Intel® Teach to the Future Essentials Course*: Impact Survey Results for 2005

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*Intel Teach to the Future Essentials Course is now referred to as the Intel® Teach Program Essentials Course

INTRODUCTION

Intel® Innovation in Education seeks to be a global partner to national governments and to contribute to the development of modern, high-quality educational systems worldwide, to help prepare young people for the 21st century. A core component of Intel's efforts is the development, dissemination and support of the Intel® Teach to the Future Essentials Course, a professional development program that offers teachers the knowledge and skills to integrate information and communication technologies as critical tools to encourage active student learning.

In five years, this program has reached more than three million teachers in over 30 countries. Through its expanding portfolio of professional development programs, Intel® Teach to the Future is also supporting the teaching of critical thinking skills, developing school leaders, enhancing technology education and supporting educators working in informal learning environments.

Education Development Center's Center for Children and Technology (EDC/CCT) has been coordinating the worldwide evaluation of the Intel® Teach to the Future professional development program since March 2003. EDC/CCT's role has been twofold. First, EDC/CCT designs and coordinates the implementation of two global surveys: the end of training survey and the international impact survey. Second, EDC/CCT supports Intel® Teach to the Future national education managers and local evaluators in designing country-specific evaluations and administering the global surveys. This two-pronged approach to evaluation provides Intel® Teach to the Future program managers with information that is particular and unique to the experience of each country as well as gross level data about the implementation around the globe. This quantitative report on the global evaluation of Intel® Teach to the Future presents findings from the 2005 impact survey that was administered in 16 countries. A separate report, *Preparing Teachers for 21st Century Classrooms*, presents an analysis based on the synthesis of all the data available to EDC: country reports, surveys and EDC site visits.

Limitations of International Survey Research

The two-pronged evaluation strategy is also important to offering insights into the particular strengths and challenges of the program's implementation in each of these countries because the survey data by itself present a limited understanding of the what is occurring on the ground. International surveys can provide only a surface-level indication of teachers' reaction to the program and their attempts to build off of the training. International surveys present a decontextualized view of educational processes that, at best, support only weak inferences.[1] The country reports and the qualitative data they contain provide a richer view of how the program is affecting participating teachers.

[1] Smith, M. (2002). Drawing Inferences for National Policy from Large-Scale Cross-National Education Surveys. In A. C. Porter & A. Gamoran (Eds.), *Methodological Advances in Cross-National Surveys of Educational Achievement* (pp. 295-317). Washington, DC: National Research Council.

Key Findings

Intel® Innovation in Education (IIE) has set a very ambitious goal for itself. In addition to providing teachers with a positive training experience, IIE seeks to form a trusted partnership with ministries of education in countries across the world as they seek to support deep transformations in teacher practice by integrating technology into project-based learning environments. Overall, the survey data indicates that the program provides teachers with very positive experiences, which in turn help them rethink their practice, take the first steps towards reforming their practice, and eventually integrate technology into their teaching. The key findings of this paper are given below.

- **The data on national income level suggests that teachers in the lower income countries have 1) less familiarity with project-based approaches to teaching, and 2) weaker access to computing resources.**
  The data on national income level suggest that the low and medium low income countries are less likely to be doing new student technology activities. The data indicate that lower income countries have disproportionately higher percentages of teachers with little prior knowledge of the targeted teaching methods. Teachers from the lower income countries also show a pattern of weak access to computer resources, they are more likely to only have lab access to computers with fewer computers, than teachers in higher-income countries.

- **The data reveal a trend that teachers in higher income countries are more likely to 1) build off of the training experience to integrate student technology activities in their teaching, and 2) to increase their use of project-based approaches.**
  Teachers from high income countries report the greatest percentage of new technology integration. This is consistent with findings presented above: lower levels of prior familiarity with project-based teaching approaches and less technology access make it more difficult for teachers from low and medium low income countries to initiate or sustain implementation of new technology-rich activities after the training.

- **Implementation of the unit plan designed during the Essentials Course is a key strategy for helping teachers meet the goals of the program.**
  Teachers' implementation of all or part of their unit plan is related to reports of broader, increased use of technology with their students as well as experimentation with new teaching methods presented in the training. The survey data illustrates a clear relationship between teacher implementation of all or part of the unit plan and reports of their increased use of the technologies and teaching methods emphasized in this training. Repeated implementation of all or part of the unit plan is associated with a greater likelihood of increased use of the targeted practices. This relationship appears stronger for integrating new technology activities than for adopting new teaching methods. This suggests that teachers may be using their Essentials Course unit plan as a "testing

ground" for new practices before extending the use of these methods to other topics or activities.

- **The program is supporting teachers in integrating new student technology activities.** Overall, the data suggest that the Essentials Course is successful at encouraging teachers to use technology in new ways at all levels of computer resources. Teacher integration of new activities with technology is moderated by availability of technology resources, suggesting that the flexibility of having access to computing resources in multiple places supports teachers' efforts to integrate technology into their students' learning activities. However, even respondents who report having no availability of computing resources in their schools indicate they are using other access strategies, such as community technology centers, to integrate technology into their students' learning in new ways.

- **Teachers are increasing their use of technology for lesson planning and preparation.** Overall, the data suggest that the Essentials Course is successful at helping teachers increase their use of technology for planning and preparation. Results across all three specific items related to preparation and planning (use of the Internet to locate resources; using technology for administrative purposes; and using technology to present to students) suggest that teachers with full access (both labs and classroom settings) and lab access only are able to build off their Essentials Course knowledge in order to use technology to 1) create administrative teacher tools and 2) to use technology to present information to students. Classroom access appears to be particularly important for teachers' use of the Internet to locate resources to support their teaching. Survey results also indicate that the program is effective at encouraging teachers with no school-based access to increase their use of technology for lesson planning and preparation, as evidenced by the fact that even the group of teachers with no in-school technology access report increased use of computers for their administrative work.

- **The program is helping teachers with differing levels of familiarity with project-based approaches experiment with new teaching methods, but prior familiarity facilitates reaching the goal of integrating technology more broadly into their teaching.**
  Even teachers who report no prior familiarity with project-based or student-centered teaching methods experiment with the teaching methods promoted in the training when they return to their classrooms. This suggests that the training motivates teachers to use their new knowledge in the classroom, regardless of the novelty of these ideas to the participating teachers. The results also suggest that having prior familiarity with the targeted teaching methods has a positive influence on teachers' follow up to the training. Overall, all participants exhibited high levels of follow up and experimented with these approaches to teaching in their classrooms.

- **Teachers who understand the relevance of the teaching methods presented in the training are more likely to integrate technology into their teaching and to experiment with new teaching methods.**
  The data on the relationship of teachers' perceptions of relevance and using new technology activities with their students suggests the importance of giving teachers time during their training to discuss whether and how they see connections between their current teaching practices and project-based, student-centered approaches to teaching. Teachers who come to the training with very different approaches to teaching are likely to need support to determine how these approaches to teaching might help them to support student learning or to envision concrete ways to draw on these strategies in their classrooms.

- **Easy access to computing resources in classrooms and labs facilitated teachers' ability to use technology with their students.**
  Regardless of the technology resources available, a sizeable portion of teachers are increasing their usage of technology for these student-centered activities. The survey results suggest classroom access and lab access support frequent use of technology activities for students. However, on two key strategies (student presentations and Internet research) lab access is nearly as effective as classroom access.

- **The Essentials Course is successfully impacting teachers from all regions.**
  Significant number of teachers report change in teaching practices across all regions. Results across regions are very similar, with the exception of some exceptionally strong results for the U.S.. This could be a function of the technology infrastructure available to teachers across regions: 83.9% of US teachers reported having access to computers in both their classrooms and computer labs while teachers from most countries in the APAC region, for example, report having lab access only. Further, the original program was designed initially to meet the needs of teachers in the US and the localization of the program may be meeting challenges as the Essentials Course moves into countries with very different contexts.

Data Sources

EDC aggregates and analyzes all data from impact surveys submitted by participating countries. This analysis is based on data collected using the 2005 version of the impact survey (See Appendix A). All surveys were administered between December 2004 and December 2005. The impact survey covers issues such as teachers' implementation of technology-rich lessons; integration of technology for preparation; changes in teacher practice; and the technical infrastructure of schools in which the respondents work. Sixteen countries submitted impact survey data on the Intel® Teach to the Future Essentials program for analysis in this report (See Table 1). The database contained 11,780 respondents as of December 15, 2005. These data represent the most recent survey results for each participating country.

Table 1: Impact Survey Data by Country

Country	Impact Survey (N)
Australia	435
Brazil	318
Chile	511
China	2,485
Egypt	183
India	1,563
Italy	139
Jordan	1,454
Korea*	261
Mexico	972
Pakistan	565
Philippines	391
Russia	322
South Africa	77
Thailand	252
Ukraine	206
United States	1,907
TOTAL	**11,780****

* Korean survey was missing a key variable, therefore this data was not included in the subsequent analysis.

** EDC requires that the impact survey be administered to teachers at least six months after the training is completed. Respondents who completed training after June 31, 2005 were removed from the analyses.

Teachers' Classroom Contexts

The survey contains a number of items that help describe the classroom environment in which program participants work. This information is collected because classroom conditions and available resources shape teachers' subsequent ability to follow up on what they learned in the Essentials Course. Since the survey is used in many different countries and regions, these questions are broadly stated, to ensure that they apply in these various contexts. This limits the level of detail and specificity in the resulting findings.

Responses to these questions indicate that teachers' reports of class size, availability of computers, the depth of that access, and their internet connectivity vary substantially by country. The following charts detail the classroom and infrastructure-related contexts within which the participant teachers operate.

Class Size

If participant teachers reported implementing new technology-integrated activities after their training, they were then asked to indicate the number of students in that class. The modal, or most frequently given, responses of respondent teachers are shown in Table 2. A class size of 21-30 was the most common response, closely followed by a class size of 31-40. The results did not differ by country income levels. The modal response of teachers from Italy (high income) and South Africa (medium high income) was a class size of 21-30 students. Also, the class size most often reported by teachers from Brazil (medium low income) was 1-10 students. (See Appendix B for a detailed table including all responses).

Table 2: Most Commonly Reported Class Size (as a range)
(n = 8,931)

Region	Country	Mode Response for Class Size
APAC	Australia	21 – 30
	China	51 or more
	India	31-40, 51 or more
	Korea	Question not asked
	Pakistan	21 - 30
	Philippines	51 or more
	Thailand	31 - 50
EMEA	Egypt	31 - 40
	Italy	21 - 30
	Jordan	21 - 30
	Russia	11 - 20
	South Africa	21 - 30
	Ukraine	11 - 20
LAR	Brazil	01 – 20
	Chile	31 – 40
	Mexico	31 - 40
US	United States	21 - 30

Computer Access: Areas in school where computers are available

Participant teachers were asked to separately indicate whether they had access to computers in their classrooms and/or computer labs. These responses were compiled to create an indicator of the availability of computers in their schools. Globally, a majority (55.6%) of teachers reported having only lab access to computers, followed by 38.9% of teachers with full access (classroom and lab access) to computers. Only 3.5% of the respondent teachers indicated having only classroom access to computers. Taken separately, countries differed in the type of access reported by the teachers who took the survey. A sizeable percentage of teachers from some countries indicated having no school-based access at all to computers, for example Brazil (7.2%), Italy (9.4%) and Pakistan (6.5%). These no access groups were not restricted to low income countries, as these countries represent medium low income, high income, and low income countries respectively. In several countries, the largest group of teachers reported having only lab access. But there were other countries, such as Australia (68.7%) and the United States (83.9%), where the largest group of teachers reported having full access to technology resources.

Table 3: Availability of Computing Resources
(n = 11,050)

Regions	Country	N	Availability of Computing Resources				Total
			None	Class Only	Lab Only	Full Access	
APAC	Australia	399	0.0%	8.0%	23.3%	**68.7%**	100.0%
	China	2173	1.3%	2.5%	**50.4%**	45.8%	100.0%
	India	1563	1.5%	3.1%	**90.9%**	4.4%	100.0%
	Pakistan	565	6.5%	3.2%	**78.8%**	11.5%	100.0%
	Philippines	388	2.3%	0.0%	**82.5%**	15.2%	100.0%
	Thailand	244	2.5%	1.6%	**57.4%**	38.5%	100.0%
EMEA	Egypt	183	0.5%	0.0%	**88.0%**	11.5%	100.0%
	Italy	139	9.4%	3.6%	**61.9%**	25.2%	100.0%
	Jordan	1303	2.5%	5.8%	**76.5%**	15.1%	100.0%
	Russia	314	4.5%	2.5%	40.8%	**52.2%**	100.0%
	South Africa	69	4.3%	5.8%	31.9%	**58.0%**	100.0%
	Ukraine	206	3.4%	11.7%	30.6%	**54.4%**	100.0%
LAR	Brazil	318	7.2%	2.2%	**54.1%**	36.5%	100.0%
	Chile	511	0.8%	1.2%	**73.2%**	24.9%	100.0%
	Mexico	949	0.9%	2.1%	46.3%	**50.7%**	100.0%
US	US	1726	0.5%	4.9%	10.8%	**83.9%**	100.0%
	Total	11050	2.0%	3.5%	**55.6%**	38.9%	100.0%

Computer Access: Number of classroom computers available

EDC examined the extent of computer availability within classrooms. This data shown in Table 4 represents teachers who only have lab access, as well as teachers who have both classroom and lab access (94.5% of the sample). Teachers who have classroom computers are almost evenly distributed between participants who had one classroom computer (16.8%) and those with two to six classroom computers (14.9%). Teachers with seven or more computers are likely to be technology teachers, in which case the table suggests that some countries are drawing substantial numbers of participants who are computer teachers. Mexico, Philippines, and Ukraine all have their highest share of respondents in the "seven or more" category.

