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# Online In-Service Training for Secondary Teachers: A Prototype for the Philippines

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## **Abstract**

*This paper proposes an online, short-term training model for in-service physics teachers in the Philippines. Developmental considerations for the model were based on the frameworks of established open universities in some developed and developing countries, the condition of information technology infrastructure in Philippine schools, the teachers' competence, skills and willingness to take part in online trainings, and the challenges identified after the implementation of an exploratory online training program in the country.*

*Adopting the ideas of the Transactional Model of distance education system, the proposed model stresses the terms of reference and interrelationships of the three model proponents, the three main actors, and the logistic support. The model proponents are comprised of the program planners and developers, including the material developers and organizers, even the training administrator and manager, while the three main actors include the tutors, the trainees, as well as the program director.*

## **Introduction**

Open and distance learning (ODL) in the Philippines started as early as 1940. It was initiated by the distance

education (DE) programs of the International Correspondence Schools of the United States of America (UNESCO, 2002). At that time, the reputation of DE was low, because of the popular view of Filipinos that distance learning is inferior, as compared to the traditional approach. Its popularity, however, improved in the 1990s when some universities started offering distance programs using print-based methods with occasional face-to-face meetings. At present, prospects for distance learning continue to improve with the increasing use of information and communication technology (ICT) infrastructure and connectivity to the Internet. Electronic mail, chat rooms, video conferencing and short-messaging-system have been utilized to deliver distance instruction.

Bandalaria (2007) placed the development of ODL in the Philippines in four generations while the first generation was focused on the improvement of standard of living by offering non-formal courses through schools-on-the-air utilizing radio transmissions systems, the second generation involved graduate degree programs delivered using print-based materials and occasional face-to-face tutorials. Radio-transmitted lessons were also used to supplement instructions. The third generation was characterized by ICT applications, though instructional contents were primarily delivered in print-based design supplemented by materials in audio and video formats. Learning centers, like in the second generation, were also considered essential in this stage. Finally, modern infrastructural applications aptly described the fourth generation, as it utilized e-Learning (electronic learning), m-Learning (mobile learning), and u-Learning (ubiquitous learning).

Excellent in its discussion of policies, foci, and technological applications, the literature on ODL in the Philippine fails to concretize the Philippine DE system model and the terms of reference and interrelationships of the system's proponents (Bandalaria, 2007; SEAMEO SEAMOLEC, 2006; DepEd, 2002). The absence of a concrete model, coupled

with lack of experience, may have led to the unsystematic management and delivery of distance programs in the country (UNESCO, 2002).

An effective learning model is necessary in any educational system to ensure better promise of success. For instance, in DE systems, a framework is required to address its heavy administrative demands; moreover, It entails delivery strategies much different from running a traditional educational structure. In some countries, DE programs are organized by specialist distance-learning colleges, while in others as an extra activity by colleges of education or departments of the university. However, in both cases, functions of various components of the framework must be clear and systematic to definite accountabilities of future outcomes.

Many developed countries have well-established DE systems. Three of these systems are considered in this article to provide foundation for the to-be-developed system suited to the Philippine condition. These selected systems were based on their status as full-fledged distance education organizations and geographic representation: UK Open University (UKOU) for Europe, Canada's Athabasca University for America, and Japan's University of Air (UA) for Asia. Notably, the large enrolments in these universities reflect substantial confidence on the effectiveness and relevance of this educational approach. For instance, the UKOU serves about two million undergraduate and post-graduate students worldwide, making it the largest institution of this type in all Europe (UK Department of Education and Skills, 2006). The Athabasca University, Canada's Open University and the largest provider of distance education in that country, served about 32,000 students in SY 2004-2005 alone (Lorenzo, 2004). In Japan, about 200,000 students enrolled in distance programs in 2000 and as many as 40 Japanese educational institutions started offering correspondence courses in 2001 (Japan Ministry of Education, Culture, Sports, Science, and Technology, 2001).

Equally, Asian countries with practically similar conditions as the Philippines have established DE frameworks. In Indonesia, the Universitas Terbuka is recognized as Indonesia's Open University, while in Thailand the Sukhothai Thammathirat Open University (STOU). These two universities were founded mainly to offer distance programs locally and internationally. Large student populations in these universities further imply wide acceptance of distance programs in these countries.

