: Age of Learners (2006)



Countries do differ significantly in regard to the age of learners, however, as shown in Figure 8. The ages of learners in the program appears to depend in part on how the program fits within the country's or region's technology literacy goals. Some countries primarily target younger learners, as do Turkey (with 77% of learners aged 8-11) and Israel (with 64% in the younger age bracket). The majority of older learners come from Chile (85% aged 14 or older) and Brazil (48%). In its first year, Chile's program largely

took place in middle schools, whereas the majority of Israel’s learners are elementary-school aged children who take part in the program as part of their school day.

Figure 8: Age of Learners, by Country (2006)



LEARNING OUTCOMES

The Intel Learn Program engages children. Evaluation reports from around the globe provide examples of children’s enthusiasm for the program. Evaluators conducting site visits in Turkey reported that learners liked the majority of the activities in the course and were happy to have the opportunity to work on computers. One learner in Turkey said, “This is even better than playing with my friends outdoors,” and a staff member added, “I have never seen such a bright look in my students’ eyes before.” In Egypt, a learner persuaded her parents to cancel their vacation so that she could finish the course. Russian evaluators reported that learners in the program do not “get distracted” while they are working. Examples like these abound in all countries, illustrating how the program successfully captures learners’ interest.

In the final survey following implementation of the program with learners, staff were asked to rate learner outcomes at two points during the course: when learners began their final projects and on completion of the course. On average, staff rated learners well-prepared to undertake final projects in each of the three target areas of the program (see Figure 9). Ratings of learners’ abilities were somewhat higher for technical skills and for collaborative work with peers than for critical thinking.

STORIES OF IMPACT

Intel Learn in Pátzcuaro, Mexico*

Pátzcuaro is a city with a high concentration of indigenous people. There, in the community, there is a municipal library, which is the place where the Intel Learn Program is located. Emilio is the program facilitator who leads the program in a masterly fashion in Spanish or in Puhépecha.

The promotion for the courses attracted children from the nearby communities. It was good to see that a station wagon came from one of them with 8 or 10 children, since the person in charge of Public Safety, the immediate authority in the town, was in favor of having the little ones become educated and to acquire knowledge and skills in handling computer technology. But that day was different. The vehicle arrived with more people in it than usual. Some parents and people from that community, located about 30 kilometers from the library, had come along with the children. The reason for this was eloquent.

With a firm voice, one of them came up to Emilio and said to him: "We came to see how you teach the kids, but also to ask you to support us for one of these courses to be given to the adults so that they can learn how to do projects and apply 'to those above' for the things we need."