Table 4: Degree of Available Computing Resources
(n = 10,440)

Region	Country	Degree of Available Computing Resources					
		N	**Lab Access Only**	**Lab Access and 1 Class PC**	**Lab Access and 2-6 Class PCs**	**Lab Access and 7 or more Class PCs**	**Total**
APAC	Australia	367	25.3%	6.0%	**51.5%**	17.2%	100%
	China	2,091	52.4%	**39.5%**	5.5%	2.5%	100%
	India	1,490	95.4%	1.6%	1.5%	1.5%	100%
	Pakistan	510	87.3%	3.7%	4.7%	4.3%	100%
	Philippines	379	84.4%	4.0%	0.5%	**11.1%**	100%
	Thailand	234	59.8%	**19.2%**	4.7%	16.2%	100%
EMEA	Egypt	182	88.5%	4.4%	5.5%	1.6%	100%
	Italy	121	71.1%	**17.4%**	9.1%	2.5%	100%
	Jordan	1,194	83.5%	1.3%	**15.2%**	0%	100%
	Russia	292	43.8%	10.6%	**25.0%**	20.5%	100%
	South Africa	62	35.5%	**25.8%**	17.7%	21.0%	100%
	Ukraine	175	36.0%	11.4%	21.1%	**31.4%**	100%
LAR	Brazil	288	59.7%	3.1%	13.9%	23.3%	100%
	Chile	501	74.7%	8.4%	3.6%	13.4%	100%
	Mexico	920	47.7%	16.5%	4.8%	**31.0%**	100%
US	US	1,634	11.4%	30.1%	**46.8%**	11.7%	100%
Total		10,440	58.8%	16.8%	14.9%	9.4%	100%

Note: This table only reports data for teachers with lab access only or full access

Computer Access: number of lab computers available

Participant teachers were asked to indicate the number of computers available in their computer labs or media centers. Results are summarized in Table 5. Slightly more than one quarter (27.6%) of respondents have labs with 11-20 computers, 21.7% have 1-10 computers, and 22.6% have more than 41 computers. However, most countries show distinct patterns, with either smaller labs of 1-10 computers or larger labs of 21 computers or more. Respondents from China, Italy, and Thailand indicate a predominance of large labs of 41 or more computers. In some countries these different national patterns may reflect educational policies promoting certain types of labs. For example, the Costa Rican government policy is to equip each computer lab with 18 computers.

Table 5: Number of Computers in Computer Labs/Media Centers
(n = 10,607)

Region	Country	N	Number of computers available in computer labs/media centers					
			1-10	11-20	21-30	31-40	41 or more	Total
APAC	Australia	364	11.0%	22.5%	31.6%	7.1%	27.7%	100%
	China	2,278	3.2%	13.8%	10.4%	17.1%	55.5%	100%
	India	1,485	**43.0%**	**36.9%**	10.4%	3.3%	6.4%	100%
	Pakistan	510	**36.9%**	30.2%	17.6%	9.0%	6.3%	100%
	Philippines	373	**42.4%**	35.1%	13.9%	3.8%	4.8%	100%
	Thailand	232	5.6%	15.1%	17.2%	15.9%	**46.1%**	100%
EMEA	Egypt	182	**83.5%**	11.0%	2.7%	0%	2.7%	100%
	Italy	121	9.9%	16.5%	19.8%	23.1%	**30.6%**	100%
	Jordan	1,213	16.2%	**52.4%**	15.3%	8.7%	7.4%	100%
	Russia	290	**52.1%**	26.9%	1.7%	15.2%	4.1%	100%
	South Africa	47	6.4%	14.9%	27.7%	**40.4%**	10.6%	100%
	Ukraine	175	**78.9%**	16.6%	2.9%	0.6%	1.1%	100%
LAR	Brazil	288	**82.3%**	11.8%	4.2%	0.3%	1.4%	100%
	Chile	501	22.4%	37.1%	22.2%	6.4%	12.0%	100%
	Mexico	919	13.6%	**46.8%**	22.2%	8.5%	8.9%	100%
US	United States	1,629	4.2%	13.4%	**34.9%**	17.7%	29.8%	100%
	Total	**10,607**	**21.7%**	**27.6%**	**17.2%**	**10.9%**	**22.6%**	**100%**

Ease of access to shared computing resources (computer labs)
Participant teachers were asked how easy or difficult it was to schedule time in the computer lab or media centers in their schools. The results are summarized in Table 6 and suggest that scheduling time in shared computer labs was difficult in most countries. Teachers in only a few countries– Brazil, Chile, Egypt, and Mexico indicated that scheduling was easy.

Table 6: Perceived Ease of Scheduling Time in the Computer Lab
(n = 10,607)

Region	Country	N	Difficult	No Opinion	Easy	Total
APAC	Australia	364	**60.0%**	4.1%	36.0%	100%
	China	2,276	**58.1%**	11.0%	30.9%	100%
	India	1,449	**60.1%**	11.0%	28.9%	100%
	Pakistan	510	**46.9%**	19.2%	33.9%	100%
	Philippines	375	**72.5%**	7.7%	19.7%	100%
	Thailand	234	**65.8%**	6.8%	27.3%	100%
EMEA	Egypt	182	36.8%	10.4%	**52.8%**	100%
	Italy	121	7.5%	**52.9%**	39.7%	100%
	Jordan	1,219	**66.3%**	13.7%	20.0%	100%
	Russia	291	**69.4%**	16.5%	14.1%	100%
	South Africa	61	**57.4%**	6.6%	36.1%	100%
	Ukraine	175	40.0%	16.6%	43.4%	100%
LAR	Brazil	288	24.0%	10.1%	**66.0%**	100%
	Chile	501	40.7%	8.8%	**50.5%**	100%
	Mexico	919	34.5%	12.6%	**52.9%**	100%
US	United States	1,632	**54.1%**	11.6%	34.4%	100%
	Total	10,607	**54.2%**	12.1%	33.8%	100%

Internet Connectivity

The data indicate that Internet access is relatively limited for these respondents. Overall, 22.7% of these teachers do not have connectivity in their schools, and 41.2 % have connectivity only through their lab. Most countries show distinct patterns. For example, large percentages of teachers in the Philippines, Jordan, and India do not have connectivity, and in Thailand, Egypt, and Italy lab-based connectivity predominates (See Table 7).

Table 7: Availability of Internet Connectivity
(n = 10,545)

Region	Country	N	Internet Connectivity for Teachers with Technology Access				Total
			None	Class Only	Lab Only	Full Access	
APAC	Australia	361	0.8%	0.0%	26.9%	**72.3%**	100.0%
	China	2223	9.5%	10.3%	**42.2%**	**38.0%**	100.0%
	India	1482	**49.1%**	0.2%	**49.2%**	1.6%	100.0%
	Pakistan	510	42.7%	1.0%	**49.6%**	6.7%	100.0%
	Philippines	377	**59.2%**	0.8%	33.4%	6.6%	100.0%
	Thailand	231	3.0%	0.4%	65.8%	30.7%	100.0%
EMEA	Egypt	182	18.1%	0.0%	**74.7%**	7.1%	100.0%
	Italy	121	0.0%	0.0%	**81.8%**	18.2%	100.0%
	Jordan	1205	**42.7%**	3.4%	**43.7%**	10.1%	100.0%
	Russia	289	33.9%	4.2%	21.8%	**40.1%**	100.0%
	South Africa	62	30.6%	1.6%	27.4%	**40.3%**	100.0%
	Ukraine	175	13.1%	1.7%	30.9%	**54.3%**	100.0%
LAR	Brazil	288	6.9%	2.1%	**55.2%**	35.8%	100.0%
	Chile	501	2.0%	0.4%	**77.2%**	20.4%	100.0%
	Mexico	919	29.3%	2.2%	**40.8%**	27.7%	100.0%
US	United States	1619	0.8%	0.7%	14.3%	**84.2%**	100.0%
	Total	10545	22.7%	3.2%	41.2%	32.9%	100.0%

IMPACT OF ESSENTIALS COURSE

This section presents findings from the survey data across some of the key goals of the Essentials Course: the integration of ICT into education, and the improvement of teaching and learning through the promotion of project-based teaching and inquiry learning. Through the use of sample lesson plans, model activities, and group reflection as the participants create their unit plan, the training is presenting two types of educational technology usage models to the teachers: one for teachers and one for students.

Teacher Use of Technology

The Essentials Course professional development program is designed to assist teachers with the integration of technology into everyday classroom practice. The goal of the training is to help teachers integrate ICTs into their teaching practice by emphasizing student-centered and inquiry-driven learning activities. This section presents high-level findings on teacher responses to survey questions regarding implementation of their unit plans, integration of new technology activities, and use of technology for lesson planning and preparation, prior knowledge of teaching strategies and the relevance of these strategies to their teaching goals.

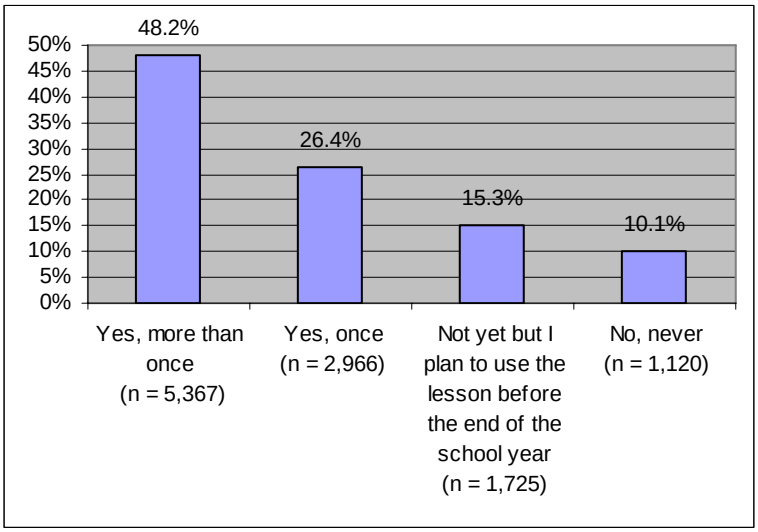
Implementation of the Unit Plan Designed during the Essentials Course

The core of the Essentials Course curriculum is the creation of a unit plan, including model student work samples, support materials, and an implementation plan. This structure allows teachers to expand their technical skills in the context of a curriculum development process. The process of designing the unit plan is intended to give participants a chance to think deeply about the issues involved in integrating ICT into their teaching. By stipulating the creation of immediately relevant materials, the curriculum puts the teachers' interests and concerns at the center of the training experience. Analyses presented here examine the relationship between actual implementation of some or all of the unit plan and the other program outcomes of encouraging teachers to integrate technology more broadly into their teaching and increase the use of new teaching methods.

Unit plan implementation

The implementation of all or part of the unit plan is interpreted as a basic indication of whether or not teachers follow up on the training. The survey asks teachers if they have implemented all or part of the unit plan they designed during the training at least once or more frequently. Roughly 75% of the teachers who responded report having implemented all or part of their unit plan at least once; 48% have used their unit plan multiple times. Of the entire sample of teachers who answered this question roughly 10% have never implemented their unit plan. This data indicates that the majority of teachers are following up on their training by implementing all or part of their unit plans in their classrooms (See Figure 1).

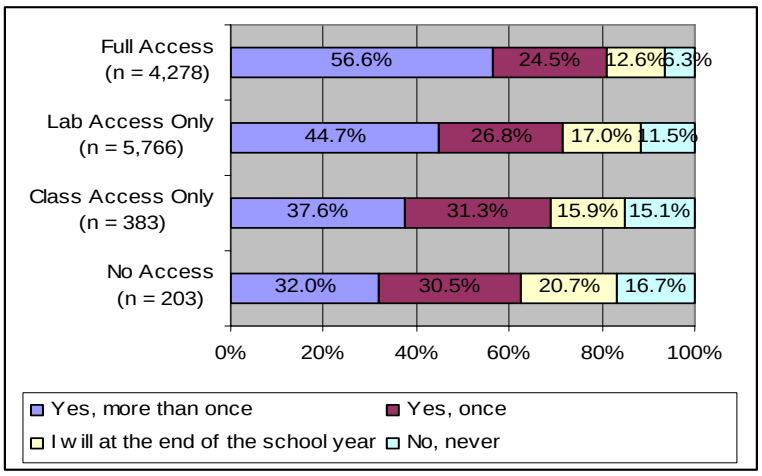
Figure 1: Teachers' Implementation of All or Part of Their Unit Plan
(n = 11,178)



Unit plan implementation by availability of computing resources

EDC examined the role that availability of computing resources plays in the implementation of unit plans, in order to understand teachers' ability to follow up on what they have learned in the trainings based on their access to computers. As shown in Figure 2, 81% of the teachers with full access (in the classroom and in a lab) to computers have implemented all or part of their unit plan at least once, compared to 63% of the teachers reporting no access. The percentage of teachers who implemented some or part of their unit plan at least once is essentially similar for teachers with only lab access and class access only (67% and 69% respectively). The fact that a higher percentage of teachers reporting full access are implementing all or part of their unit plan suggests that having multiple places to access the computer resources makes it easier to experiment with their unit plan.

Figure 2: Teachers' Implementation of All or Part of Their Unit Plan by Availability of Computing Resources
(n = 10,630)



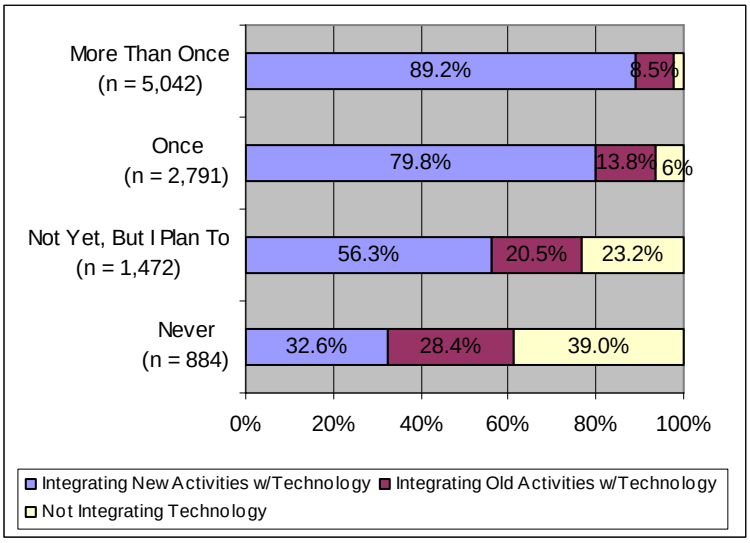
Unit plan implementation by integration of new technology activities

The design of the unit plan is also a professional development strategy that the Essentials Course uses to encourage teachers to integrate technology activities in their classrooms. The optimal outcome for the training is that teachers will integrate new technology activities beyond their unit plan into their teaching. Consequently, analysis of the survey data involved examining the relationship of unit plan implementation to the introduction of new student technology activities. EDC created an indicator that details whether teachers are using technology in new ways since the training.