**Table 1.** Features of some established distance education frameworks

Institution	Primary Medium	Supplementary Media	Tutorials	Schooling	Meeting Venues	Collaboration
<u>Developed Countries</u>						
UKOU	Print	Broadcasts Video & audio cassettes CD ROMs	Online Face-to-face	Some courses	Study centers	BBC Some foreign universities. Governmental agencies
Athabasca University	Print	Web-based materials	Online Face-to-face	Some groups	Partner institutions	National & foreign educational institutions.
UA	Broadcast	Print Video cassettes	Correspondence Face-to-face	University degree courses	Study centers	National tv & radio stations
<u>Developing Countries</u>						
UT	Print	Audio & video cassettes Broadcasts	Correspondence Face-to-face Broadcast	Practicum Fieldwork	Regional offices	Governmental & national educational institutions.
STOU	Print	CAIs Online instructions Broadcasts	Online Face-to-face	None	Provincial secondary schools	Dept. of Education National tv & radio stations

As evaluation of the abovementioned open university frameworks shows, similarities and differences in features are pretty obvious, as seen in Table 1. While four models employ print modules as the primary study material, Japan's UA

utilizes broadcast media for this purpose. Variation in the use of supplementary resources is also apparent. Similarly, though all frameworks regard face-to-face meetings as an integral part of the system, the frequency of these meetings varies according to students' needs. The UKOU, for example, holds regular tutorial sessions, while in Indonesia's UT, tutorials are optional. Not all models neither adopt schooling – distance students meet in the university for a certain specified time – as an educational strategy. Four models regard schooling as an important component for some courses, whereas in the STOU's, this approach is prohibited. Contrastingly, all seem to agree that having study centers and partnerships with local and international organizations is an essential feature of a distance learning framework. Popular collaborations are those with television and radio stations, governmental agencies and other educational institutions.

Differences in features may be attributed to some distinct conditions in each country. To illustrate, the use of video conferencing is utilized in developed countries more than in developing countries, mainly because of the disparity in ICT infrastructure. Cultural characteristics also dictate certain aspects of the system. A conservative country may opt to have more traditional approaches like face-to-face meetings, while a highly industrialized nation may hold meetings more in digital environments.

Based on these observations, it can be inferred that a DE framework proven effective in one country may not effect same educational outcomes in another. What is applicable and effective in other countries may not work well, if adapted in Totto, in the Philippines. If the Philippines shall utilized instructional delivery, it is, therefore, imperative that it develops a model based on its own education needs and prospects. In addition, a distance-learning framework should be developed and validated using variables unique to the Philippine's cultural features, economic status and educational system.

In the absence of a Philippine DE framework, this paper is aimed at developing a web-based distance-education prototype for in-service physics teachers. It took off at assessing teachers' access to the Internet and ability to explore and willingness to avail themselves of online trainings. This is followed by developing and validating online modules given the data on teacher competence and designing online training model for the exploratory study of effectiveness. Validating this model using physics education variables is for the intent to addressing the present crisis in the quality of Philippine secondary physics education characterized by poor student achievement and low teacher competence. International educational assessments like the International Mathematics and Science Study (TIMSS) as well as national assessments by the Philippine Department of Education (DepEd) reflect below par student achievement in physics (IEA, 2004; Philippine National Statistical Coordination Board, 2006). On the other hand, Orleans (2007) disclosed that only 30% of high school physics teachers in the country are qualified practitioners. Similar results were also observed in the survey conducted by the Department of Science and Technology –Science Education Institute (DOST-SEI, 2001); only 27% of public and private physics teachers hold degrees in physics or physics education.

Given the state of the art in education and infrastructural condition in Philippine secondary schools as basis and the promise of favorable outcomes of distance education delivery, it is envisioned that the online training prototype proposed in this study will result in marked improvements in Philippine education, so as it can come close, if not at par, with that of developed countries.

## **An Exploratory Online Training**

### ***A. Survey Participants***

In an attempt to capture the condition of information technology infrastructure in schools and physics teacher's ability to explore the Internet, a nationwide survey

participated by 767 physics teachers in 464 schools was conducted. Teachers' willingness to take part in online trainings was also surveyed to help determine relevance of online trainings. The sample schools were comprised of public schools (83%) and private schools (17%). All regions of the country were represented with Region IV, Southern Luzon, having the greatest school and teacher representations and the Autonomous Region of Muslim Mindanao the least.

