THE PILOT INTEL® TEACH PEDAGOGICAL SUPPORT SYSTEM

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Background

The Intel® Teach to the Future Program has trained more than 50 000 high school teachers in the Philippines on how to effectively integrate technology in the subjects they teach. Although end-of-training evaluations consistently show that a high percentage of teachers greatly appreciated the new strategies and skills they gained, impact survey reported poor utilization of said strategies and skills in the classroom, as evidenced by the very low percentage of trained teachers actually implementing the technology-enhanced Unit Plan developed during training. Among the reasons cited by teachers was the lack of adequate technical and/or instructional support.

The Unit Plan is among the components of an entire portfolio-- called a *Unit Portfolio*-- that teachers develop while on training. Aside from the Unit Plan, the portfolio consists of teacher-created samples of student outputs, evaluation tools for the student samples, teacher support and student support materials, and other technology-based resources needed to integrate technology in a particular curricular content.

The Pilot Pedagogical Support System

Objectives and Structure

The aim of the Pedagogical Support System (PSS) was straightforward: to enable newly trained Master Trainers (MTs) to implement the Unit Plan they developed during training and overcome challenges during implementation. Support focused on enabling MTs to: (a) enhance the Unit Plan they developed during training; (b) implement the Unit Plan; (c) reflect on and evaluate implementation; and (d) revise the Unit Plan for future implementation (Figure 1).

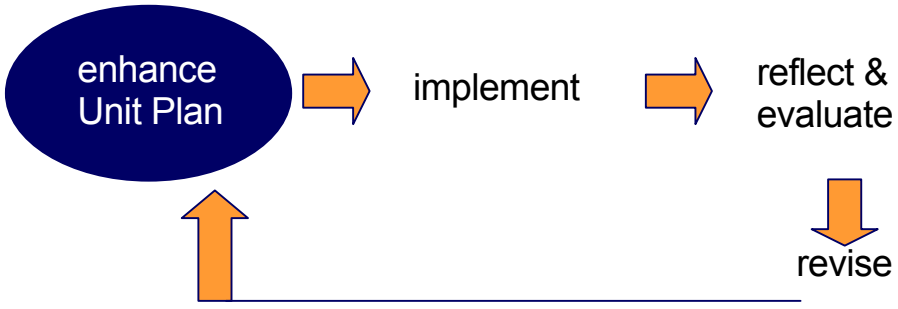

Figure 1. The Pedagogical Support Process

Accordingly, activities were carried out in three stages: *Stage 1-- Unit Plan Enhancement*, *Stage 2-- Unit Plan Implementation*, and *Stage 3-- Reflection and*

Evaluation. Stage 1 consisted of Unit Plan clinics, provision of access to supplementary resources, and consultations done face-to-face, over the phone, through emails, and text messaging-- all aimed at ensuring the quality of the Unit Plan and the overall unit portfolio prior to implementation. Stage 2 consisted of Unit Plan walk-throughs, class observations, post-observation conferences, and just-in-time coaching. Stage 3 consisted of debriefing sessions, journal sharing-discussions, and the Unit Plan revision. If video footages of the implementation have been taken, viewing and discussion were also conducted at this stage. Throughout the three stages, there was option to use Web-mediated collaboration tools and services.

The Beneficiaries

The pilot PSS was provided to 68 new MTs trained under the Intel® Teach to the Future Program in May 2005. The MTs were public secondary school teachers from 10 pre-selected divisions in various parts of the country: Bulacan and Tarlac in Region III; Batangas, Laguna, and Cavite in Region IV-A; Davao City in Region XI; Lanao del Sur II in ARMM; and Makati City, Quezon City, and Pasig-San Juan in NCR. Their selection was based on their school principals' recommendation.