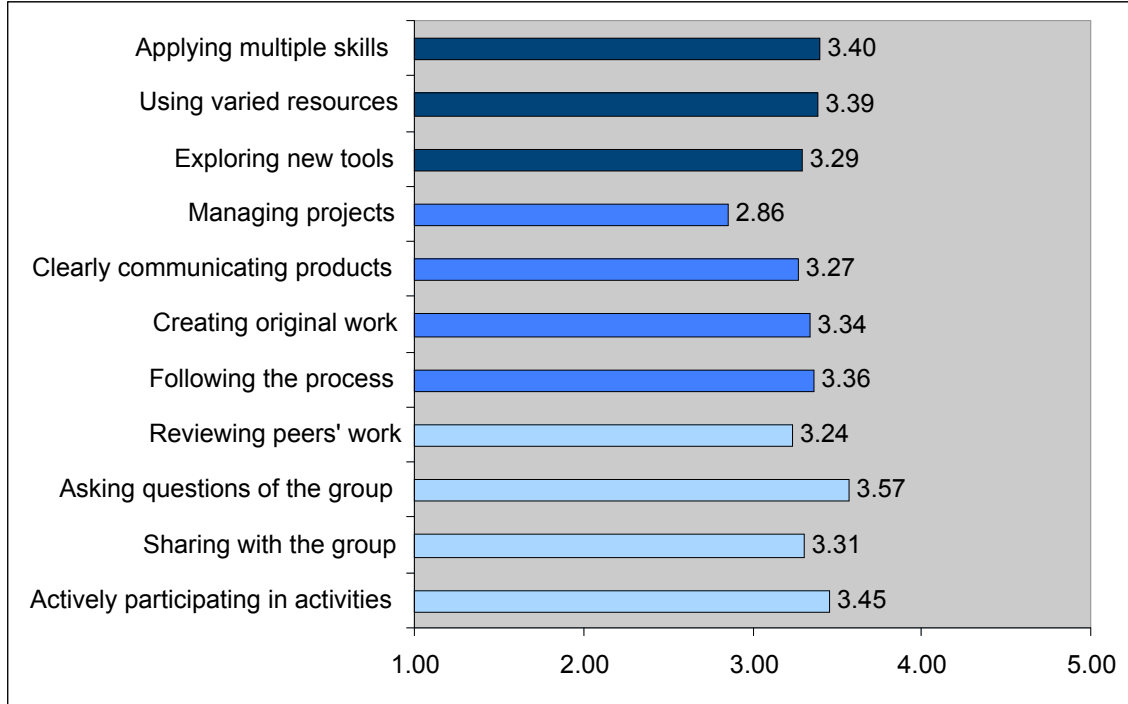
With his hat in his hands, which he was playing with to control the natural nervousness felt by people from the country, he added: "These kids are seeing the problems and they have thought up the solutions, and they are even going to send letters to I don't know whom to get them resolved. So we think that if we learn well, we can also apply for or plan things that we have left to one side for many years. Seriously, you are teaching them good things." while this person was speaking in a calm, quiet voice, others who had come with him were advising him in their own language.

Emilio, the Intel Learn facilitator, spoke to them first in their indigenous language, and then in Spanish. He told them that he was thrilled to know that they understood the work children were doing in these courses. In addition to learning to use the technology, he said, the children were looking at their community, its problems and assets, and were thinking how they could improve it. He promised to speak to the person in charge of the library about preparing something for the adults. They went away happy and hopeful.

Inside, there were 20 children, with faces burnt by the cold and covered with dust, but full of enthusiasm. One of the girls, who seemed to be a little afraid, asked Emilio, "Teacher, are you angry because our parents came?" "Not at all," he replied, "I see that they like what we are doing, that you are learning quickly, and have talked about it to other people. That is wonderful."