### ***B. Module Development***

Three online modules were designed for non-major physics teachers. This consideration was made, because the majority of in-service Filipino physics teachers, about 70%, are non-majors (Orleans, 2007). The modules deal on topics in modern physics, radioactivity and nuclear energy, topics in high school physics which teachers have the least confidence in teaching (Orleans, 2007). They contained activities that facilitate understanding and promote learning, featured sections on lesson organization to guide teachers in teaching these topics, and stressed the principles of adult learning to ensure module effectiveness. The modules were content validated by physics education experts, digitized using the Moodle platform developed by the Macromedia Incorporated, and was found to markedly enhance teacher pedagogical content knowledge, based on the results of a case study participated in by nine (9) teachers in the Division of Negros Occidental.

### ***C. Delivery Structure***

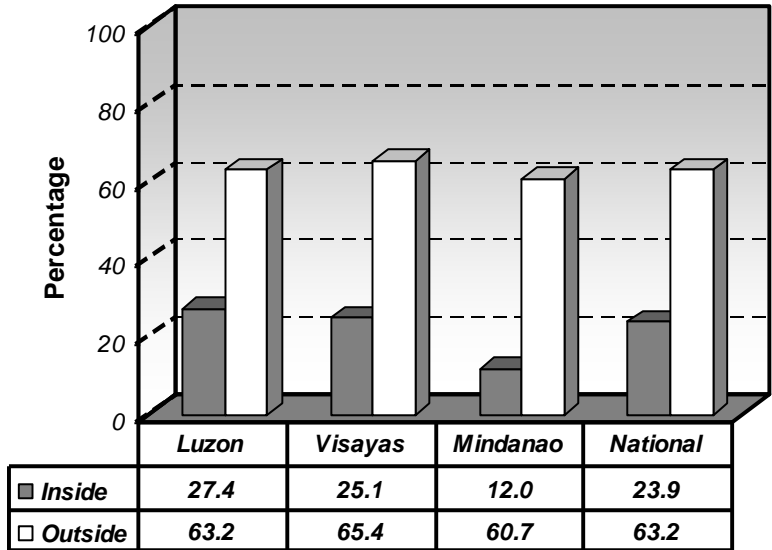
An experimental online prototype was also designed and tried out to identify issues and challenges related to training length and time, access frequency, and output quality and submission rate. The prototype design took into account the features of established DE models, the present condition of ICT infrastructure in schools and teachers' ability in exploring the Internet. The training design was made simple, but

appropriate to the objectives of the activity. The print was made the primary training medium and the Internet the delivery method, a strategy deemed favorable to a DE system with limited operational budget. Correspondence and submission of outputs were also done through electronic mail. For concerns needing immediate attention, the short messaging system (SMS) of mobile phone services was utilized. Face-to-face meetings were not considered, because the training was intended to be fully online to minimize training cost. The training was implemented in coordination with the Regional Science Teaching Center based at the Philippine Normal University (PNU), Manila.

***D. Teacher's Access to Internet, Ability to Explore and Willingness to Avail Online Trainings***

The extent of access to the Internet of physics teachers inside and outside the school premises is reflected in Figure 1, where teacher's access in schools is only marked 23.4%, while that outside 63.2%. Outside-school-access variation appears to be minimal for the Luzon, Visayas, and Mindanao groups, while the inside-school-access variation considerable. Based on this measure, teachers in Mindanao are given the least opportunity to avail themselves of opportunities to advance when intervention is delivered online. However, these opportunities may not be dismal, because data show that the majority of Mindanao teachers have access to the Internet.

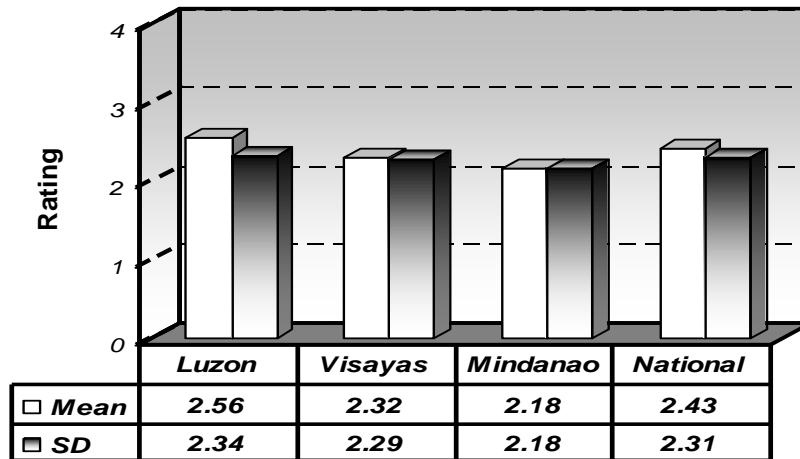




**Respondent's Access to the Internet Inside and Outside the School Premises**

**Figure 1**

Figure 2 shows the ability of the teachers to explore the Internet, the data gathered from teacher's self-ratings in this measure, based on a five-point scale. Such parameter provides the impression that physics teachers are "poor" in exploring the Internet. Teachers in Luzon, however, considered themselves to have "fair" ability to imply that to ensure effectiveness of online training teachers must be well trained in navigating through the training modules. The technical requirement in exploring the module may also be made simple to overcome this constrain and maximize knowledge transfer.