The Support Providers

The lead Support Providers (SPs) were selected from the community of Intel® Teach practitioners (secondary school teachers or faculty from Teacher Education Institutions) within the MT's division or from a nearby division, or anywhere within the same region. Among other qualifications, they must have participated in earlier enhancement workshops that familiarized them to the Intel® Teach Essentials Course curriculum the MTs underwent. Due to unavailability of qualified Intel Teach practitioners near the area, members of the UP NISMED curriculum development team served as SPs for Makati City, Quezon City, Pasig-San Juan, Batangas, and Cavite MTs. One lead SP was assigned to an MT. The team likewise included content and curriculum experts (department heads, division supervisors, university faculty) in science, mathematics, and English. The lead SP was responsible for identifying, engaging, and coordinating the assistance of these other experts, as needed.

Scope of Support

The pilot ran from October 2005 to May 2006. Stage 1 and Stage 3 support were extended to MTs who implemented their Unit Plans before October 2005 and in full, that is, from Stage 1 to Stage 3 to MTs who implemented between October 2005 and March 2006. Figure 2 below shows the distribution of MTs by nature of instructional support received.

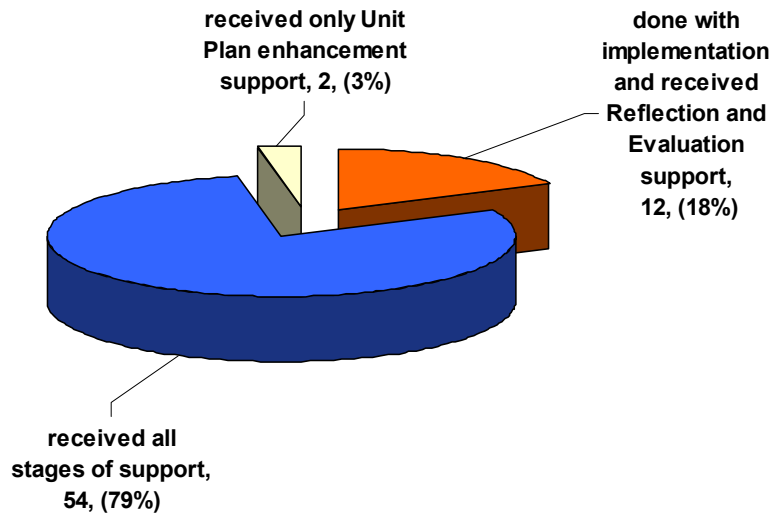

Figure 2. Distribution of MTs by Stage of Support Received

The Tools

A number of tools were used as a means to deliver the support and to gather data and feedback. A portfolio review guide was used by the SP and external reviewers in Stage 1. MTs and SPs completed journals in Stages 1 and 2. A class observation form was used in Stage 2, while a guide for conducting debriefing sessions was used in Stage 3. In each stage, SPs used a checklist to monitor progress in both process and outputs.

Accomplishments

Sixty-eight of the 70 MTs trained in May 2005 received pedagogical support. (Two MTs were reported to have gone abroad and resigned from their posts even before the PSS began operation. They were excluded when computing for the total number of MTs.) The nature of support received by MTs varied as this depended on the status of unit implementation they were in at the time an SP reached them. Of the 68 MTs that received pedagogical support, 66 (97%) were able to implement their Unit Plans in SY 2005-2006. This is much higher compared to the 2003 SEAMEO-Innotech survey figure of 16.6 per cent (SEAMEO-Innotech, 2004). Table 1 shows the number and percentage of MTs who implemented their Unit Plans by division.

Table 1. MTs who implemented their Unit Plans by division

Division	Total No. of MTs	MTs who implemented their Unit Plans	
		no.	%
Bulacan	3	3	100
Tarlac	3	3	100
Batangas Province	11	11	100
Laguna	8	8	100

Cavite	2	2	100
Davao City	7	7	100
Malabang	1	1	100
Makati City	15	13	87
Quezon City	16	16	100
San Juan	2	2	100
Total	68	66	97%

Challenges Encountered

Master Trainers and Support Providers faced difficulties during the delivery of the pilot Pedagogical Support. A number of them are presented in this section.