**Story told and translated by local evaluators in Mexico.*

Figure 9: Learner Preparedness for Final Projects

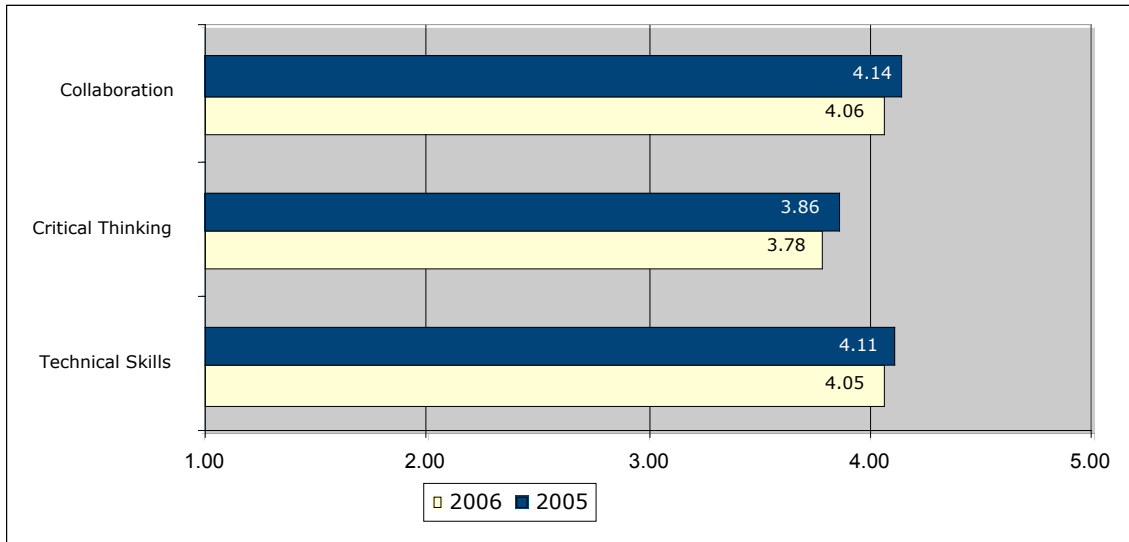


Legend for the scale of 1 to 5: 1 = not at all prepared, and 5 = extremely well-prepared. All countries, 2006 data. Indigo = Technical Skills, Dark Blue = Critical Thinking, Light Blue = Collaboration.

Because the new instruments developed in 2006 divided each of the main program goals into subcategories, we now have better data regarding which aspects of the goals are being best met. Ratings were relatively higher for a few subskills: using varied resources to learn new skills; applying multiple skills to complete an activity; following the process of planning, doing, reviewing, and sharing work; creating original work products that reflect learners' unique ideas; creating products that communicate clear messages and match intended purposes; actively participating in group activities; and asking one another questions and helping one another while working on projects. Ratings were slightly lower for exploring new technology tools; sharing goals, strategies, and ideas; and reviewing peers' work and giving constructive feedback. The only subskill notably lower than the others was managing the final, open-ended, complex project; this finding suggests that the most challenging aspect of the final project in the program centers on project management and that this area could be fruitful for focused intervention.

When asked to rate change in learners' abilities at the end of the course, staff indicated that learners' skill levels had improved greatly since the beginning of the course (see Figure 10). Staff rated the greatest levels of change in the areas of collaboration and technical skills. Evaluation findings in this regard are effectively the same across years, as expected.

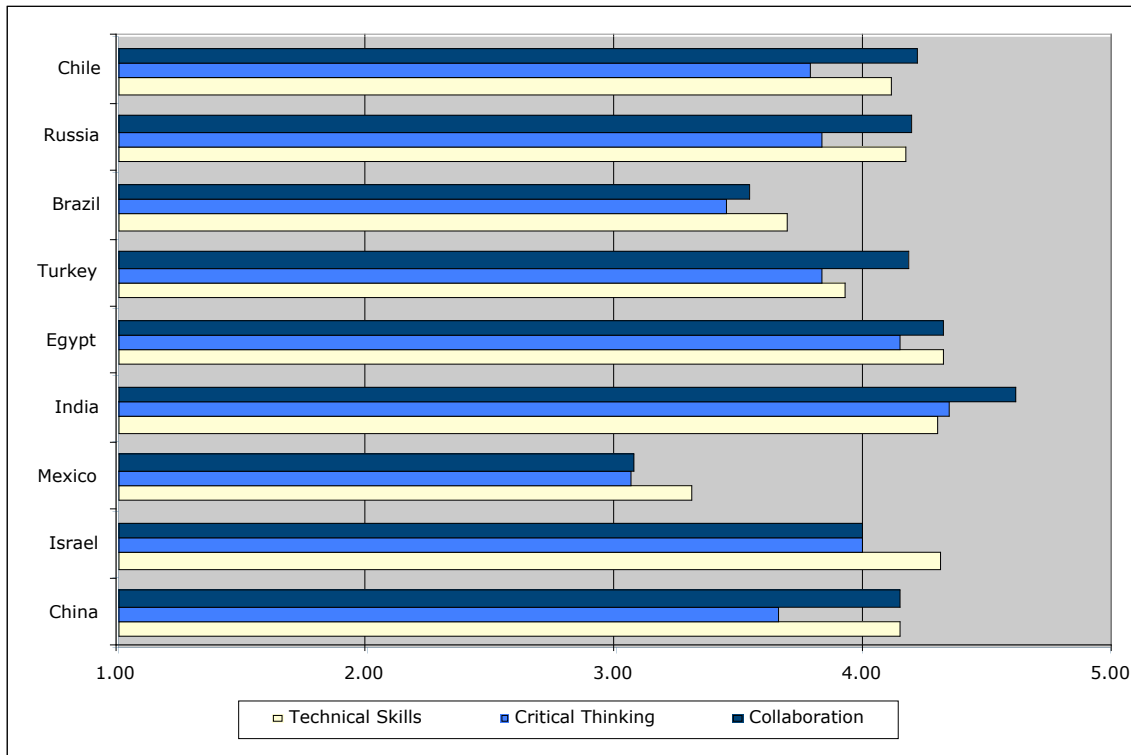
Figure 10: Learning Outcomes (all countries)



Legend for the scale of 1 to 5: 1 = no change, and 5 = a high degree of change.