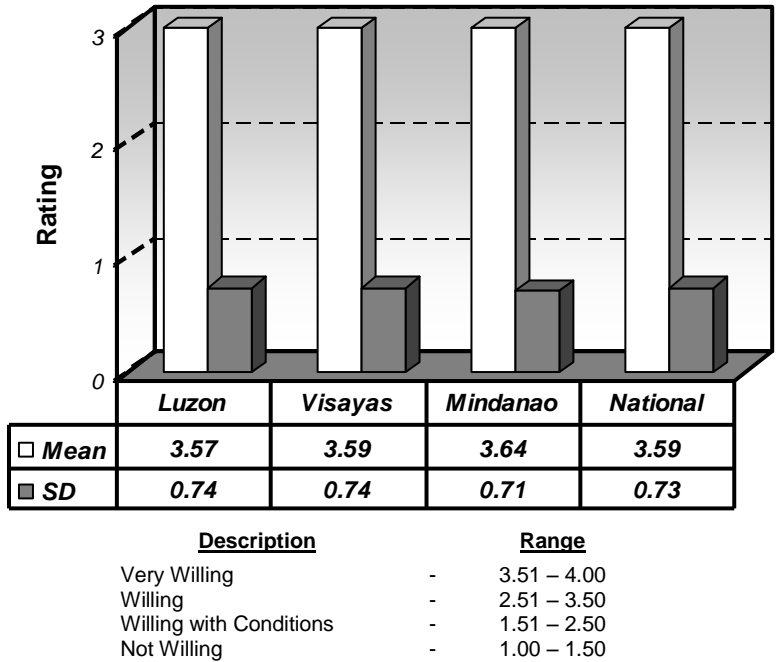


<u>Description</u>		<u>Range</u>
Very Good	-	4.51 – 5.00
Good	-	3.51 – 4.50
Fair	-	2.51 – 3.50
Poor	-	1.51 – 2.50
No Experience	-	1.00 – 1.50

#### Respondents' Ability in Exploring the Internet

**Figure 2**

It can be seen in Figure 3 that the physics teachers are “very willing” to avail themselves of online trainings. This is indicated by the high rating of 3.59 in a scale of 1 to 4 (the latter being the highest). Mindanao teachers registered the highest willingness (3.64) and Luzon teachers the lowest (3.57). These data imply that motivation to pursue learning is not a problem in developing online programs. Standard deviations for the three groups as well as that for the whole group are almost similar, an indication that agreement in responses among participants exists.



**Respondents' Willingness to Avail of Online Training Programs**

*Figure 3*

**E. Training Effectiveness**

Many teachers showed interest in joining the training, but because of the bulk of school activities during the training schedule, many were not able to finish the exercise. The training time, September 2006, overlapped with the science and technology month celebration in Philippine schools when numerous student and teacher activities were held. For this reason, only 14 non-major physics teachers with sufficient teaching experience, coming from different places in northern and central Philippines, actively participated in and completed the training.

Table 2 shows the participants' access to the different sections of the modules. Notably, most of the participants seem not particular with the overview and objectives of the modules and of each lesson. A considerable percentage of them had not even accessed the lesson introduction and objectives, a quite surprising result, because as teachers, they must be particular with learning objectives. Identifying learning objectives helps in shaping study schedules and in preparing for future learning assessment.

**Table 2.** Access frequency to the different module sections.

Section	Access Frequency (Top 3 Occurrences)		
	<i>First</i>	<i>Second</i>	<i>Third</i>
Module Introduction & Objectives	Once (28.7%)	Never (21.2%)	Twice (20.9%)
General Instructions	Never (42.4%)	Once (33.3%)	4 times (6.1%)
Lesson Introduction & Objectives	Never (34.1%)	Once (25.9%)	Twice (21.2%)
Activities & Exercises	Twice (23.9%)	Once (20.1%)	Never (17.9%)
Readings	Once (33.6%)	Twice (23.1%)	3 times (11.5%)
Answers to Exercises	Never (85.7%)	Once (7.1%)	Twice (7.1%)
Lesson Organization	Once (50.0%)	Twice (21.4%)	3 times (21.4%)
References	Never (58.8%)	Once (17.6%)	Twice (14.7%)

Both answers to exercises and reference lists were hardly accessed by the majority of the participants; 85.7% and 58.8%, respectively. Their failure to access answers to exercises could be attributed to the fact that this section was

made available only after the training and the short training time for the participants' inability to view the list of references.