Challenges in Unit Plan Enhancement and Implementation

The biggest challenge that confronted MTs during Unit Plan enhancement and implementation was the lack of resources-- which included time, computer facilities, Internet connectivity, and materials and equipment needed for the non-technology activities. During unit plan enhancement, MTs also experienced difficulty in selecting the technology tools appropriate for a given student activity, formulating and matching Curriculum-Framing Questions with learning objectives, and designing/adapting and properly sequencing activities. Six MTs who were not able to implement their Unit Plan during the target grading period also had difficulty developing a new one. Technical and logistical problems such as unavailability of the needed technology tool, presence of varying software versions, slow or unreliable Internet connection, corrupted or lost files, cancellation of computer use due to unexpected school events, and power interruptions had negative effects on the unit implementation. In a number of cases, students' poor ICT skills also added burden to the MTs especially when classes are big. Monitoring student progress and providing appropriate and timely assistance was another difficulty most MTs experienced.

Challenges in the Provision of Support

Support Providers considered a big challenge the task of reviewing and suggesting enhancements to Unit Plans in learning areas other than their own. Scheduling and conducting face-to-face meetings with MTs also posed another challenge. Encouraging MTs to continue with Unit Plan implementation was also tough because of the pessimistic attitude of some of them. Another challenge commonly reported by SPs is helping MTs apply effective classroom management techniques during implementation. Preparing individual reports for each MT supported was a difficulty expressed by majority of the SPs.

Learnings

The pilot Pedagogical Support System took place at the grassroots and involved players from various levels and sectors of the education community. Support Providers were immersed in the same day-to-day realities confronting the

MTs and their schools, giving them lots of opportunities to: (a) identify key contextual factors that affected the efficacy and degree of technology implementation within the school environment; (b) observe impact of integrating technology on the MTs and their students; and (c) identify important aspects of teacher learning and continuing professional development.

Learnings about key factors affecting technology integration by teachers

Analysis of feedback and reports accumulated throughout the Project indicated that meaningful technology integration is demanding. It entails strong content and pedagogy background, time, initiative, and resourcefulness on the part of the teacher, adequate access to required ICT resources, support from administration, active participation from students, and partnerships with the wider Intel Teach community and other players.

Access to technological resources is a critical element that affects the way the MTs implemented application of computers in their classrooms.

It was evident from the feedback gathered through the MTs' and SPs' journals that inadequate ICT resources and access as well as lack of equipment during laboratory activities adversely affected the quality of implementation and student participation. Although all participating schools were beneficiaries of the PCs for Public Schools (PCPS) project of the Department of Trade and Industry and had 10-20 PCs in their lab, not all of these PCs were in good working condition at the time of unit implementation. The inadequacy was further aggravated when class sizes are large. Large groupings were often resorted to so as to provide each group with a computer and the materials needed for the activity. As a result, many students merely observed what two or three group mates were doing, instead of participating in the activity and contributing to the output. In a number of schools, computers were arranged side-by-side close to each other that made it difficult for more than two students to be around a computer. Hence, a typical physical configuration of a group around a computer had two to three students rubbing bodies in front of a computer while the remaining five group mates were standing behind them elbowing their way to view what's on the screen. Inches away is another group similarly positioned.

Technical and logistical problems such as unavailability of the needed technology tool, different versions of software, unreliable or slow Internet connection, corrupted files, power interruptions, and cancellation of computer use due to unexpected school events had negative effects on the unit implementation.

Administrative support and encouragement is essential and facilitative.

Right from the start, the Project strongly believed that administrative support was essential for successful technology integration by the MTs and advocated that school leaders (principals, department heads, ICT coordinators) need to encourage teachers to apply skills gained from training and assure a reliable technological environment for technology integration. School administrators indeed played a big part in the implementation by the MTs of their Unit Plans as their role was not limited only to ensuring prioritized access to ICT

resources but also to providing pressure and moral support. Four MTs reported that constant follow up by their school heads pressured them to implement their Unit Plans. On the other hand, the non-involvement of school heads resulted in the delay in Unit Plan implementation by a few MTs. In general though, school administrators were able to provide MTs with a safe and collaborative environment that allowed experimentation with new technologies and implementation of technology-supported pedagogical practices.