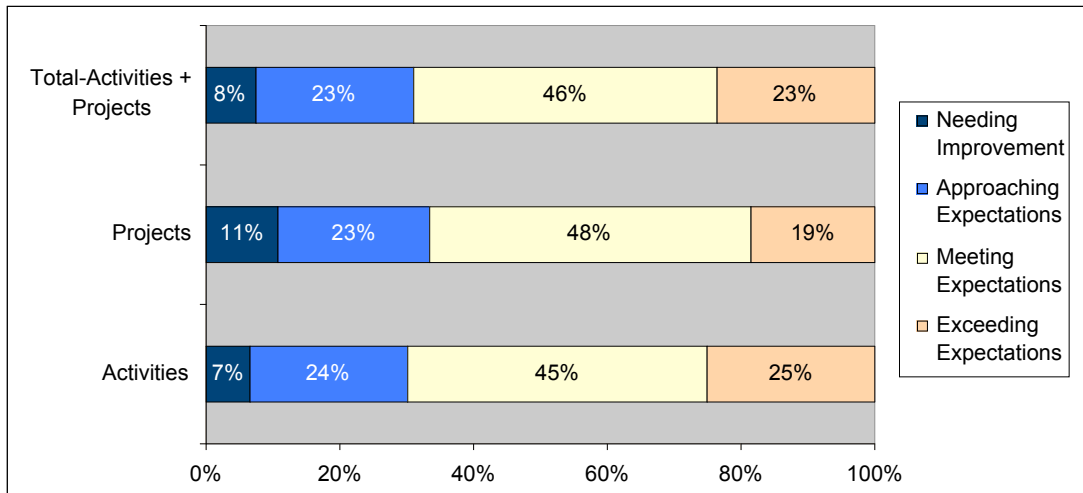
Staff analyses of learners' preparedness for project work and their final learning outcomes suggest that critical thinking remains the most challenging aspect of the program. This finding is consistent across countries, with the exception of India, where technical skills received the lowest outcome rating by a small margin (see Figure 11).

Figure 11: Learner Outcomes, by Country (2006 only)