On the contrary, the most accessed section appears to be the lesson organization followed by the reading materials. The lesson organization section was accessed once by half of the participants, twice and thrice by 21.4%. On the other hand, 33.6% of the participants accessed it once and 23.1% twice - these results imply participants' desire for competence improvement. The readings enhance knowledge, while the lesson organizations develop effective teaching strategy.

Table 3 presents the output submission rates in each module. The highest percentage appears in module one and the least in module three, with 50% and 18.6%, respectively. Activities in module one entail simple skills like identifying words from a table of letters, outlining scientists' personal and professional circumstances, and making concept maps. For module three, activities require making a simple radiation detector, measuring radiation intensity from household devices, answering a crossword puzzle, developing a concept map, and writing a journal article. On the average, 35.5% submission rate had been posted. This percentage is relatively low considering the fact that activities require only simple skills to be accomplished. Probably, lack of time and heavy school activities explain this low rate.

**Table 3.** Percentage of output submitted per module.

<b>Module</b>	<b>Percentage</b>
One	50.0%
Two	38.3%
Three	18.6%
Average	35.5%

In terms of the number of output accomplishments by each participant, about two out of five outputs had been

submitted for module one, two out of six outputs for module two, and one out of five outputs for module three.

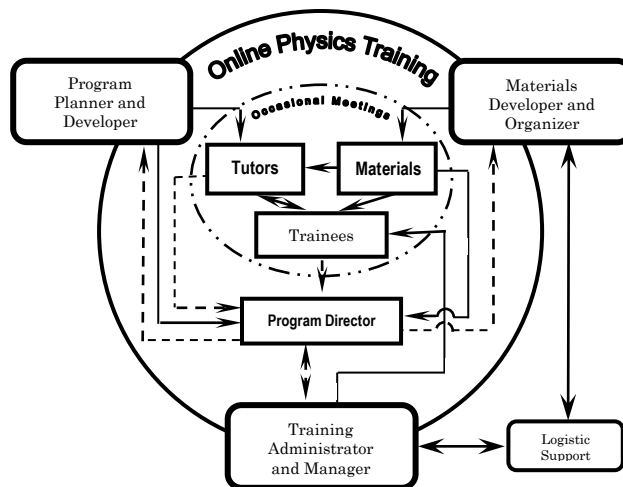
The quality of outputs, however, is satisfactory as every evaluation yields.

### ***Proposed Online Training Model***

Taking into account the relevant strengths of established distance learning frameworks in other countries, the results of the survey on relevant variables and the insights obtained from the exploratory activity, an online training prototype for in-service secondary physics teachers was developed. The model is characterized by digital delivery of training materials and occasional face-to-face sessions. Digital delivery of primary training materials is deemed favorable to a system with meager monetary budget, and for the reason that the Internet is accessible to the majority of physics teachers, as seen in Figure 4. Producing print materials requires substantial amount of money that could hardly be supported by a very young distance system. Equally, the model deemed appropriate to a newly conceptualized system adapts the ideas inherent to the Transactional Model of DE system which puts more emphasis on human relation dimensions rather than on the rational aspects of management (Satyanarayana & Sesharatnam, 2000). Well-defined roles and relationships of the training characters are favorable in developing an effective model of a DE system.

The proposed model was designed specifically for short-term teacher training programs and maybe as part of few courses leading to teacher education degrees. Educational condition in the Philippines appears not yet ready for degree-granting online programs, because of the conservative views of Filipinos that instruction can still be best acquired in the classroom. This situation was obvious in the exploratory training where few teachers participated in the activity despite the encouragement and endorsement coming from authorities.

However, given this condition, online learning in the Philippines has to start somehow for it to join the global economic, social and cultural development process. No less than the UNESCO (2002) explained that the major changes occurring in world economy today, are mainly due to the expansion of new information-bearing technologies particularly in education. Survey results suggesting high extent of teachers' willingness to participate in online trainings also justifies development of online trainings in the Philippines. To this end, a short-term online training program for physics teachers can be a good starting point due to its simplicity to manage and for the reason that it is what the Philippine education system needs at present – to develop competent physics teachers.