Designing and implementing pedagogical strategies made possible by integrating technology requires flexibility in organizing and delivering the curriculum.

For example, Project-Based Learning requires adjustments in topic sequencing and time allotment (or budget of work) as a means to achieve the goals of authentic and meaningful learning and the development of higher-order thinking skills, information literacy, and teamwork. Similar student-centered technology-supported learning activities may also require students and teachers from different learning areas and year levels to collaborate in a common unit of study.

The difficulties encountered by MTs while enhancing and implementing their Unit Plans enumerated earlier are indicative of their struggles to design and implement technology-supported methodologies. This is not an easy task not only because of their lack of experience but also because such strategies are not practiced in their schools. The MTs needed to be assured that it is ok to experiment with new pedagogical practices that integrate technology without having to worry about being reprimanded by the principal, department head or division supervisor when a topic is taking longer or is being taken up earlier or later than usual.

Content and pedagogical competencies affected MTs' ability to meaningfully integrate technology into the teaching-learning process.

That MTs' had difficulties in content and student-centered pedagogy was evident from the quality of their end-of-training Unit Plans and portfolios. Teachers whose own knowledge of content is limited to knowing facts and procedures and some shallow applications of content to real life tended to focus on low-level learning objectives when designing their technology-supported units. For instance, technology-supported activities merely required students to define, identify, describe, and/or summarize. Moreover, teachers who are used to teacher-centered strategies or possess a very limited set of teaching strategies tended to use technology as a means to enhance productivity in delivering instruction (e.g., teacher's use of a multimedia presentation to aid lecture), rather than as a tool to maximize student learning in a particular task or situation (e.g., student use of an electronic spreadsheet to investigate relationship among variables and making predictions in a math or science class; students creating publications and multimedia to inform schoolmates and the community about coral reef destruction and campaign against destructive fishing practices while studying about informative and persuasive text in a language class).

Majority of the MTs were not particularly successful in generating innovative ways for using technology that would enhance student learning experiences in ways not possible without the use of technology.

Learnings about the Provision of Support

Although majority (n=68; 74 per cent to a great extent, 22 per cent to a moderate extent) of the MTs declared that the knowledge and skills they acquired from the training will help them to effectively integrate technology into the subjects they teach, results of the Unit Plan and portfolio review revealed that many of them were not prepared to do so immediately after the training. Perhaps, the MTs needed a more focused and contextualized professional development in order to apply what they have learned. The provision of pedagogical support may be considered as a form of follow-up professional development activity that focused on intensifying and sustaining gains from the 10-day MT Training. The following experiences of MTs and SPs have highlighted important elements of continuing teacher learning at the school level.

> **Effective pedagogical support requires content expertise and know-how of current best practices in the learning area.**

The introduction of outside experts into the follow-up support design was a quality assurance strategy that seemed to have attained its objective. MTs reported that inputs from Support Providers improved their Unit Plans and portfolios in terms of: (a) employing teaching strategies and learning activities that are appropriate to students; (b) incorporating learning activities that are student-centered and dealt with authentic, real-life situations; (c) appropriately sequencing learning activities to support concept development; and (d) including support materials that served as springboards and scaffolds toward better student learning. SPs, in addition, reported that review of content accuracy and currency, selection of appropriate technology, instructional design, management and facilitation of technology-based activities, and student assessment and evaluation constituted much of the support they rendered.

Further analysis of MTs' journals revealed that SPs who come from pre-service teacher institutions focused their inputs on teaching strategies and tips in classroom management while UP NISMED SPs emphasized the design of student-centered activities and how to match them with targeted learning objectives.