The majority of teachers who have implemented all or part of their unit plan are also reporting integrating new technology into their work with students more broadly, and teachers who implemented more than once are most likely to report integrating new technology into their teaching (89%). Teachers who did not implement their unit plan, were also not likely to have experimented with other student technology activities in their classroom: only 32.6% of these teachers have integrated new activities with their students, 28.4% have increased activities they were already doing with their students, and 39% are not using technology with their students at all (See Figure 3). This pattern suggests that unit plan implementation is more likely to be part of a process of introducing ICTs into the classroom in new ways.

Figure 3: Teachers' Implementation of All or Part of Their Unit Plan by Teachers' Use of Technology with Students

(n = 10,189)



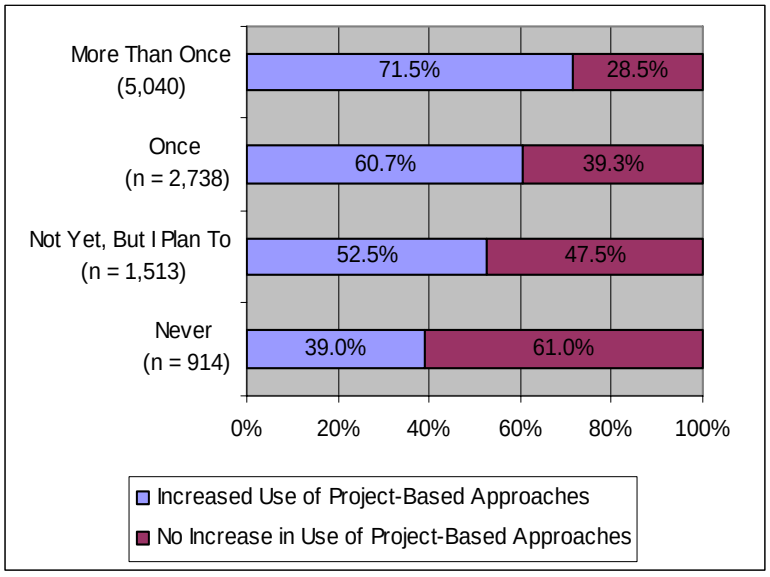
***In order to maintain clarity values below 5.0% were removed from the chart.

Unit plan implementation and use of pedagogical practices

In addition to integration of technology activities, the process of developing a unit plan is designed to prepare teachers to increase their use of project-based approaches to teaching. The following figures detail the impact teacher implementation of all or part of their unit plan has on their use of: 1) project-based teaching methods, 2) Essential Questions to structure lessons, and 3) group projects with students.

As above, implementation of the unit plan is associated with increased change in broader practices (See Figure 4). Teachers who have implemented all or part of their unit plan more than once are most likely to report increases (71.5%) in their use of project-based approaches to teaching, followed by teachers who have implemented their unit plan one time (60.7%). Teachers who never implemented their unit plan showed the greatest percentage of teachers not increasing their use of project-based approaches (61.0%).

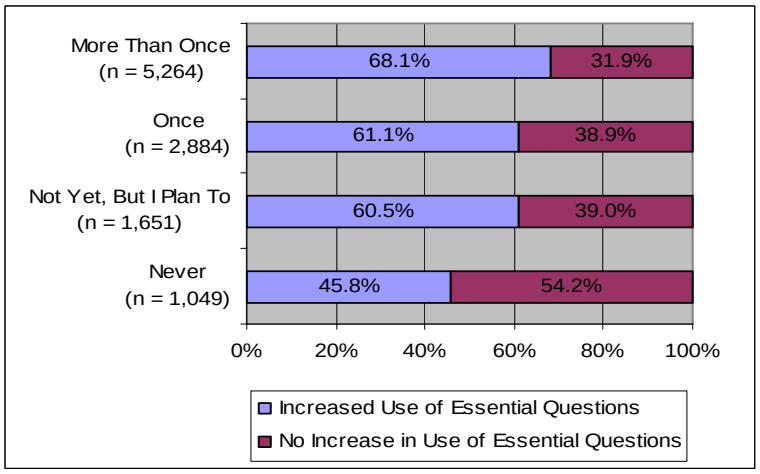
Figure 4: Teachers' Implementation of All or Part of Their Unit Plan by Increased Use of Project-Based Approaches
(n = 10,848)



There is also a similar, though weaker, trend in the data related to the increased use of Essential Questions. The survey asked teachers about their use of Essential Questions to structure lessons. The teachers who implemented all or part of their unit plan more than once were also most likely to have increased their use of Essential Questions (68.1%). There was no difference in the usage of Essential Questions between teachers who have used all or part of their unit plan once and teachers who are still planning on implementing. However, there is a 22% difference in the increased use of Essential Questions between teachers who implemented more than once and teachers who have never implemented their unit plan (See Figure 5).

Figure 5: Teachers' Implementation of All or Part of Their Unit Plan by Increased Use of Essential Questions to Structure Lessons

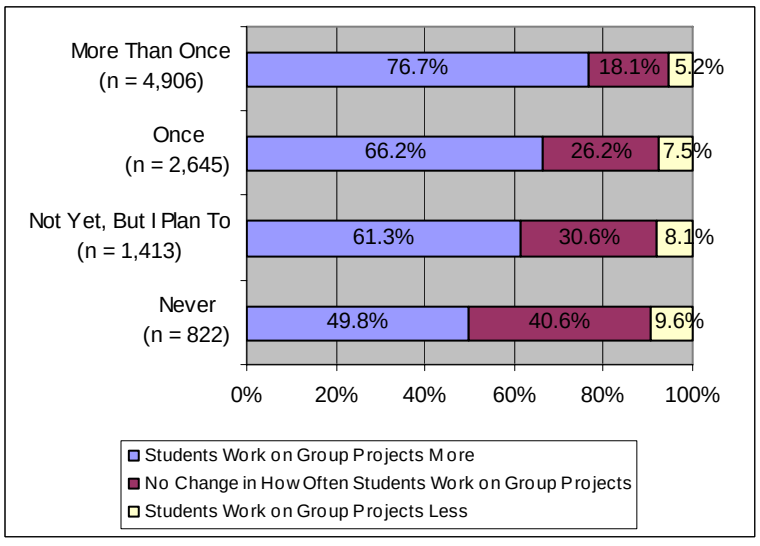
(n = 10,205)



A larger share of teachers (76.7%) who implemented all or part of their unit plan have increased their use of group projects more than teachers who have not implemented their unit plan (49.8%) (See Figure 6). In terms of having students work on group projects, there is a 27% difference between teachers who have implemented more than once and teachers who have never implemented.

Figure 6: Teachers' Implementation of All or Part of Their Unit Plan by Change in Teachers' Use of Group Projects

(n = 9,786)



The survey data illustrates a clear relationship between teacher implementation of all or part of the unit plan and reports of increased use of the technologies and teaching methods emphasized in this training. Repeated implementation of all or part of the unit plan is associated with a greater likelihood of increased use of the targeted practices, and the relationship appears stronger for integrating new technology activities than for adopting new teaching methods. The use of

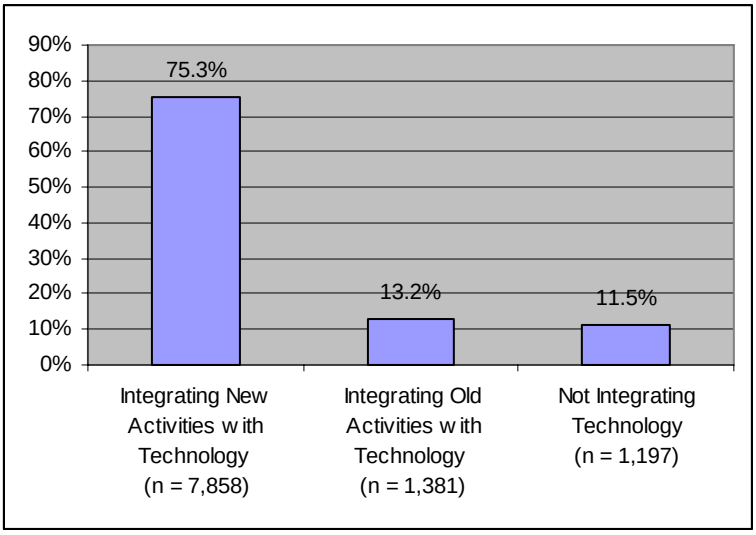
Essential Questions and student group work appear to be most closely connected to multiple implementations of all or part of the unit plan. This suggests that teachers may be using their Essentials Course unit plan as a "testing ground" for new practices before extending the use of these methods to other topics or activities.

Teacher Integration of New Technology Activities

Creating the unit plan is a way to engage teachers in technology integration so that they can build on this initial experience and, over time, apply this knowledge to other activities. Beyond the implementation of the unit plan, the Essentials Course is intended to influence teachers' approaches to integrating technology across their teaching more broadly. As mentioned earlier, EDC created an indicator of how teachers are using technology with their students to identify if teachers are integrating technology in new ways upon completion of the program. The following figures use this indicator to illustrate how teacher use of technology with their students may vary by a teacher's level of access to technology.

As shown in Figure 7, the large majority (75.3%) of teachers indicate that they are integrating technology in new ways upon completion of the training program. This compares to 13.2% of teachers who are using technology but have not integrated any new activities, and 11.5% of teachers who are not integrating technology at all.

Figure 7: Teachers' Use of Technology with Students
(n = 10,436)

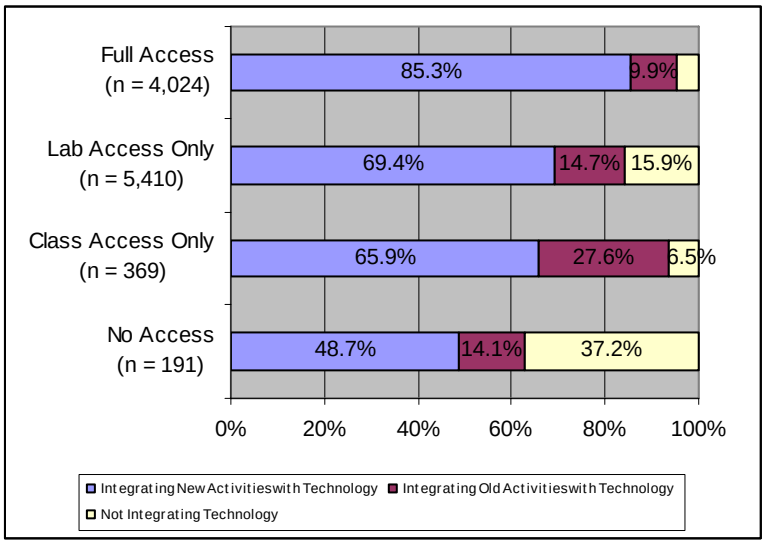


Integration of new technology activities by availability of computing resources

As with implementing the unit plan, the teacher's ability to incorporate new technological activities may be related to the technological resources available to them, so responses were analyzed relative to teachers' reports of their availability of computing resources in school (See Figure 8). This relationship was found: teachers with full access to technology (both classroom and lab access) exhibit the greatest percentage of integrating technological activities in new ways (85.3%) in comparison to teachers with lab access only (69.4%), class access only (65.9%), and

no access (48.7%). Conversely, teachers who indicate that they have no access show the greatest percentage of *not* integrating any type of technological activity (37.2%).

Figure 8: Teachers' Use of Technology with Students by Availability of Computing Resources
(n = 9,994)



***In order to maintain clarity values below 5.0% were removed from the chart.

Overall, the data suggests that the Essentials Course is successful at encouraging teachers to use technology in new ways at all levels of computer resources. Even 48.7% of respondents who report having no availability of computing resources in their schools still report integrating technology into their students' learning in new ways. These teachers report using community technology centers or home access to bring technology into their teaching. Additionally, teacher integration of new activities with technology was seen to be moderated by availability of technology resources. The fact that respondents with full access show the highest proportion of teachers introducing new technology activities suggests that the flexibility of having access to computing resources in multiple places is important to helping teachers integrate technology into their students' learning activities.

It is important to note that the survey question about "new technology activities" does not capture any information about the nature of the "new activities," or about how successful or problematic teachers found these new activities to be for them or for their students. This question is an important but limited indicator of the broader impact of the Essentials Course on teachers' practices, because it captures evidence of teachers' broader and more sustained follow up to their participation in the program, but does not demonstrate whether or not their follow up is consistent with the goals or priorities of the program. The qualitative data suggests that many teachers are still struggling to improve the quality of their technology use and that many of these new activities may be more teacher-centered than student-centered (See *Preparing Teachers for 21st Century Classrooms*).

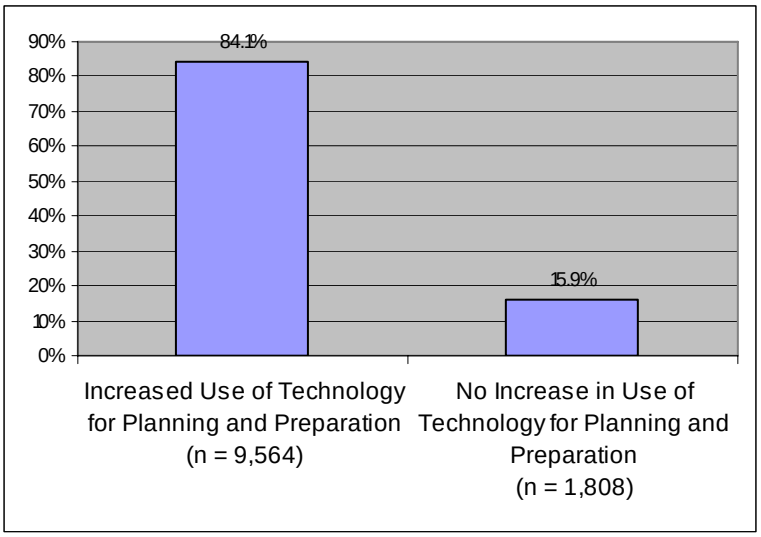
Teacher Use of Technology for Lesson Planning and Preparation

The Essentials Course also offers teachers the opportunity to experiment with new ways to use technology for lesson planning and preparation. In the Essentials Course, teachers learn how to

use the Internet to find information and classroom resources, and create teacher support materials. The following charts present teachers' reports about their increased use of technology for planning, for administrative activities and to present information to students since completing the Essentials Course. The relationship of the availability of computing resources to teachers' increased use of technology in their planning and preparation is also examined.