**Proposed online training prototype for in-service secondary school physics teachers in the Philippines**

**Figure 4**

**A. Training Characters**

To easily identify accountabilities, the proposed model groups the training characters into three – the major proponents, the main actors, and the logistic support. Such

grouping of training characters was arrived at after review of the features of some established DE models, the Transactional Model for DE system, and the insights obtained from the exploratory training. The major proponents include the program planners and developers, the materials developers and organizers, and the training administrator and manager – all interacting constructively to develop relevant programs and lay down a learning-conducive scenario. The main actors are comprised of the tutors, the trainees, and the program director who all take active parts in the training and determine its success. Lastly, information and communications technology and laboratory technicians take the roles of logistic support, technically assisting two major proponents for an orderly distance learning delivery. Figure 4 captures these training characters, their interaction directions (represented by solid arrows), and the feedback mechanisms (indicated by broken arrows)

#### A.1. Major Proponents

##### A.1.1. Program Planners and Developers

The program planners and developers should be represented by a group of individuals with substantial experience in managing DE programs and content knowledge to ensure effective training design and development. As in the STOU's model, planning of training area must be based on assessment of the current strengths and limitations of the target participants for maximum impact in the field.

Apart from designing and developing relevant training programs, the group acts as the system's policy-making and control body that addresses both internal and external concerns. It lays down the rules and the guidelines for all the trainings the system carries out as well as controls the internal structure in selecting program directors and tutors, in organizing study centers and occasional meetings for trainees, and in supervising field support.



This proponent is also responsible in collaborating with governmental and private agencies for commissioned trainings and in moving for accreditation and endorsement of all trainings by concerned governmental agencies. For instance, the Philippine Professional Regulatory Commission (PRC) and the Philippine Department of Education (DepEd) require involvement in DepEd recognized professional development activities as a criterion in the renewal of teaching licenses and in teacher promotion. All trainings to be conducted by this model, therefore, must be approved by the DepEd for them to be considered for these purposes. By contrast, the Department of Science and Technology – Science Education Institute (DOST-SEI) often sponsors teacher trainings to enhance in-service science teachers’ competencies. Earning the confidence of these governmental institutions means lifetime support for all the trainings of the system. Interestingly, this type of linkages is one of the success secrets of the UK OU and other DE models.

#### A.1.2. Material Developers and Organizers

The group of material developer and organizer must be composed of subject-matter specialists and instructional material development experts. In the UK OU, this group is composed of a large course team that includes content specialists, educational technologists, language and subject editors, on-site artists, and publishing consultants. However, in the absence of such composition, Perraton (1984) presents other ways to get course materials written. First, suitable materials developed by other institutions can be utilized. The cost of acquiring these materials is often lesser than developing original ones. Some programs of the Athabasca University in Canada use this strategy to deliver education at a distance. Second, course writers can be seconded to the system from their own institutions or departments for a certain period of time. In Tanzania, for instance, the staff of teacher training colleges was seconded to write course materials for the country’s National Correspondence Institute. In this

arrangement, writers work on full-time basis in their institution, while they are on secondment in the DE system. Third, writing of course materials can be commissioned to a group of people. Well organized educational systems in developed countries found this strategy relatively easy because they have sufficient resources to support the activity. DE organizations in developing countries, however, may find it difficult to get course materials written in this way.

In the Philippines, the second method may be the best way to get training materials done. Course materials developed in other countries may not be suited for use without any revisions in the Philippine conditions. Variables such as teachers' competence and needs, instructional resources, and school workload may pose big problems in the training delivery, if not considered during the design and development of materials. Commissioned material development may also prove difficult to undertake due to insufficiency of funds; After all, DE in the country is relatively young, if not struggling to survive with its limited resources. Most training materials for distance learning are done through secondment strategy. A case in point is the Center for Educational Technology and Distance Education of the PNU which had its training materials seconded by senior faculty of other departments in the institution. Heavy work load of these writers, however, posted great delays to the project. Thus, it is recommended that should the same situation occur, the job be given to junior faculty members with sufficient expertise in content and in material development to hasten the procedure. Senior faculty members can, however, be tapped as evaluators of the finished materials.

#### A.1.3. Training Administrator and Manager

The training administration and management proponent serves as the nerve center of the system. It keeps relevant records of trainees' background, administers the pre- and post-tests, forms study groups, ensures smooth tutor-

trainee communication flow, arranges face-to-face meetings, monitors trainees' access to online materials, and awards training certificates to successful participants. Information on trainees's such as age, sex, address, educational background, and work experiences together with pre-test results, are deemed important to be collected during enrolment to provide tutors solid grounds for an excellent training take-off. Such data may also be used to create study groups for organized, problem-limited, and effective face-to-face meetings. Similarly, exchange of contact information between the participants and the tutors can facilitate smooth instructional communication flow. Moreover, this group facilitates awarding of certificates to successful participants, as recommended by the project director.