> **Post-training support entails time and utilizes multiple activities to address the MTs' diverse needs.**

Support Providers knew at the outset that completing the support cycle for one MT would require some amount of time. The record of communications that took place during the entire support period submitted by SPs as well as their informal accounts of actual time spent yielded figures at least double their initial estimate. SPs reported that the increase was brought about mostly by extending time for completing certain tasks, but was also due to difficulty in finding a common time for face-to-face meetings and travel time since most MTs and SPs live and work far from each other.

The support activities had been designed to address the MTs' needs revolving around the life cycle of the Unit Plan. In actual delivery during the pilot, these activities did not occur in a linear, sequential manner, but rather in an iterative, manner that corresponded to changes to the Unit Plan proposed by MTs either as a result of progress in their understanding of technology-supported pedagogical strategies or of their assessment of the logistical and technological environment existing in the school.

MTs appreciated the supplementary and reference materials suggested by their SPs, but considered the Internet resources as the most useful. MTs also reported that they found the classroom observations useful in the sense that it helped them identify self-strengths which they can leverage on and the weaknesses they needed to address in order to improve practice.

> **MTs became enabled when they learn from and are supported by a strong community of experts and co-learners.**

Support provision in its earliest implementations was carried out in isolated SP-MT pairs and characterized mainly by expert-to-novice dispensing of knowledge. As the support process progressed, however, other key players (reviewers, principal, school ICT coordinator, computer teacher, department head, fellow MTs, and other Intel Teach practitioners) came into the picture. Inasmuch as the nature of involvement of each key player is shaped by their respective roles, MTs' and SPs' accounts of their participation were fairly uniform across schools. The following is a representative account of their involvement. The principal has given the MT the go signal to proceed with implementation and has directed everyone to provide full support. The department head has approved the MT's request for supplies and promised to conduct two class observations. The computer teacher has agreed to give the class a quick session in web browsing and PowerPoint. The school ICT coordinator has prioritized access to the computer lab for the MT's class at designated schedules and for the two special sessions. Fellow MTs are giving him/her moral support and one volunteered to facilitate as the class schedule coincided with her vacant period. Forming strong relationships soon became as important as knowing how to improve and implement the Unit Plan. There is a growing awareness on the part of the MT and SP that the success of the unit implementation somehow depends on those other players; in particular, on how quickly they are able to provide the appropriate support. Thus, successful Unit Plan implementation is no longer the goal of just the MT and his/her designated SP, but of everyone who has been drawn into the loop. Support is no longer limited to the instructional; and its provision no longer the task of one person, but of an entire community.

Learnings about the Impact of Using Technology in Class

> **Implementing a technology-supported unit has improved teachers' skills and confidence in using technology and increased their interest to innovate with technology in their classes.**

MTs identified the following as gains derived from actually implementing their Unit Plans: (1) improved ICT skills, (2) increased confidence in using technology, (3) increased confidence and motivation in innovating with technology

in their classes, (4) improved teaching practices, and (5) better understanding of what it means to use technology in the teaching-learning process. In particular, MTs reported that the experience encouraged them to design technology-supported strategies not only to increase their productivity but more importantly, to enhance student learning and facilitate their creation of technology-based products as evidence of learning.

Integration of technology in learning activities improved student outcomes.

Providing students with learning activities that allowed them to use technology increased their motivation. Use of applications (e.g., PowerPoint, Publisher, Word, and Excel enabled them to create multiple evidences of learning in the form of multimedia presentations, publications, documents, tables, charts, and websites-- demonstrating their creativity and raising their self-confidence. Many times students worked in groups— fostering collaboration, communication and independent work. Another commonly observed effect of incorporating technology in learning activities is increased student participation. However, their active participation appeared to have been a result of their keen interest in the technology rather than in the subject matter.