EDC combined responses on multiple variables to create an indicator of increased use of technology for lesson planning and preparation (See Figure 9). According to this indicator, 84% of teachers report that they have increased their use of technology for administration and planning since participating in the training. This suggests that the teachers are leaving the training program with the skills necessary to use technology to support their teaching.

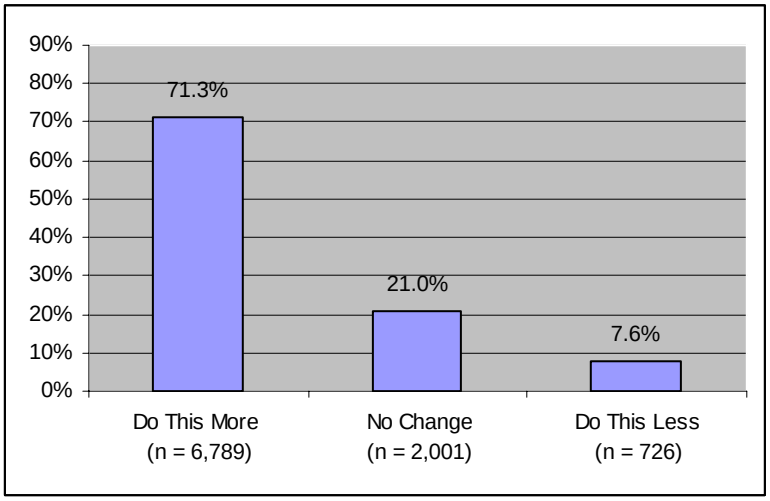
Figure 9: Change in Teachers' Use of Technology for Planning and Preparation
(n = 11,372)



Use of Internet for lesson planning and preparation

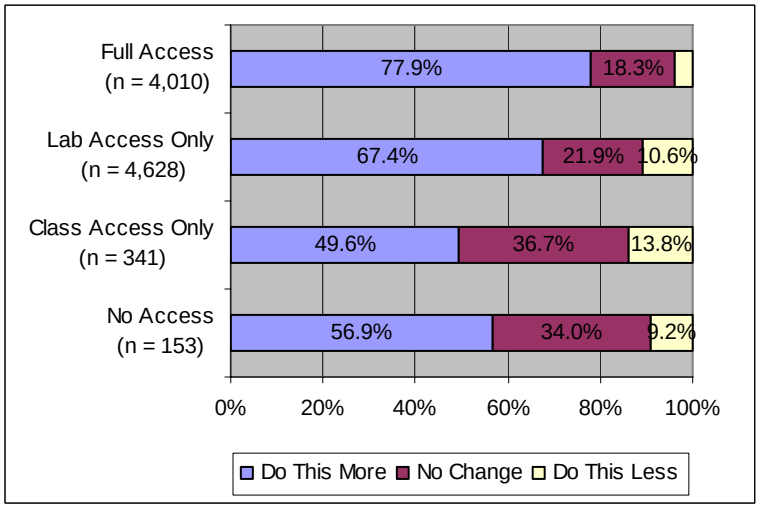
The program trains teachers on how to use the Internet to locate teaching resources, and the survey asks respondents if they have increased their use of the Internet (See Figure 10). The results indicate nearly three-quarters (71.3%) of the teachers reports that they have increased their use of Internet as a tool to aid in the development of lessons.

Figure 10: Change in Teachers' Use of the Internet to Aid in the Development of Lessons
(n = 9,516)



When these results are examined by the availability of computer resources, approximately 78% of teachers with full access to technology are increasing their use of the Internet to aid in the development of lessons (See Figure 11). The results suggest that having access in both their classroom and a lab facilitates teachers' use of the Internet for planning. However, it is interesting to note that 56.9% of teachers who report having no school-based computer access also report that they have increased their use of the Internet to support their planning. This suggests that these teachers find the Internet such a valuable source of support that they are taking the trouble to access the Internet outside of school (i.e. in cyber cafés or at home).

Figure 11: Change in Teachers' Use of the Internet to Aid in the Development of Lessons by Availability of Computing Resources
(n = 9,132)

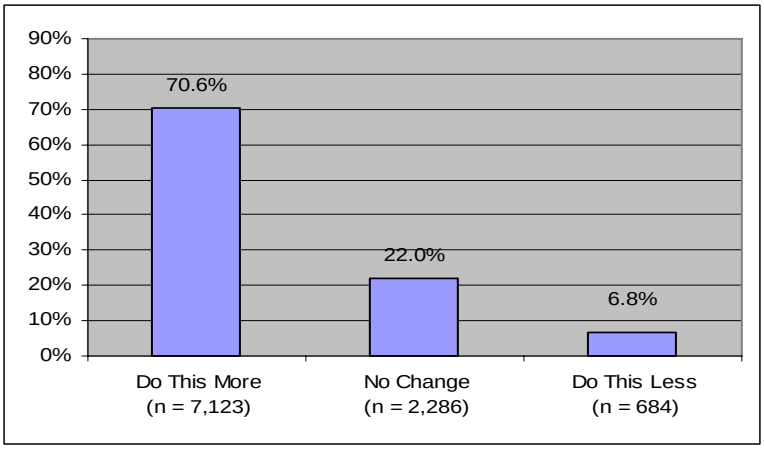


***In order to maintain clarity values below 5.0% were removed from the chart.

Use of computers for administrative work

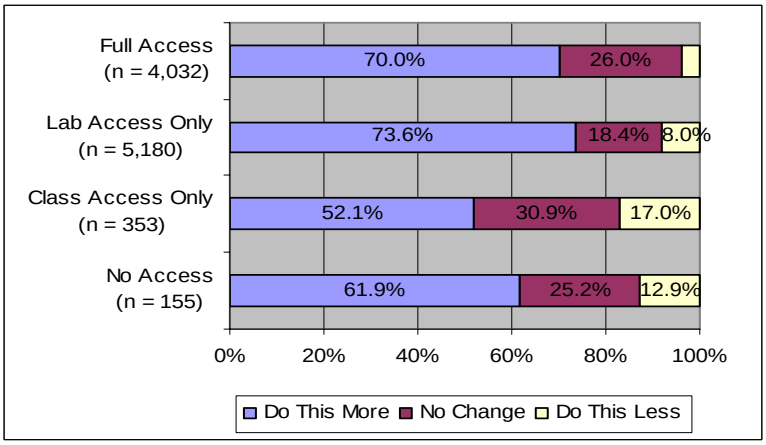
The survey also asked participant teachers about changes in their use of computers for administrative purposes since completing the Essentials Course (See Figure 12). This activity could include creating teacher tools like class rosters for attendance or grading, handouts or worksheets. Roughly 71% of teachers who answered this question reported that they had increased their use of computers for administrative work since the training.

Figure 12: Change in Teachers' Use of Computers for Administrative Work
(n = 10,093)



EDC examined how teacher use of computers for their administrative purposes varied by availability of computing resources. Teachers with lab access only display the greatest percent (73.6%) of increase in usage of computers for administrative work followed by teachers with full access (See Figure 13). This suggests that lab access may be sufficient for teachers to be able to increase their use of technology to create helpful products for their classroom. Many of the teacher tools that could be envisioned here are paper-based products that teachers could create in the lab and take back to the classroom. The relatively high response of teachers with no school-based access, nearly 62% report increased use, also supports this conclusion.

Figure 13: Change in Teachers' Use of Computers for Administrative Work by Availability of Computer Access
(n = 9,720)

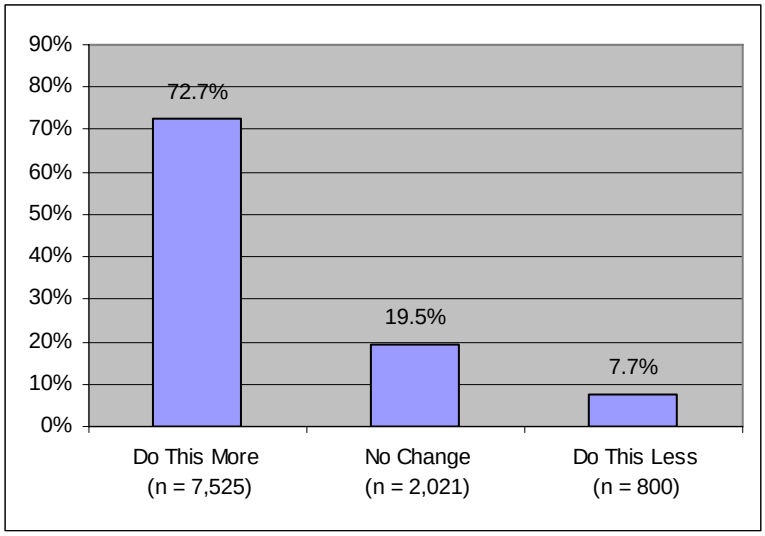


***In order to maintain clarity values below 5.0% are not presented in the chart.

Using computers to present information to students

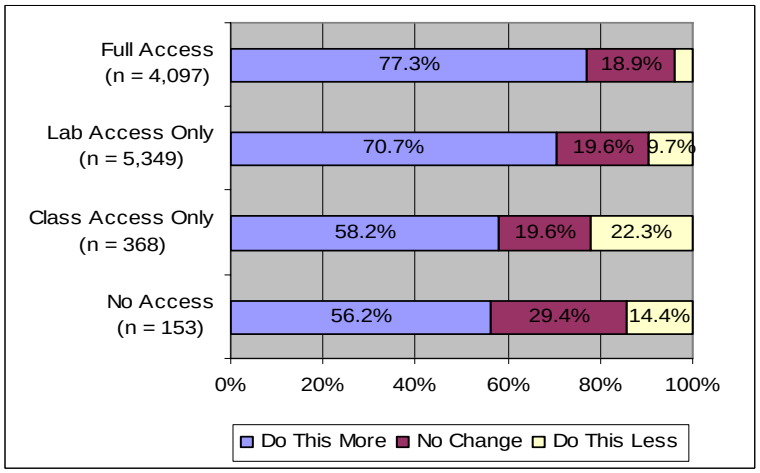
The survey also asked participant teachers about their use of technology to present information to students (See Figure 14). Similar to the other outcomes related to teacher use of ICT for lesson planning and preparation, the majority of teachers (72.7%) reported that they are presenting information to students using computers more often since the training.

Figure 14: Change in Teachers' Use of Technology to Present Information to Students
(n = 10,346)



Teachers with full access (both classroom and lab access) to computers exhibit the greatest percentage (77.3%) of increasing their use of technology to present information to students, followed by teachers with only lab access at nearly 71% (See Figure 15). These findings suggest that classroom access to computers facilitates using the computer as a presentation tool, but that this is also a common strategy for teachers working in lab only environments.

Figure 15: Change in Teachers' Use of Technology to Present Information to Students by Availability of Computing Resources
(n = 9,967)



***In order to maintain clarity values below 5.0% were removed from the chart.

These results across all three specific items related to preparation and planning (Internet to locate resources; technology for administration; and to present to students) suggest that teachers with full access (both labs and classroom settings) and with lab access only are able to build off their Essentials Course to use technology to create administrative teacher tools and to use technology to present information to students. However, classroom access appears to facilitate teachers' use of the Internet to locate resources to support their teaching. Survey results also indicate that the program is effective at encouraging teachers with no school-based access to increase their use of technology for lesson planning and preparation, as evidenced by the fact that even the no access group of teachers report increased use of computers for their administrative work.

Familiarity with the Teaching Methods Presented in the Essentials Course

Evaluation of the Essentials Course has consistently shown that two key strengths of the course are its ability to build upon teachers' existing knowledge and interests, and to help teachers identify and achieve incremental changes in their use of technology and of project-based teaching methods. This section of the report discusses an important challenge that survey data indicates is growing as the program extends to new countries: many more teachers are coming into the training with little or no prior awareness of the project-based and student-centered teaching methods emphasized in the training[2].

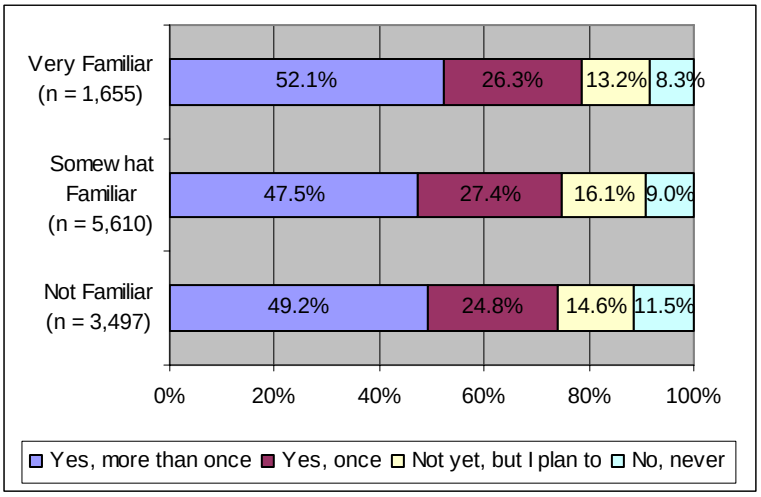
Because prior evaluation has demonstrated that teachers' prior familiarity with the teaching methods emphasized in the Essentials Course influences how they follow up on the training back in the classrooms, this section of the report investigates the relationship between teachers' prior knowledge of project-based, student-centered teaching methods and their level of classroom follow up after the training.

Familiarity and unit plan implementation

As noted in the section on unit plan implementation (See Figures 1-6), the 2005 survey data illustrates a positive relationship between teacher implementation of all or part of the unit plan and broader integration of both technology related and student-centered activities in the classroom. Given this relationship, the effect of prior knowledge of the targeted teaching methods on unit plan implementation was also analyzed, which demonstrated that there is no clear relationship between these variables (See Figure 16). About half (49.2%) of the teachers not familiar with the teaching strategies indicated that they implemented all or part of their unit plan more than one time, and a similar percentage (52.1%) of teachers who reported being very familiar with the teaching strategies indicated the same. The overall numbers for implementation of all or part of unit plans one or more times is 78.4% for teachers familiar with the teaching strategies, and 74% for teachers unfamiliar with the teaching strategies.