## A.2. Main Actors

### A.2.1. Tutors

Tutors must be recruited based on subject-matter and teaching competence, knowledge about distance learning environment, skills related to DE logistics, availability and commitment, and willingness to interact with DE students. They must also possess organization skills much better than ordinary classroom instructors, because organization is an important requisite of distance delivery. In the Philippines, a growing pool of education professionals is believed to possess these characteristics. Most of them have been directly involved in DE system as proponents or as students of international and local DE programs. Others had been trained abroad to acquire the necessary knowledge and skills for distance learning delivery. Hiring of tutors should not be limited to the army of faculty of the institution. Qualified instructors coming from others institutions with proximity advantage should also be considered.

Once designated, tutors are responsible for evaluating trainees' achievements, sustaining trainee enthusiasm, helping

instructional interactions, guiding collaboration groups, and answering participants' questions. They are also expected to limit some barriers of distance learning, if not mitigate the trainees' feeling of isolation to avoid drop-outs. Upon receipt of the training materials, the tutors are expected to master the content and organize distance instruction. They should also provide regular feedback to the project director about the participants' progress and the delivery of instruction.

### A.2.2. Trainees

Before creating a distance training program, it is necessary to have a clear picture of the target participants and their working conditions. It is equally important to grasp the training needs of these participants. As for the Philippine physics teachers, data showed that the majority are not physics majors (DOST-SEI, 2001). Orleans (2007a) disclosed that physics teachers in the Philippines have deficient academic preparations and low continuing professional involvements, but substantial teaching experience and excellent licensure status. Specifically, Philippine high school physics teachers appear to be weak in Modern Physics and Electromagnetism. He also revealed that the physics class load per teacher is manageable, the frequency of students in physics classes large, professional mentoring unpopular, instructional materials and technologies are limited, and library and internet access favorable. Given these conditions and observations, it is highly desirable then that future physics teacher training take them into account these observations and findings.

Furthermore, training schedule must consider teachers' activities in school, which tend to get heavy during the months of June, September, and March. In the Philippines, the school year starts in June, the science month celebration falls in September, while the graduation ceremonies and national learning assessments take place in March.

During the training, teacher-participants are anticipated to enthusiastically interact with the tutors and among themselves, and actively participate in the training, especially during the face-to-face meetings. Expectedly, they also accomplish activity outputs and provide feedback to the program director about the conduct of the training. Information on these two activities will help determine effectiveness of the training, and further improve future distance programs.

#### A.2.3. Program Director

Necessarily, the program director must possess content knowledge and must demonstrate considerable experience in handling teacher training. He or she must not only have a full grasp of DE environment but also display exemplary skills in program evaluation to enable him/her to direct the training effectively and evaluate trainees' achievement and program delivery appropriately. The program director may also recommend necessary revisions to the material developer and organizer proponent for the improvement of future training materials based on the information at his/her disposal. With the feedback coming from the tutors, the program director evaluates general quality of activity outputs and test results and recommends to the training administrator and manager the awarding of certificates to successful participants. He/She is also expected to provide summative training evaluation to the program planners and developers for criticisms and commendations of the training conducted. Improvements in future trainings depend to a large extent on the evaluation output of the program director.

#### A.3. Logistic Support

The logistic support for this distance training model is composed of information and communication technology experts and laboratory technicians. The ICT specialists take charge of assisting the development and delivery of some

training materials, the enrolment of trainees, and the administration of the pre- and post-tests and formative quizzes. By contrast, the laboratory technicians are responsible for assisting tutors facilitate lesson activities during the face-to-face meetings.