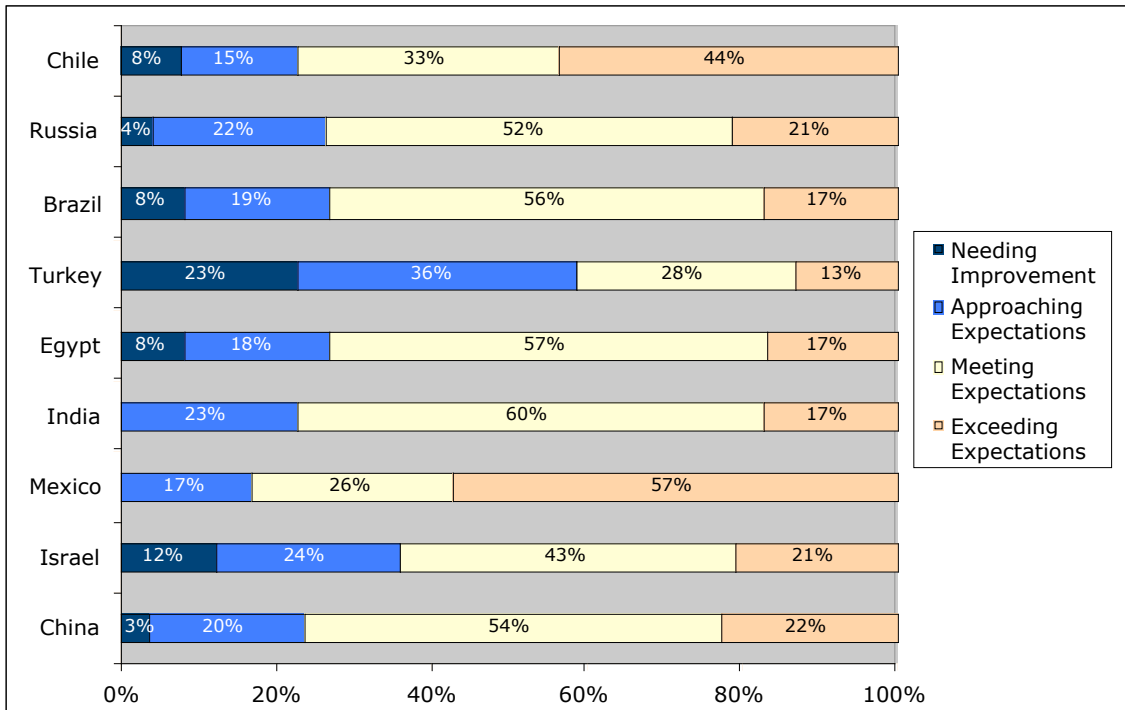
Analysis of learner work provides an important perspective on outcomes resulting from participating in the Intel Learn Program. Evaluators have used a rubric specifically developed for learner work products to assess these outcomes. The original intention in developing the rubric was to track a purposive sample of groups of learners over time to attempt to detect changes in the quality of their work. This strategy did not prove practical. Nonetheless, evaluators in each country have piloted the rubric for a relatively large number of learner work samples, analyzing 3,303 samples of learners’ activities (work completed before the final project) and 1,031 samples of learners’ final projects. The evaluators rated the work on five dimensions (originality, technical skills, required elements, communication to audience, and collaboration) on a four-point scale (needing improvement, approaching expectations, meeting expectations, and exceeding expectations). In 2006, a majority of the work submitted and analyzed (69%) met or exceeded expectations, and only 8% of work fell into the “needing improvement” category. A slightly smaller percentage (66%) of learners’ final projects met or exceeded expectations (see Figure 12).

Figure 12: Learner Work Analysis: Activities and Projects



Eleven percent of the learners’ final projects fell into the “Needs Improvement” category. This finding suggests that the projects present greater challenges to learners than the activities. Given other survey items, we know that learners face difficulties in managing long and complex projects, which might be a key factor affecting the quality of the projects. Figure 13 indicates notable variation by country in the assessment of learner work.