[2] See also the Quarterly End of Training Reports for Q2 and Q2 02005.

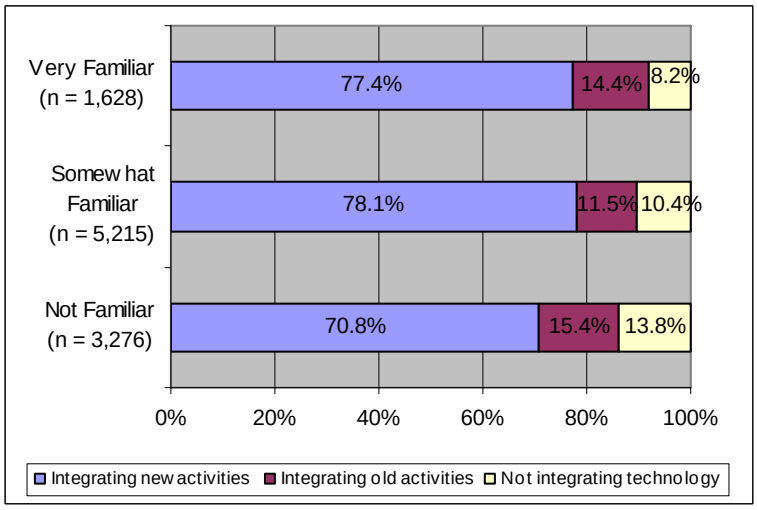
Figure 16: Degree of Familiarity with Teaching Methods by Teachers' Implementation of their Unit Plan
(n = 10,762)



Familiarity and integration of new technology activities

To examine the relationship between participants' prior knowledge of the targeted teaching methods and the optimal outcome measure of integrating new technology activities into their teaching, EDC looked at respondents' reports of integrating new technology-rich activities by their degree of familiarity. The survey data indicated that across all levels of prior familiarity, large numbers of teachers report integrating new technology activities into their teaching (See Figure 17). However, some degree of familiarity with the teaching methods does appear to facilitate the integration of new technology activities: 78.1% and 77.4% respectively have integrated new technology activities with their students. A lower percentage of the teachers with no prior knowledge (70.8%) report integrating new student technology activities.

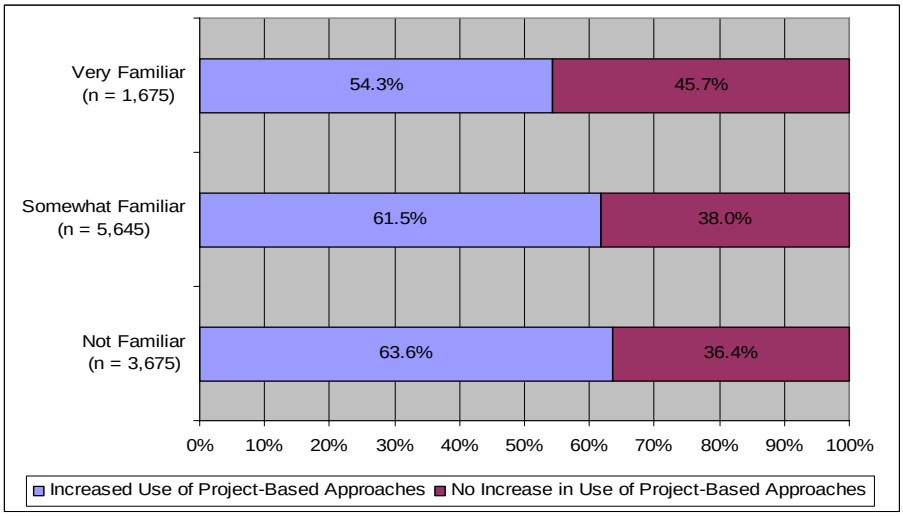
Figure 17: Degree of Familiarity with Teaching Methods by Teacher Integration of Student Technology Activities
(n = 10,114)



Familiarity and use of project-based approaches to teaching
The survey also asked participants about their use of project-based approaches to teaching, Essential Questions and student group projects. The following figures detail the relationship between the degree of familiarity with the teaching strategies presented in the training and teachers' change on these survey items.

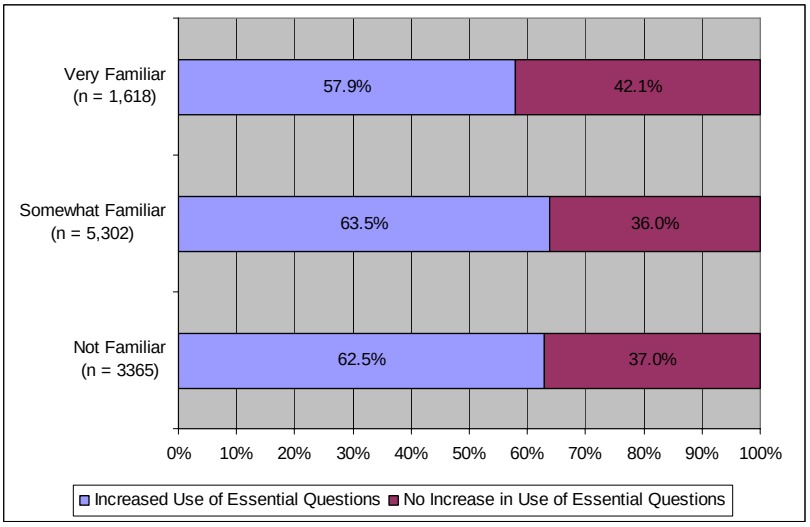
Teachers' use of project-based approaches in the classroom after their training did not differ by their prior familiarity with the teaching strategies presented in the training (See Figure 18). On the contrary, more teachers who reported no prior familiarity (63.6%) indicated that they had used project-based approaches with their students after their training than did teachers who reported being very familiar with the teaching strategies (54.3%). These findings may indicate that the training is helping all teachers increase their use of project-based approaches.

Figure 18: Degree of Familiarity with Teaching Methods by Change in Teachers' Use of Project-Based Approaches
(n = 10, 995)



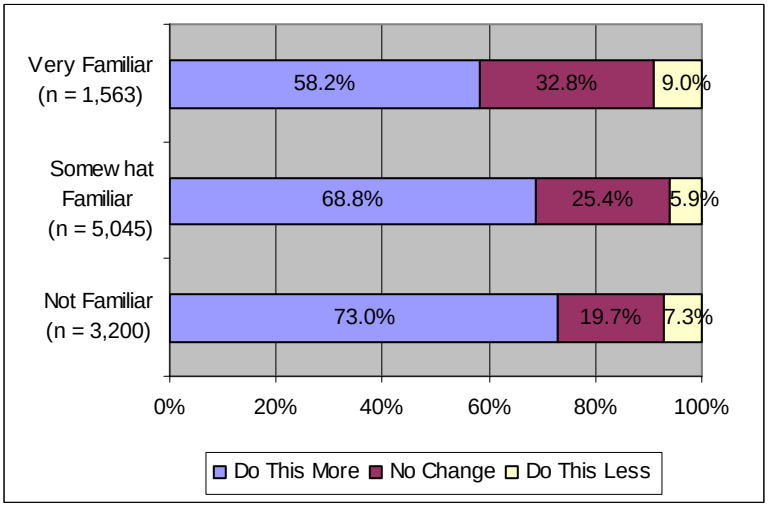
Participant teachers were also asked about their use of Essential Questions to structure lessons since the training. Survey data suggests that prior familiarity with the teaching strategies presented in the training did not seem to have an effect on teachers' use of Essential Questions (See Figure 19). A higher number of teachers (62.5%) with little or no familiarity with the teaching strategies reported increased use of Essential Questions than teachers who were very familiar (57.9%). This difference could have emerged because teachers with prior exposure to the teaching strategies presented in the training were already using Essential Questions in their classrooms.

Figure 19: Degree of Familiarity with Teaching Methods by Change in Teachers' Use of Essential Questions to Structure Lessons
(n = 10,285)



When asked how frequently they had their students work on group projects, more teachers (73%) with no familiarity with the teaching methods indicated that they did this more frequently since the training (See Figure 20). Only 58% of the teachers who were very familiar with the teaching strategies prior to the training indicated that they assigned more group projects to their students. However, this could again be because the teachers with prior exposure to the teaching strategies presented in the training were already having their students work on group projects with some frequency.

Figure 20: Degree of Familiarity with Teaching Methods by Change in Teachers' Use of Group Projects
(n = 9,808)



The data presented in this section show that even teachers with no familiarity with project-based or student-centered teaching methods do go on to experiment with the teaching methods promoted in the training when they return to their classrooms. This would demonstrate that the training successfully exposes teachers to the concepts and skills covered in the training and motivates them to use their new knowledge in the classroom, regardless of the novelty of these ideas to the participating teachers. The data presented here suggest that having prior familiarity with the targeted teaching methods does have some positive influence on teachers' follow up to the training, but that all participants are exhibiting high levels of follow up and are experimenting with these approaches to teaching in their classrooms.

However, evidence collected in teacher interviews, training observations and classroom observations in many countries' evaluations suggest that these reports may reflect very limited or even inaccurate understandings of how to implement these teaching strategies appropriately, especially among teachers who bring no prior knowledge of these approaches to teaching into the training. (See *Preparing Teachers for 21st Century Classrooms* for a fuller discussion of these issues).

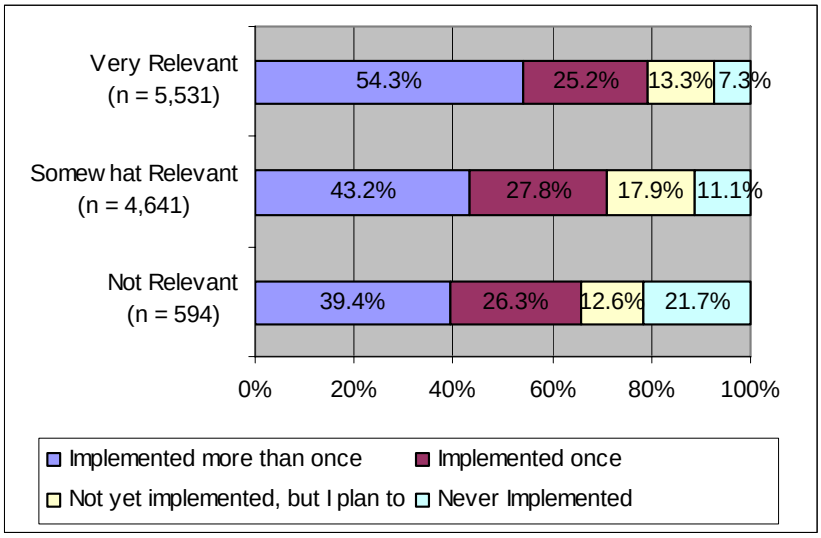
Relevance of the Teaching Methods Presented in the Essentials Course

This report also explores the relationship between teachers' perceptions of the relevance of the targeted teaching methods to their own teaching practices and follow up activities such as unit plan implementation and the integration of new technology activities. If teachers do not perceive the strategies presented in the training to be relevant to their classrooms and teaching goals, they may be expected to not follow up on the training in their classrooms.

Relevance and unit plan implementation

Teachers' perceptions of the relevance of the targeted teaching methods had a noticeable influence on teachers' implementation of all or part of their unit plans. Only 39.4% of the teachers who indicated that they did not find the teaching strategies relevant to their teaching goals implemented some or all of their unit plans more than once, with close to a quarter (21.7%) reporting they would not implement it at all (See Figure 21). This compares to over half (54.3%) of the respondent teachers who felt that the strategies were very relevant, who had implemented their unit plans more than once. The overall implementation rate for teachers who found the teaching methods to be relevant was 79.5%, compared to 65.7% of teachers who did not find the teaching strategies relevant to their teaching goals. This suggests that teachers' ability to see the relevance of these methods is important to their decision to implement all or part of their unit.

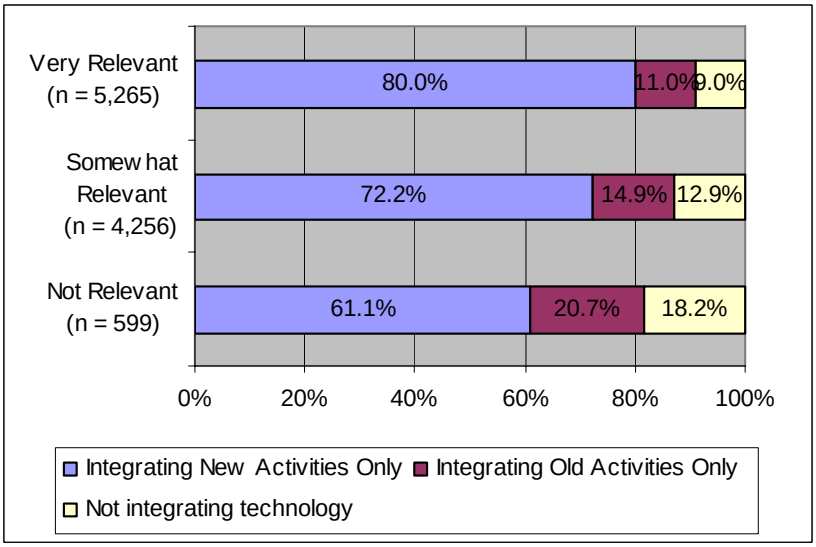
Figure 21: Degree of Relevance to Teaching Goals by Teachers' Implementation of Unit Plan
(n = 10,766)



Relevance and integration of new technological activities

The connection between teachers' perceptions of relevance and the integration of new technology activities is more pronounced than the relationship to the use of their unit plan. Eighty percent of the teachers who found the teaching strategies relevant had integrated new technology activities in comparison to 61.1% of the teachers who did not find the teaching strategies relevant (See Figure 22). Teachers who found the teaching strategies not relevant were more likely than teachers who saw at least some degree of relevance to report an increased use of technology activities they had already been doing, or to report not integrating technology at all.