## **B. Training Materials, Delivery, and Duration**

The training material package is the blood of the training in that effective, relevant and updated materials determine the success of the whole training. For this model, it may include the DepEd prescribed textbook for high school physics, a college-level reference textbook, modules specifically developed for the training, videotaped teaching demonstrations, and training schedule guide. The DepEd prescribed textbook is necessary, because it serves as the primary instructional material used in most Philippine classrooms in the absence of other kinds of instructional materials (Orleans, 2007a). All aspects of the textbook have to be made clear to the teachers for an effective, meaningful, and smooth delivery of the learning objectives in the curriculum. It must be accompanied by a college-level reference physics textbook to provide participants with sufficient higher level knowledge, giving them additional confidence in answering questions raised by advanced students. Modules specially designed for the training shall provide both subject-matter enhancement activities, and the latest most effective trends or subject- and lesson-specific teaching strategies, accentuated by innovative learning assessment procedures in science teaching. Similarly, video-recorded classroom demonstrations of excellent teaching instructions may be helpful to improve teachers' skills in teaching strategies. These recorded demonstrations can provide participants with insights into effective physics instructions to effect better educational outcomes. Instructional materials used in these demonstration classes must be easily acquired by teachers to minimize their feeling of frustrations. Flawed taped demonstrations are also desirable

for comparison. Lastly, the training schedule guide will keep the teachers in pace with the rest of the group.

Materials developed for the training of physics teachers need to be simply and clearly written, coherent, and easy to follow, given the low quality of secondary physics teachers in the country. In most occasions, the participants will be working alone during the training. If they get confused by difficult language and unclear narrations, major problems may occur. Simple and direct prose is best especially for non-major physics teacher participants. Pretty soon with much patience, they will master their register, the special vocabulary of their discipline. Likewise, lessons should be coherent and easy to follow. Ideally, the trainees must be able to see the relationship of the various sections of the lesson and their relevance to their practical classroom work. To accomplish this goal, lesson activities ought to be closely tied-up with local classroom activities to effect meaningful learning. Similarly, accounts on the submission rate of participants in the exploratory training has be considered. Participants in that training submitted only one output for the one week training time. Modules demanding five outputs, therefore, need to have longer training time than one week, while those given a one week training duration must require less than five activity outputs.

In the distance delivery of the trainings, face-to-face meetings appear to be relevant. Like in most established DE frameworks, this Philippine prototype regards such approach as an important training entity. Face-to-face meetings will provide substantial opportunity to improve both subject-matter knowledge and teaching skills. For this purpose, coordination with the Philippine DOST-SEI for the use of the regional Philippine Science High School facilities may be worked out. As an evidence, the Sukhothai Thammathirat Open University in Thailand has proven this strategy effective in establishing regional centers all over the country by coordinating with its DepEd for using provincial secondary school as venues for face-

to-face meetings. In the Philippines, most of the 16 geopolitical regions have at least one science-oriented high school that can be made teaching clinics for the training. Clinics have helped Indonesia's Universitas Terbuka realize its objectives for its distance teacher programs. For some Philippine universities like the PNU, its satellite branches in Northern and Southern Luzon, West Visayas and Mindanao, and even affiliated schools, can best serve as training clinics. Undoubtedly, the use of these satellite institutions can facilitate successful delivery of the distance training. Lastly, video streaming accompanied by chat boards can be an alternative to face-to-face meetings, if physical interaction of resource speakers with participants is impractical and unworkable.

Finally, training time and duration must be given much attention. Trainings must not fall on months when teachers are occupied with numerous school activities particularly in September and March, as explained earlier. Like in the exploratory training conducted, though many showed interest in taking part in the training only few teachers were able to finish the training activity, because the training fell in September. Many teachers dropped in the middle of the training sessions. Similarly, trainings held in December may unlikely result in effective training due to the Christmas celebration. Considering the activities in schools, summer time is deemed the best time for online trainings for teachers hold no classes during this season. Attention can be focused on training activities when interventions are held at this time. Equally, the training duration must be long enough for teachers to accomplish its requirements. If done during school days, training time allotted for each module must be more than a week, if the materials to be studied are similar in content as those used in the exploratory study. In that exploration, output submission rate proved low, because teachers were only given a week time to study and accomplish all the requirements in each module. Training length, however, must not be too long to sustain interest and enthusiasm.



In sum, many considerations must be taken into account in designing online trainings. Insights obtained from the experiences of DE systems in other countries can provide substantial help, but an online training model validated in the Philippine environment promises better output.

## Conclusion

Considering the strengths of the research data and literature presented, online teacher training can be introduced and conducted in the Philippines. If organized, managed and supported properly, teacher training at a distance can significantly improve teacher subject-matter competence and teaching skills. Organization of this distance teacher training system can adapt the proposed model discussed above to ensure success of the training. The proposed model is composed of three model proponents, three main actors, and a logistic support. While management of trainings is done by the model proponents, the actual conduct of the training involved the main actors. Supported by partnerships with government organizations like the DepEd and DOST-SEI, there seems to be no rhyme nor reason that the operations of the distance training system can not be substantially sustained.

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