Figure 13. Activities and Projects Combined, by Country



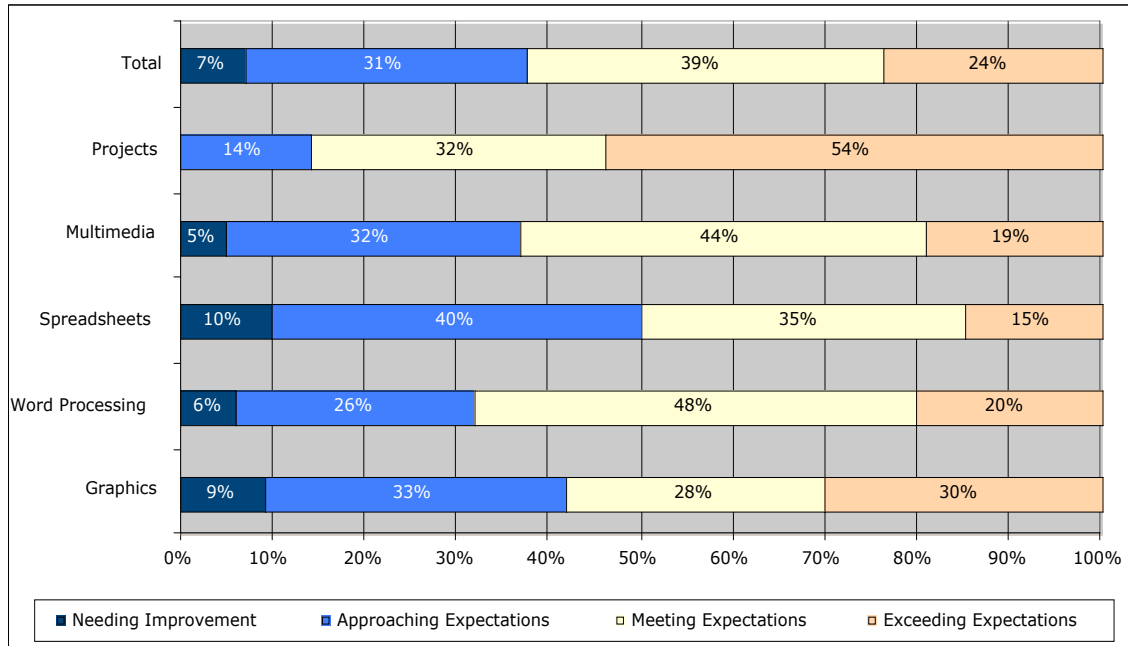
To assess learning outcomes in the program better, a team of SRI coders¹⁴ conducted independent analyses of a random sample of 337 of the approximately 1,000 pieces of learner work produced in Chile during the program’s first year there. Findings show that 63% of the samples that the coders scored represented work that fully met all the expectations for learner performance; that rate was comparable to the overall rate across all other countries. Moreover, many of the samples considerably exceeded expectations for these activities in regard to their originality, quality of communication, use of technology, and other assessment criteria. An additional 31% of the work samples that SRI scored closely approached expectations. Findings for learners’ final projects, which consist of extended multimedia presentations developed by teams on topics of interest and import, showed that 83% were at the highest levels of achievement.

As Figure 14 shows, none of the projects that SRI scored fell into the lowest category (needing improvement), suggesting that by the time learners undertake their final project, they closely approach, if not meet or exceed, the standard of achievement targeted by the program. The figure also shows that when broken out by technology type (e.g., graphics, word processing), 50% of the spreadsheet activities did not meet or exceed expectations, accounting more than other activities for the lower range of the total results; creating

¹⁴ Interrater reliability exceeded 80%.

spreadsheets is known to be more difficult for children because of the steeper learning curve and mathematics involved in those activities.¹⁵

Figure 14. Chilean Sample of Activities and Projects



Overall, then, very few of the learner work products fell into the “needing improvement” category. Because the “approaching expectations” category represents work that is only marginally below the standards of achievement targeted by the program, SRI’s analysis of the Chilean sample provides clear evidence that almost all learners are achieving at high levels or are very close to doing so. In other words, the vast majority of the children in the program are succeeding.

LEARNERS’ COLLABORATE

Systematic observations of learners conducted during site visits by local evaluators were particularly positive. In almost all cases, learners worked well together in collaborative groups; they included all team members in the activities, respected one another’s contributions, and resolved disagreements on their own.

¹⁵ Differences in outcomes across countries may in part stem from how many spreadsheets are included in the analysis and how they are scored, a topic which will be addressed in future discussions between SRI and country-level evaluators. In this regard, it is worth mentioning that one of SRI’s motivations in conducting this analysis of learner work was to increase our own experience in applying the rubric to a large set of samples in order to better support country-level evaluation teams in consistently, effectively, and reliably using the rubric for research purposes.

STORIES OF IMPACT

Intel Learn in Bodequena, Brazil*

In Bodoquena, where the Village has assimilated some aspects of Brazilian culture and the youth learn Portuguese as a second language, we have the opportunity to contrast some of the cultural and sociological phenomena taking place during Intel Learn. In the following statement, a volunteer staff member comments on some of the subtleties of the notion of collaboration. While teamwork comes naturally in their culture, and is rarely permitted in the traditional classroom setting, sharing of materials and ideas is uncommon.