Figure 22: Degree of Relevance to Teaching Goals by Teacher Integration of Student Technology Activities
(n = 10,120)



The data on the relationship of teachers' perceptions of relevance and using new technology activities with their students suggests the importance of giving teachers time during their training to discuss whether and how they see connections between their current teaching practices and goals and project-based, student-centered approaches to teaching. Teachers who come to the training with very different approaches to teaching are likely to need support to determine how these approaches to teaching might help them to support student learning or to envision concrete ways to draw on these strategies in their classrooms.

The local evaluation reports from some of the countries that are in the early stages of wide-spread pedagogic reform also raise the issue that participants need further support in understanding the potential of these new teaching strategies in deepening student learning[3].

Student Use of Technology

The Essentials Course encourages teachers to put students in control of technology in the classroom, and to use technology to gather and analyze information and present their knowledge and interpretations to others. Research suggests that these uses of technology in classrooms, when combined with effective instructional approaches and rich curricular content, can have a positive impact on a variety of indicators of student achievement, such as ability to engage in scientific inquiry, higher-order thinking skills,[4] motivation and organization skills[5], and critical thinking and collaboration skills[6] .

This report has already demonstrated that large majorities of teachers who have participated in the Essentials Course go on to implement all or part of their unit plans (75%) and use other new technology-rich activities in the classroom (75%). The following section examines teachers' reports of how frequently they are using new technology integrated lessons, and their use of two key student-centered practices: having students present their work to an audience, and doing Internet research.

Frequency of teacher use of technology with students

A primary objective of the Essentials Course is to equip teachers with the necessary skills to integrate technology into their lessons with students on a regular basis. In order to assess how often teachers integrate technology into their teaching after participation in the training, the teachers were asked "Since completing your Intel® Teach to the Future training, how often have you had your students engage in technology-integrated lessons?" As shown in Figure 23, the

[3] In particular, see the 2005 country reports prepared by the Teacher Foundation in India and the Ho Chi Minh Pedagogy University in Vietnam. (See Appendix C).

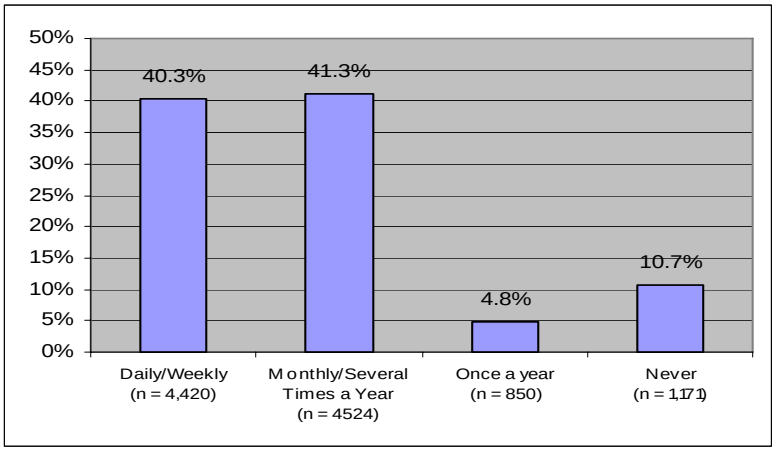
[4] Hunt, E., & Minstrell, J. (1994). A cognitive approach to the teaching of physics. In K. McGilly (Ed.), *Classroom Lessons: Integration Cognitive Theory and Classroom Practice*. Cambridge, MA: MIT Press, White, B. Y., & Frederiksen, J. R. (1998). Inquiry, modeling, and metacognition: Making science accessible to all students. *Cognition and Instruction, 16*(1), 3-118.

[5] Cradler, R., & Cradler, J. (1999). *Just in time: Technology innovation challenge grant year 2 evaluation report*. San Mateo, CA: Blackfoot School District No. 55, Educational Support Systems.

[6] Means, B., & Olson, K. (1997). *Technology and education reform. Studies of Education Reform*. Washington DC: US Government Printing Office, Sandholtz, J., Ringstaff, C., & Dwyer, D. C. (1997). *Teaching with technology : creating student-centered classrooms*. New York: Teachers College Press, Scardamilia, M., & Bereiter, C. (1996). Computer support for knowledge-building communities. In T. Kaschmann (Ed.), *CSCL: Theory and practice of an emerging paradigm*. Mahwah, NJ: Erlbaum.

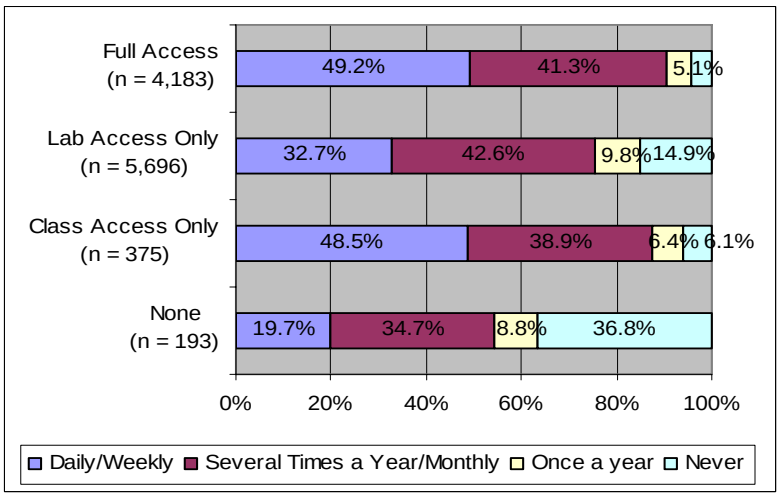
results indicate that teachers are integrating technology into their lessons most often on a monthly basis (41.3%), closely followed by on a weekly or daily basis (40.3 %).

Figure 23: Reported Frequency of Implementing Technology-Integrated Lessons
(n = 10,965)



To understand the relationship between the availability of computing resources and teachers' frequency of integrating technology into their lessons, EDC examined teachers' reported frequency of technology integration by the availability of computing resources. Teachers who had full access to technology resources (both classroom and lab access) report the greatest frequency of integrating technology into their lessons, with 49.2% integrating technology into their teaching weekly or more frequently, closely followed by the teachers who have only classroom access (48.5%). Only a third of the respondents from the lab access only group are integrating technology lessons on a weekly basis or more frequently (See Figure 24). This finding clearly demonstrates that classroom access to technology supports more frequent use of technology with students over time.

Figure 24: Teacher Frequency of Technology-Integrated Lessons by Availability of Computing Resources
(n = 10,447)

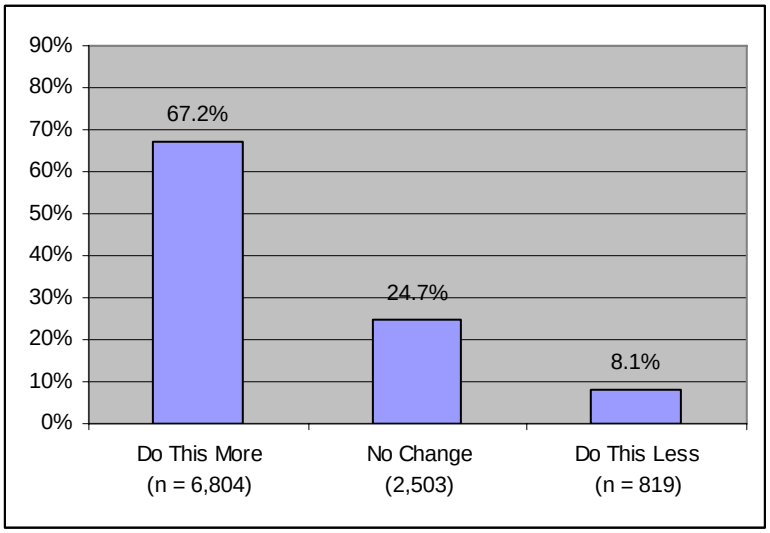


***In order to maintain clarity values below 5.0% were removed from the chart.

Student presentations

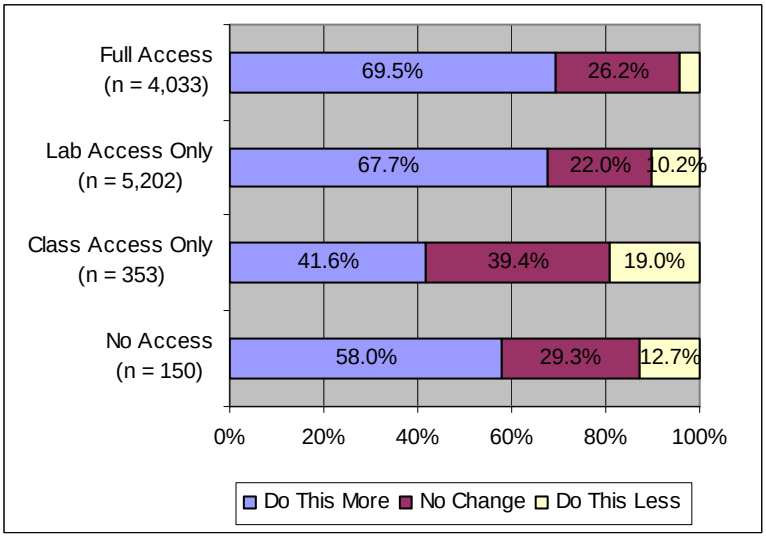
Having students create products to present their work to the class is a central strategy presented in the Essentials Course. The data suggest that this activity is widely adopted by the participants. Approximately 67% of the teachers report having their students present their work to the class more often since the training (See Figure 25).

Figure 25: Change in Teachers' Use of Student Presentation of Work to the Class
(n = 10,126)



When these results are analyzed by the availability of computing resources, there are similar results for teachers with lab access only and those with full access: 69.5% of teachers with full access and 67.7 % of teachers with lab access only report having students present their work to others more often since completion of the training program (See Figure 26). This suggests that teachers are able to introduce student presentations even if they only have lab access.

Figure 26: Student Presentation of Work to the Class by Availability of Computing Resources
(n = 9,738)

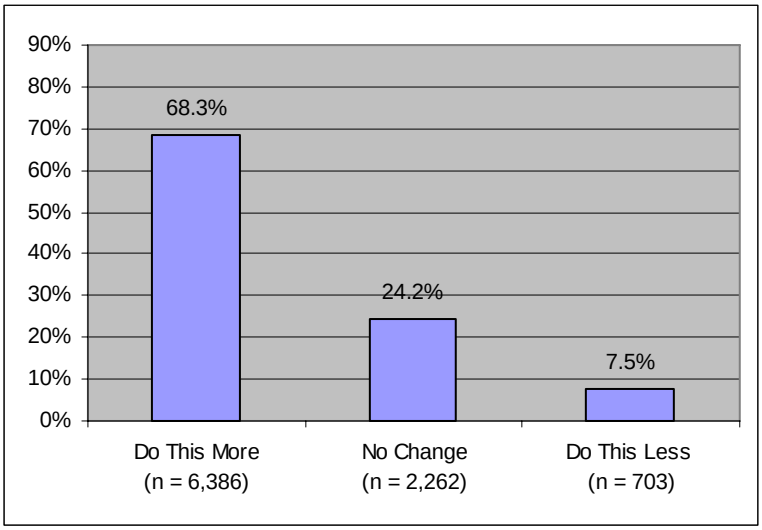


***In order to maintain clarity values below 5.0% were removed from the chart.

Student use of the Internet

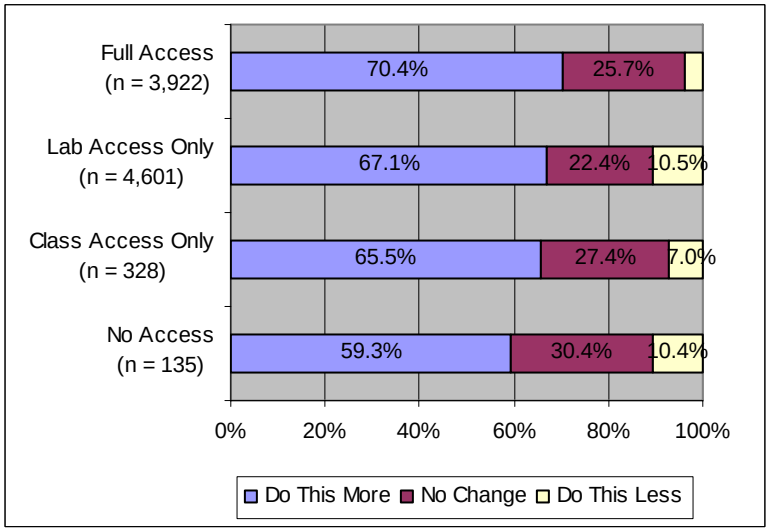
The survey also asked teachers if they had increased their students' use of the Internet. A large percentage of teachers (68.3%) are having their students use the Internet for independent research more often since completion of the training (See Figure 27).

Figure 27: Change in Teachers' Use of Student Internet Research
(n = 9,351)



In relation to having students do independent Internet research, teachers with full access and teachers with lab access only exhibit similar results (See Figure 28): 70.4% of teachers with full access and 67.1% with lab access only indicate having students use the internet for research more often.

Figure 28: Student Use of Internet for Independent Research by Availability of Computing Resources
(n = 8,986)



***In order to maintain clarity values below 5.0% were removed from the chart.

The survey results suggest classroom access supports more frequent use of technology activities for students, but that on two key strategies (student presentations and Internet research) lab access is nearly as effective as classroom access. Regardless of the technology resources available, a sizeable portion of teachers are increasing their usage of technology for these student-centered activities. Over half of the teachers reporting no access to computers in their schools indicate having their students present work to the class and do independent research using the internet. To understand this phenomenon, EDC examined these teachers' reported use of community technology centers and or home use. The survey responses indicate that 57.3% of teachers with no school-based access used community technology centers to work with their students, and 46.1% reported having their students access the computer at home for their school work.

Variation by Income level

The Essentials Course is implemented in countries with very different levels of economic development. EDC examined possible roles that economic development could have in mediating the impact of the Essentials Course on teachers. Other evaluation data have consistently demonstrated that teachers working in different conditions follow up on their training in different ways, and that the scope and depth of their adoption of new approaches to technology integration and instructional practice are closely tied to their prior knowledge, existing practices, and level of access to technology. National measures of economic development could be an appropriate proxy for variations in local and national context that shape these variations in teacher follow up. The following section examines the relationship between country income level and two key indicators: integration of new technology activities with students, and increased use of project-based teaching approaches. To more fully examine this relationship, EDC also looked at availability of computing resources, including lab size, and prior familiarity with new teaching methods.