Implications

This Project has highlighted a number of critical factors that influence effective technology implementation at the school level. Careful consideration of their implications may be relevant to schools that have just started to integrate technology in the teaching-learning process, as well as to schools that wish to intensify their own efforts of innovating with technology.

Administrative support and cooperation from the entire system. Administrative support for teachers returning from training that are key to their having been able to practice what they have learned include: (1) providing adequate access to technology resources and ensuring a reliable technological environment; (2) providing a safe and collaborative environment that allows experimentation with new technologies and implementation of new technology-supported pedagogical practices; and (3) supporting teachers to participate in continuing professional development through partnerships with the wider community, as experts or co-learners.

Adequate access means that the required technology is available (e.g., no. of computers allow for 1:1 to 1:3 computer to student ratio, software in all computer systems are of the same version) and that teachers and their classes are provided with scheduled use at the lab. Moreover, teachers returning from training come with new pedagogical strategies and would need the assurance that it is ok to try them out in class. In addition to the principal, teachers would need flexibility from their department head and, in some cases, the division supervisor, in order to incorporate new teaching and learning activities. Teachers also need the cooperation of and assistance from other school personnel, such as the school ICT coordinator and computer teachers.

Everyone who is part of the technology integration process should be introduced to and benefit from a learning community that supports and challenges each member's practice. As has been shown during the pilot PSS, teachers became enabled when they received support from and learned with the wider community of experts and co-learners. This experience is true not only for the MTs, but also for the SPs. Most of the support providers were MTs once. These MTs now turned SPs likewise consider the pilot PSS as an experience that has deepened their own understanding of what it means to effectively integrate technology. They expressed that supporting an MT has motivated and challenged them to improve their own practice. The UP NISMED personnel who served as SPs are also involved in the curriculum development and training components of the Intel Teach to the Future program. They too, gained new perspectives on a number of key aspects of designing content and strategies for teacher professional development on ICT-pedagogy integration.

Selection of teachers for professional development programs. As has been seen during the pilot PSS, the design and implementation of technology-enhanced units was shaped by the teachers' background on content and pedagogy.

When recommending teachers to professional development programs on ICT-pedagogy integration, school administrators should therefore select teachers who have a strong background in the discipline and are already familiar with student-centered pedagogical strategies, in addition to their technological knowledge and skills. The teachers must also be genuinely interested in implementing technology integration in their learning areas as this has been shown to influence how the training will subsequently impact actual teaching practices.

Increased participation of division supervisors and department heads in providing pedagogical support to teachers on ICT-pedagogy integration. Since supervisors are already performing academic supervision and support, their active participation in post-training support provision is both crucial and inherent. The demand in terms of time and expertise discussed earlier, point to the division area supervisor and the department head as the best educational personnel to deliver the support. In particular, the department head has the advantage of being able to provide timely and sustained support since he/she is in the same school and would know how to deal with contextual challenges, while the division supervisor has a lead role in the diffusion and scale up of technology-supported curricular reforms and instructional interventions in the entire division.

Assessment and evaluation of student outcomes. As discussed earlier, MTs and SPs have noted some evidence of improved student outcomes when technology was integrated into learning activities. As technology is gradually being introduced in classrooms, research into the relative advantage of technology-supported teaching-learning strategies over other strategies in increasing student achievement and other outcomes becomes imperative. Educational research as well as student testing, however, should use multiple measures for formative and summative assessment in order not to fall into the trap of relying solely on phenomenological evidence or standardized test scores. Indeed, divisions and

schools should be able to support teachers in continuously assessing learning outcomes of technology-supported activities to inform planning, teaching, and further assessment.

Conclusion

This project has shown how a post-training support scheme enabled newly trained teachers to implement the Unit Plan they developed during training. The challenges experienced by MTs and SPs as well as the learnings gained from these challenges demonstrate that, consistent with past findings, educational change with technology in schools is a complex process. In particular, utilizing learnings from an ICT-pedagogy integration training necessitates an enabling school environment coupled with support from the wider community of experts and co-learners.

References

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