“...the development of the learners, such as critical thinking, was an educational novelty for them since the school does not offer this level of curriculum. It is still based on traditional teaching. Teamwork was a way of bringing the students closer to one another since there is no communication between students in the classroom. The students were able to feel the way that is natural for them outside the classroom and it helped them to participate more actively in the sessions. Sharing material was another novelty in their lives due to the individuality that exists between them...”

**Stories told and translated by local evaluators in Brazil.*

Learners also reported that they enjoyed the collaborative atmosphere. One learner from India indicated that although he had known the members of his group from school, it was not until working with them on activities and projects in the program that they became friends.

In 2006, in-country evaluation staff from 8 of the 9 countries in the program completed 530 visits to centers to observe the program in action (the number of visits made in China is unknown). Evaluators' observation logs represent a perspective different from and complementary to staff reports on the quality of the learning environment. Observers found that in most or all the classes observed, learners' groups had healthy collaboration dynamics, as indicated in Table 4. Almost all observations revealed that learners were working in groups rather than on their own, that groups included all members in their work, and that group members showed respect for each other. Observers indicated that the large majority of participants were meeting the curricular goal of learning to collaborate effectively; only a few observations cited instances of groups having trouble resolving disagreements.

Table 4. Collaboration During Observations

Collaboration Activities	Percent of Groups (N= 530 observations)*
Learners work in groups.	86
Groups actively include all members.	83
Group members show respect for each other.	82
Groups have difficulty resolving disagreements.	5
Groups discuss goals and strategies for their projects.	73
Group members ask questions of one another.	73

*Percent of observations in which the local evaluator observed “most” or “all” groups undertaking this activity.

The strategies groups used in project planning, problem solving, and project design also demonstrated that most learners were achieving the collaboration goals of the Intel Learn Program. In more than two-thirds of groups (73%), members discussed strategies and goals for their activities and projects, and regularly asked questions of one another when challenges arose, rather than turning to staff. These findings suggest that the Intel Learn Program is successfully creating learning environments that encourage participants to collaboratively explore the challenges that they encounter.

CONCLUSION AND RECOMMENDATIONS

The Intel Learn Program has been highly successful in its initial 3 years of implementation. Findings across countries and evaluation methods show that the Intel Learn Program has had a positive effect on staff, learners, and the communities in which it has been implemented. The program continues to reach learners from a diversity of backgrounds across the globe with an innovative curriculum that exposes them to 21st-century skills in technology, critical thinking, and collaboration. From the perspective of both program staff and independent evaluators, learners are achieving the goals of the program. In particular, learners are gaining technical skills and learning to work with their peers, and they are also developing the ability to plan and design projects, and to solve problems. Intel Learn is also making a difference for staff, who are delivering the curriculum via a student-centered approach instead of relying on more traditional teaching methods.

Close to half a million youth have gone through the Intel Learn Program worldwide, and the majority of children that enroll in the program complete it—an important indicator for voluntary, informal programs like Intel Learn. In all countries, evaluators have continuously reported high levels of enthusiasm and engagement among both staff and learners. Again and again, the Intel Learn Program has resulted in relevant, meaningful learning experiences for underserved youth. On the whole, the positive indicators from the evaluation and characteristics of Intel Learn suggest that it represents an approach to technology learning that is engaging for participants and is aligned with 21st-century teaching and learning approaches.

As the program continues to expand in participating countries, we anticipate that Intel and its country-level partners will build on the many successes of the program, sharing best practices and ideas for improvement among staff, administrators, and researchers. Three areas of program practice stand out in particular as worthy of additional attention:

- **Translation and localization.** Recommendations from staff who work with the curriculum in classrooms would be a useful resource for future revisions in local materials.
- **Staff training and support.** Staff would benefit from additional training, pedagogical support, and opportunities to collaborate in the form of user-groups or other online forums.
- **Learner outreach.** Continuing to reach out to the most underserved populations will ensure the program is reaching those who need it most.

Intel has shown its commitment to the process of continual improvement across all its programs, including Intel Learn. Given this commitment and the quality of the program thus far, we are confident that the Intel Learn Program will continue to fulfill the Intel Education Initiative goal of promoting 21st-century education opportunities around the world.