This year there are four income levels represented in the data. Countries included in the survey dataset were grouped according to the World Bank's categorization of national incomes based on 2004 gross national income (GNI) per capita (See Tables 8 and 9).[7]

Table 8: World Bank 2005 Income Groups Based on 2004 Gross National Income (GNI) per capita

Income Group	Corresponding Per Capita Income
Low Income	**$825 or less**
Medium Low Income	**$826 - $3,255**
Medium High Income	**$3,256 - $10, 065**
High Income	**$10, 066 or higher**

[7] This data is available in the World Bank 2005 List of Economies Report (http://siteresources.worldbank.org/DATASTATISTICS/Resources/CLASS.XLS).

Table 9: Participating Countries by National Income Level

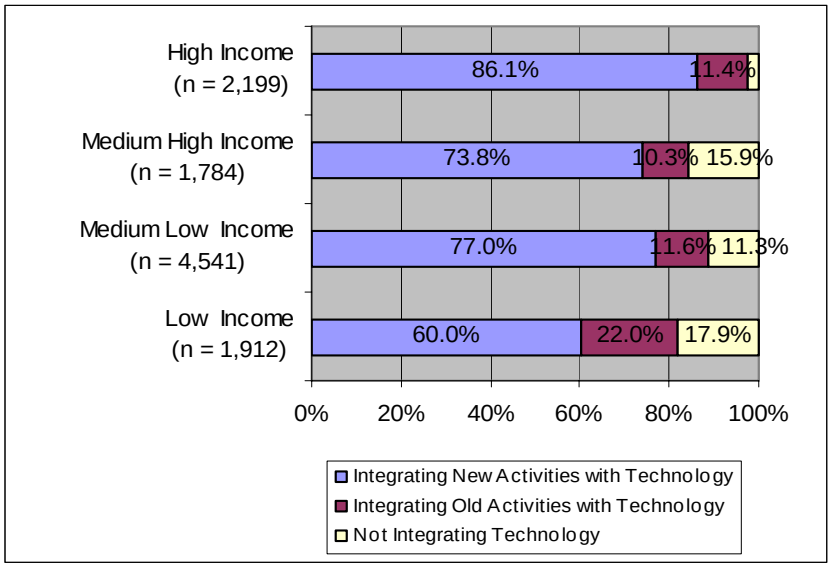
Country	Income Level	N
Australia	High	435
US	High	1,9072
Italy	High	139
Chile	Medium High	511
Mexico	Medium High	972
Russia	Medium High	322
South Africa	Medium High	77
Brazil	Medium Low	318
China	Medium Low	2,485
Egypt	Medium Low	183
Jordan	Medium Low	1,454
Philippines	Medium Low	391
Thailand	Medium Low	252
Ukraine	Medium Low	206
India	Low	1,563
Pakistan	Low	565

National income level by teacher integration of student technology activities

These data present a trend of increasing integration of new activities for teachers in the higher income countries. Approximately 86% of teachers from high income countries are integrating new activities with technology (See Figure 29). Low income countries display the lowest frequency of integrating new activities with students (60.1%) and the greatest percent increasing prior activities technology (22.0%), and not integrating technology at all (17.9%).

Figure 29: Teacher Integration of Student Technology Activities by National Income Level

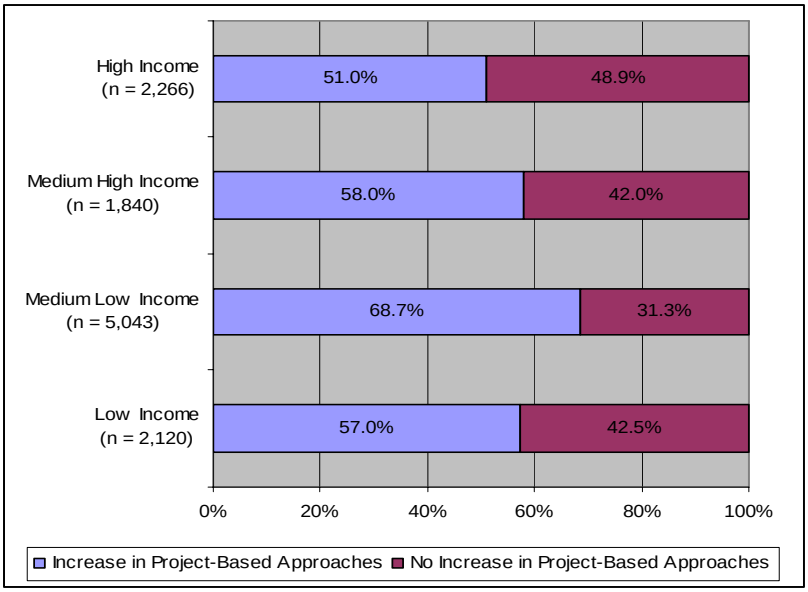
(n = 10,436)



National income level by increased use of project-based approaches

The data on changes in teacher practice is less conclusive (See Figure 30). Teachers from medium low income level countries were most likely to report increased use of project-based teaching approaches (68.7%). Fewer teachers in high income level countries report increasing their use of project-based approaches (51.1%). One limitation to interpreting the results is that the survey does not account for teachers already doing extensive project-based teaching. But, the data suggests that change in teaching methods after participation in the training is not dependent on national economic development.

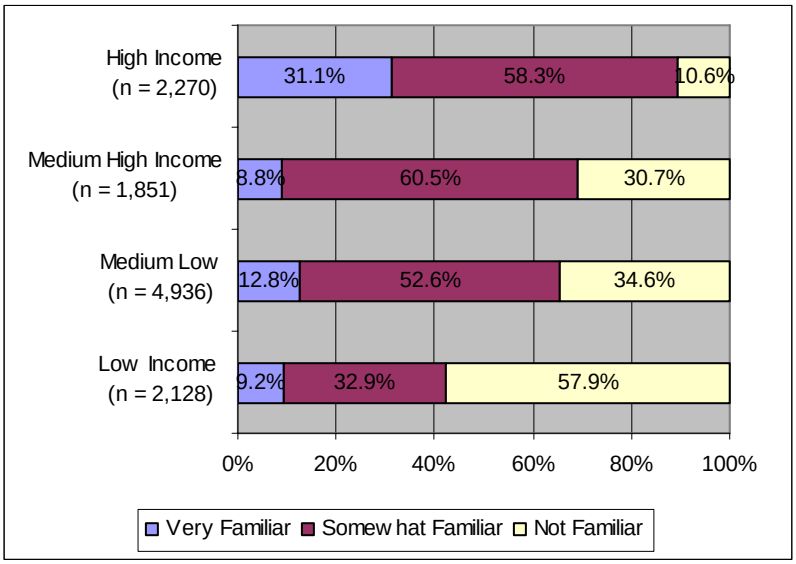
Figure 30: Teachers' Increased Use of Project-Based Approaches by National Income Level
(n = 11,269)



National income level by degree of familiarity with teaching methods presented in the Essentials Course

To more closely examine the relationship between economic development and the influence of the Essentials Course on changing teacher practice, EDC looked at teachers' level of familiarity with the teaching methods presented in the training (See Figure 31). The respondents in the high income countries report greater familiarity with the teaching methods presented in the training: 31.1% report being very familiar and only 10.6% report no familiarity with these teaching methods. Teachers in low income countries report the opposite trend: 57.9% indicate no prior knowledge of these strategies and only 9.2% report being very familiar.

Figure 31: Degree of Familiarity with Teaching Methods by National Income Level
(n=11,185)

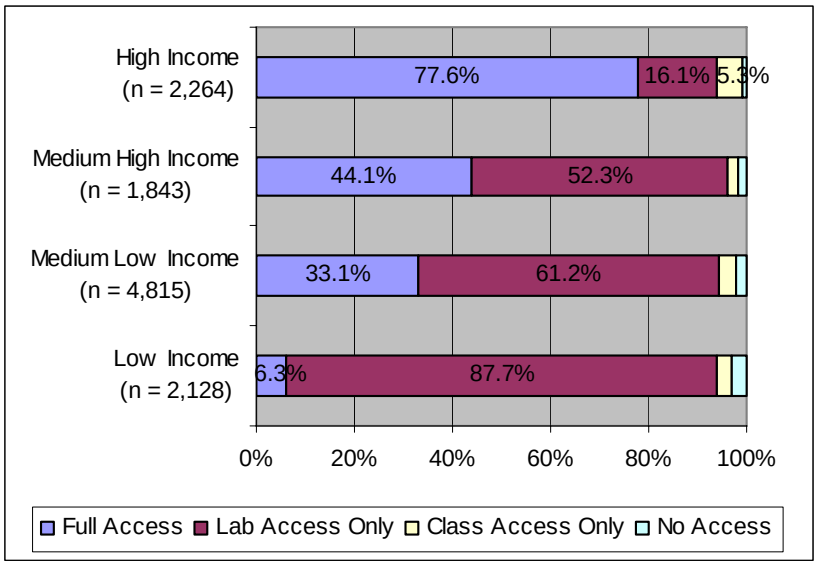


The data on national income level suggest that the low and medium low income countries have disproportionately higher percentage of teachers with little prior knowledge of the targeted instructional strategies. This is consistent with findings presented earlier, which show that teachers from high income countries report the greatest percentage of new technology integration, and that teachers with prior knowledge of the targeted teaching methods were more likely than others to follow up on the training with new technology activities in their classrooms. These variations in prior familiarity may also help to explain the lower percentage of teachers from low and medium low income countries who are implementing new technology after the training.

National income level by infrastructure

EDC also examined the infrastructure available to teachers within different national income levels. The data reveals the availability of more, and more flexible, resources for teachers in higher income countries (See Figure 32). Teachers in the high income category (77.6%) are most likely to report having full access (both classroom and lab access) and only 16.1% of these teachers have only lab access. The majority of teachers at the other three income levels have only access to a lab, ranging from a high 87.7% of teachers in the low income countries to 52.3% respondents in the medium high countries.

Figure 32: Availability of Computer Resources by National Income Level
(n=11,050)



EDC also examined the size of the computer labs that teachers have access to by national income level. This data shows a trend for teachers in the lower income countries to report smaller labs with 1-10 computers (See Table 10). The results for the medium low income category are due to the Chinese pattern of having more than 41 computer in their labs. This pattern is unique to China and not found in the data of the other medium low income countries.

Table 10: Income Level and Size of Computer Lab
(n = 10,607)

Income Level	1-10 computers	11-20 computers	21-30 computers	31-40 computers	41 or more computers
High Income	5.7%	15.2%	33.5%	16.2%	29.5%
Medium High Income	22.3%	39.9%	19.0%	9.8%	9.0%
Medium Low Income	20.4%	25.3%	11.3%	11.6%	31.4%
Low	41.4%	35.2%	12.3%	4.8%	6.4%

These data indicate a pattern that teachers in lower income countries have weaker access to computer resources: they are more likely to only have lab access to computers and, those labs are likely to have fewer computers.

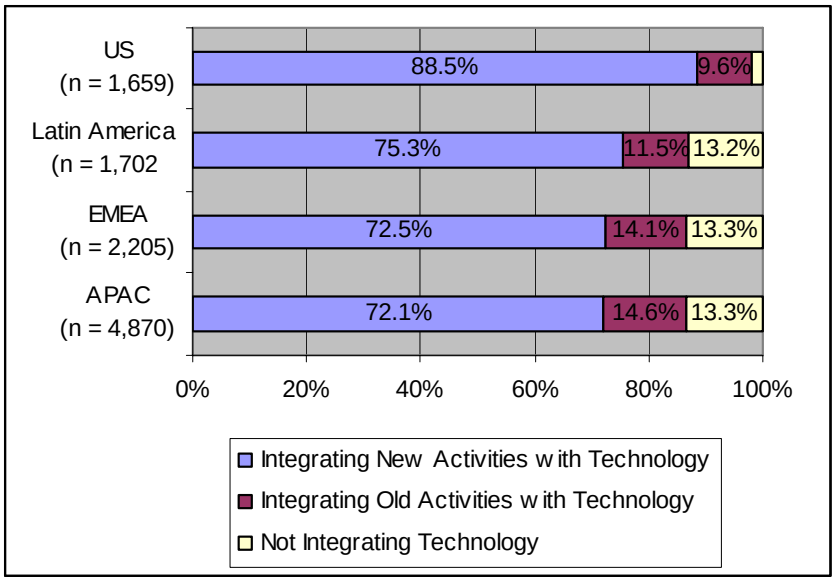
Variation by Region

Previous survey results have indicated regional differences on various outcomes, so EDC examined the key indicators of teacher outcomes by region. The following charts examine regional differences in teacher on two indicators: the integration of new technology activities and the increased use of project-based teaching methods.

Regional variation in integration of new technology activities

The survey results indicate that a significant number of teachers across all regions are integrating new technology activities with their students. Teachers from the US region report the highest frequency (88.5%) of integrating new technology activities, and roughly equal number of teachers from LAR (75.3%), EMEA (72.5%) and APAC (72.1%) regions report integrating new technology activities. LAR, EMEA, and APAC regions are also equivalent in their percentage of teachers who are not implementing technology activities (See Figure 33).

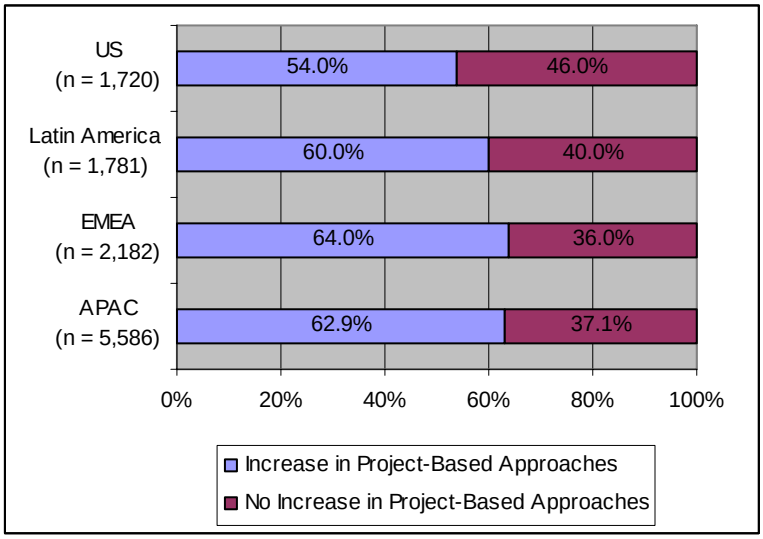
Figure 33: Teacher Integration of Student Technology Activities by Region
(n = 10,436)



Regional variation in use of project-based teaching methods

The survey data indicates that across all regions, more than half of the respondent teachers have increased their use of project-based approaches (See Figure 34). The EMEA region displayed the greatest percentage of teachers who increased their use of project-based pedagogy (64%) closely followed by APAC region teachers (62.9%). Teachers from the US region report the lowest frequency (54%) of increase in project-based pedagogy. However, this could be because the survey only tracks an increase in using project-based approaches and does not account for teachers who may already be using these approaches.

Figure 34: Teacher Increased Use of Project-Based Approaches by Region
(n = 11,269)



These data indicate that the Essentials Course is having an impact on teachers from all regions, as significant number of teachers report change in teaching practices across all regions. Results across regions are very similar, with the exception of some exceptionally strong results for the U.S.. For example, the US region reported the greatest percentage (88.5%) of new technology integration and the other regions show percentages ranging from APAC at 72.1% to EMEA at 75.3%. This could be a function of the technology infrastructure available to teachers across regions: 83.9% of US teachers reported having access to computers in both their classrooms and computer labs while teachers from most countries in the APAC region, for example, report having lab access only. Further, the original program was designed initially to meet the needs of teachers in the US and the localization of the program may be meeting challenges as the Essentials Course moves into countries with very different contexts.

CONCLUSION

Intel® Innovation in Education seeks to enhance the role of technology in teaching and learning and to contribute to the improvement of instruction in classrooms worldwide through the Intel® Teach to the Future Essentials Course. In every country, establishing a 21st Century educational system that can adequately prepare young people for the challenges and opportunities of a globalized economy requires long-term, incremental change. The countries currently participating in the Essentials Course are each at a unique point in the process of building the human capacity, technical infrastructure, and policy environment that will enable educators to make real, lasting changes in how teaching and learning occurs in their schools and classrooms.

The Essentials Course promotes a vision of quality instruction that links project-based teaching strategies with student-driven technology use that is closely aligned with the image of 21st Century education that many Ministries of Education and multi-lateral organizations are seeking to achieve. Evaluation of the Essentials Course has consistently shown that two key strengths of the course are its ability to build upon teachers' existing knowledge and interests, and to help teachers identify and achieve incremental changes in their use of technology and of project-based teaching methods. However, the impact survey data suggests that the program is facing an important challenge as the program extends to new countries where many more teachers are coming into the training with little or no prior awareness of the project-based and student-centered teaching methods emphasized in the training.

Survey data show that most participants have a positive experience of the workshops. After completing the Essentials Course, large numbers of participants in many countries do experiment with new instructional strategies in their classrooms and attempt to integrate technology into their teaching. However, the data on national income level suggest that the lower income countries are less likely build off of the program in the expected ways. Teachers in these countries are much less likely to have prior knowledge of the targeted instructional strategies and are more likely to have weaker access to computer resources: they are more likely to only have lab access to computers and, those labs are likely to have fewer computers. Furthermore, case studies and other qualitative evaluation efforts show that in countries where these approaches to teaching are least familiar, teachers are struggling to envision how isolated strategies - such as having students work in groups - can become integral parts of a coherent shift in overall classroom practice.

Appendix A

2005 Intel® Teach to the Future Impact Survey

1. Which Intel® Teach to the Future training did you complete?

Master Teacher training
Participant Teacher training

2. When did you complete your training?

Jan.-March, 2000
April-June, 2000
July-Sept., 2000
Oct.-Dec., 2000
Jan.-March, 2001
April-June, 2001
July-Sept., 2001
Oct.-Dec., 2001
Jan.-March, 2002
April-June, 2002
July-Sept., 2002
Oct.-Dec., 2002
Jan.-March, 2003
April-June, 2003
July-Sept., 2003
Oct.-Dec., 2003
Jan.-March, 2004
April-June, 2004
July-Sept., 2004
Oct.-Dec., 2004
Jan.-March, 2005
April-June, 2005
July-Sept., 2005
Oct.-Dec., 2005

3. Since completing your Intel® Teach to the Future training, how many times have you used your:

	More Than 10 Times	*4-10 Times*	*1-3 Times*	*Not At All*	*Did Not Receive*
a) Intel® Teach to the Future manual?					
b) Intel® Teach to the Future CD-ROM?					

4. Since completing your Intel® training how many times have you visited the Intel® Innovation in Education website?

More than 10 times
4-10 times
1-3 times
Never / Don't know

5. Since your training, have you implemented some or all of the unit plan you developed in your Intel® Teach to the Future training?

Yes, more than once
Yes, once
Not yet, but I plan to use the lesson before the end of this school year
No, never

6. Since completing your Intel® Teach to the Future training, how often have you had your students engage in technology-integrated lessons?

Daily
Weekly
Monthly
Several times a year
Once a year
Never **(Skip Question 7)**

7. Have you used technology with your students in new ways since you participated in the training?

Yes
No

Question 8 is only for teachers who DO NOT use technology with their students

8. Did any of the following reasons influence your decision not to use technology with your students? Please indicate the extent to which you agree or disagree with each statement.

	Strongly Disagree 1	*Disagree 2*	*No Opinion 3*	*Agree 4*	*Strongly Agree 5*
a) Not enough computers were available.					
b) The necessary software was not available.					
c) You did not have adequate access to the Internet.					
d) The lesson did not fit well into your curriculum.					
e) The lesson would not help your students meet required learning goals.					
f) You did not feel confident enough in your technology skills.					
g) You did not have enough planning and preparation time.					
h) You did not have adequate administrative support.					
i) You did not have adequate technical support.					
j) You did not have adequate instructional support.					

(Skip to Question 13)

Questions 9 to 12 are for teachers who HAVE used technology with students

Think of a class in which you implemented a particular technology-integrated lesson or activity. Please answer the following questions about that experience.

9. How many students were in that class?

1-10
11-20
21-30
31-40
41-50
51 or more

10. Below are some possible objectives of that lesson. Please mark an "X" beside the ONE goal that was most relevant or important for that lesson.

Students learn curriculum content
Students work on basic skills (such as math and reading)
Students express their ideas/opinions by creating multimedia products
Students conduct research
Students gain preparation to succeed in the workforce
Students present information to an audience
Students improve their computer skills
Students learn to work in groups
Students learn to work independently
None of the above

11. Please indicate the degree to which you agree or disagree with each statement about the impact of this technology-integrated lesson on your students.

	Strongly Disagree 1	*Disagree 2*	*No Opinion 3*	*Agree 4*	*Strongly Agree 5*
a) Students were motivated and actively involved in the lesson.					
b) Students worked together more often than in previous, comparable assignments.					
c) Technology-integrated lessons addressed students' different learning styles.					
d) Student work showed more in-depth understanding of content than in previous, comparable assignments.					
e) Students were able to communicate their ideas and opinions with greater confidence than in previous, comparable assignments.					

12. The following statements are about challenges you may have faced while implementing this technology-integrated lesson or activity. Please indicate the extent to which you agree or disagree with each statement.

	Strongly Disagree 1	*Disagree 2*	*No Opinion 3*	*Agree 4*	*Strongly Agree 5*
a) It was difficult to manage your students on the computers.					
b) Not enough computers were available.					
c) You did not have adequate access to the Internet.					
d) The class time or lab time that was available was too short.					
e) You did not have strong enough computer skills.					
f) Many students did not have strong enough computer skills.					
g) You did not have adequate administrative support.					
h) You did not have adequate technical support.					
i) You did not have adequate instructional support.					

13. In addition to its focus on technology skills, the Intel® Teach to the Future training suggests strategies that participants might use to incorporate project-based lessons into their teaching. Please indicate whether the teaching strategies presented in the training were new or relevant to your teaching.

	Not True At All 1	*Somewhat True 2*	*Very True 3*
a) The teaching strategies were new to me.			
b) The teaching strategies were relevant to my teaching goals.			

14. Since completing your Intel® Teach to the Future training, has there been a change in how frequently you do the following?

	Do This Less 1	*No Change 2*	*Do This More 3*	*Not Applicable 4*
a) Use a textbook as a primary guide for instruction.				
b) Use Essential Questions to structure lessons.				
c) Access the Internet to aid in developing lessons or activities.				
d) Use a computer for administrative work (for example, grading, attendance, creating handouts).				
e) Present information to students using computer technology.				
f) Use rubrics to evaluate student work.				
g) Have students review and revise their own work.				
h) Have students present their work to the class.				
i) Have students engage in independent research using the Internet.				
j) Have students work on group projects.				
k) Have students choose their own topics for research projects.				

15. How many computers are in your classroom (the room(s) in which you primarily teach, not the school computer lab)?

0 computers **(skip to question 17)**
1 computer
2-4 computers
5-7 computers
More than 7 computers

16. Do the computers in your classroom have Internet access?

Yes, all of them do
Yes, some of them do
No, none of them do

17. In your school do you have computer labs or media centers?

Yes
No **(skip to question 22)**

18. Do some or all of the computers in the labs/media centers have access to the Internet?

Yes
No

19. In total, how many computers are available in the computer labs or media centers? (Please give a combined total if your students have access to multiple labs or media centers.)

1-10 computers
11-20 computers
21-30 computers
31- 40 computers
41 or more computers

20. How often do you work with your students in the computer lab or media center?

Daily
Weekly
Monthly
Less than once per month
Never

21. How easy or difficult is it to schedule time in the computer lab/media center?

Very difficult
Somewhat difficult
No opinion
Easy
Very easy

22. Do you have your students use computers at home to do their schoolwork?

Yes
No

23. To do their schoolwork, do you have your students use computers outside of school at a community center, library, or public technology center?

Yes
No

Appendix B

Reported Class Size (as a range) by Country

Region	Country	N	Class Size						Total
			1-10	11-20	21-30	31-40	41-50	51 or more	
APAC	Australia	378	6.3%	16.1%	75.1%	1.1%	0.5%	0.8%	100.0%
	China	2032	0.4%	0.1%	9.5%	14.1%	25.7%	50.1%	100.0%
	India	1132	6.0%	16.6%	17.7%	22.4%	16.0%	21.3%	100.0%
	Pakistan	332	13.6%	21.7%	30.7%	17.8%	6.0%	10.2%	100.0%
	Philippines	276	2.5%	4.3%	6.5%	13.4%	26.1%	47.1%	100.0%
	Thailand	226	2.7%	2.7%	8.0%	45.6%	38.1%	3.1%	100.0%
EMEA	Egypt	164	4.9%	4.9%	17.1%	36.6%	32.9%	3.7%	100.0%
	Italy	111	3.6%	28.8%	53.2%	11.7%	2.7%	0%	100.0%
	Jordan	964	6.7%	17.6%	39.4%	26.9%	8.2%	1.1%	100.0%
	Russia	136	33.1%	50.7%	14.7%	1.5%	0%	0%	100.0%
	South Africa	59	3.4%	28.8%	44.1%	13.6%	5.1%	5.1%	100.0%
	Ukraine	202	29.2%	37.1%	29.2%	3.5%	1.0%	0%	100.0%
LAR	Brazil	261	28.4%	26.8%	21.8%	16.9%	1.9%	4.2%	100.0%
	Chile	405	4.7%	11.6%	25.4%	36.3%	18.3%	3.7%	100.0%
	Mexico	647	10.5%	12.5%	26.1%	38.8%	9.1%	2.9%	100.0%
US	US	1606	10.7%	27.3%	42.2%	11.4%	5.7%	2.7%	100.0%
	Total		7.6%	15.1%	26.8%	19.2%	14.0%	17.3%	100.0%

Appendix C

Argentina
Assessment of the courses' pedagogic-didactic impact (Word document)
Intel® Teach to the Future
Prepared by Prof. Dra Margarita Schweizer

Brazil
Evaluation of the Intel® Teach to the Future Program in Brasil (PowerPoint)
Prepared by Foundation Carlos Chagas

Egypt
Evaluation of the Intel® Teach to the Future (Word document)
Prepared by National Centre for Examinations and Educational Evaluation (NCEEE)
http://www.nceee.edu.eg

India
Intel® Teach to the Future (India) Program Report
An understanding of the programme (Word document)
Prepared by PQR, a specialist qualitative unit of IMRB International

A Comparative Study of ICT Leadership in Schools: A Case Study of 4 Government-aided Schools in Gujarat. (Word document)
Prepared by The Teacher Foundation

Israel
Intel® Teach to the Future Assessment Report on Assimilating the Program (Word document)
Prepared by Department of Assessment, Achva, Academic College of Education

Assessment of the "Intel® Teach to the Future" Program (PowerPoint)
Prepared by Department of Assessment, Achva, Academic College of Education

Japan
Survey on the Intel® Teach to the Future Program (Powerpoint)
Prepared by Nikkei Research Inc.

Jordan
Impact Survey Report, Intel® Teach to the Future (Word document)
Prepared by Dr. Younes Al Younes, & Mr. Haidar Zaza, Jordan University; and Mr. Ziad El-Nsour, Ministry of Education

Korea
2005 Final Report for Impact Evaluation on Korea Intel® Teach to the Future program (Word document)
Prepared by Korea Institute of Curriculum and Evaluation (KICE)

Russia
Intel® Teach to the Future Program in Russia (Word Document)
Prepared by State Institute for Information Technologies and Telecommunications
http://www.informika.ru/text/index.html

Thailand
Analysis of the EDC After 6 Month Survey for the Intel® Teach to the Future Program (Word document)
Prepared by Thailand Education Development Alliance (TEDA)

The Analysis of (The Result of) the MT Training 2004 (Word Document)
Prepared by Thailand Education Development Alliance (TEDA)

Vietnam
Final Report Intel® Teach to the Future Evaluation
Pre-Service Component at Hochominh City University of Pedagogy
Prepared by Kim Dung Nguyen and Trung Nguyen Le Nguyen

United States
Intel® Teach to the Future Essentials Course, U.S. Evaluation: 2005 End of School Year Survey Report
Prepared by Education Development Center/Center for Children and Technology