

Development of an effective and sustainable system for ID training: Proposing a strategy model of Training of Trainer (ToT)

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The authors developed a prototype of Training of Trainer (ToT) of Instructional Design (ID), based on the elaboration theory. The prototype was validated through the implementation of ToT at CEMADOJA (Dominican-Japanese Friendship Medical Education Center). The results are satisfactory in improvement of the ID skills, and sustainability of the transferred innovation at the participant and institutional levels. Based on this experience, the authors tried to clarify the relevant factors for the effectiveness and sustainability of the program and propose the Composite Model of ToT.

Key words :Training of Trainer, International Cooperation, Capacity Development, Instructional Design, Training System

1. INTRODUCTION

As part of official development assistance, the Government of Japan through the Japan International Cooperation Agency (JICA) is implementing several Human Resources Development (HRD) projects to help developing countries enhance the capacity of their human resources in various fields. In 1999, JICA and the Dominican Republic Ministry of Health started a project for medical education covering radiography and epidemiology for physician trainees at CEMADOJA. Recent internal evaluation of the training courses identified the need for improvement in the quality of instruction as well as the training curricula and materials, especially in epidemiology. In response to the request by CEMADOJA and JICA, Ito, one of the authors, was dispatched to the project on two occasions: first from October 2003 to January 2004 and then in July 2004. On both occasions, Ito served as an instructor to enhance the capacity of CEMADOJA's trainers by improving their instructional design and presentation skills. Through this project and successive undertakings, the authors have been trying to develop a practical model of an effective and sustainable ToT program that can be applied to similar projects.

One of the common weaknesses in the field of training is the applicability of the trained

knowledge and skills. Donald L. Kirkpatrick (1998) pointed out the importance of evaluating how much of what has been learned in training is applied at work, and what impact it has generated. He proposed the "four-level evaluation of training" as a perspective in training design. His idea is that training design is to be extended to more than just learning and applied to actual work because, to justify its cost, training must benefit the organization concerned. The four levels are as follows: (Level 1) Reaction; (Level 2) Learning; (Level 3) Behavior; and (Level 4) Results.

The authors focused on finding an effective strategy to improve the application and sustainability of training results in work situations even after the training was finished. In this study, the authors applied the Kirkpatrick evaluation perspective at Levels 1, 2 and 3.

The scope of this study is limited to development and validation of a prototype of ToT, with an expectation to be expanded to a hybrid training system combining WBT and on-site training.

2. OBJECTIVE OF THIS STUDY

The objective of this study is to develop and propose an effective and sustainable training strategy model of Training of Trainers (ToT), based on the practice and evaluation of ToT in the Medical Education Project in the Dominican Republic.

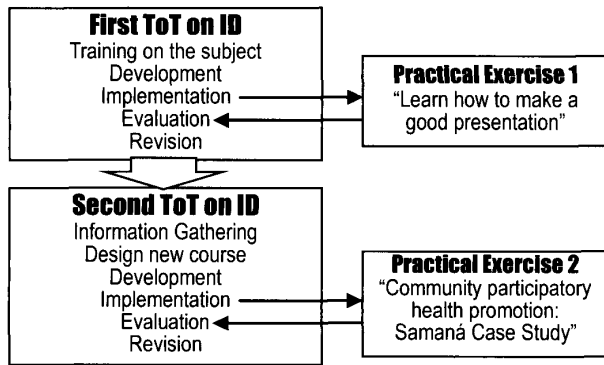


Fig. 1. Two-Stage Workshop

3. IMPLEMENTATION

The workshop for this study was implemented in 2 stages as shown in the Figure 1: the first ToT on Instructional Design with the practical exercise 1, the second ToT on Instructional Design and the practical exercise 2.

Table 1 shows details on the workshop and types of assessment applied.

3.1. ID training of CEMADOJA's Epidemiology section trainers

The training was conducted in the following two stages: basic ID skill training and applied ID skill training. The basic ID skill training was done for 12 days (66 hours) from November 2003 to January 2004. The applied ID skill training was done for 15 days (52 hours) from June to July 2004.

What skills does a trainer need to conduct a training program in a systematic way? 8 topics were selected to enhance the capacity of the trainers as described in "3.1.1. Objectives of the training". The first training covered objectives (1) to (7), while the second training repeated the

same objectives but added a new skill: development of a new course design. The basic difference between the first and second training is as follows: while the first training dealt with a simple subject, i.e., presentation techniques, with pre-elaborated content, the second training covered a subject whose content was to be developed anew. This means that trainers must gather information, analyze it, select necessary items, and organize a new training course.

Below is a brief description of the training course.

3.1.1. Objectives of the training

Under the guidance of the instructor, the participants will be able to design, prepare, conduct and evaluate effectively a training program. Specifically, they will learn to:

- (1) Set training objectives;
- (2) Prepare evaluation tools;
- (3) Prepare a lesson plan;
- (4) Design an effective presentation;
- (5) Prepare presentation slides;
- (6) Conduct the course and presentation;
- (7) Evaluate learning and course management; and
- (8) Design a new course (only in the second training).

The evaluation criteria on the achievement of the mentioned objectives are as follows: A (can do well without the help of an instructor); B (can do OK without the help of an instructor); C (can do with some help of an instructor); D (can do with much help of an instructor); and E (cannot do).

3.1.2. Target group

4 trainers of Epidemiology section of CEMADOJA. They are the local trainers with

Table 1. Workshop Content (parentheses indicate topics in this study)

Workshop	Period and duration	Instructor	Participants (Targets)	Assessment method (Related chapter in this paper)
1. First ToT on ID "Basic ID skill training" (3.1)	Oct. 2003 – Jan. 2004: 12 days	Ito	4 epidemiology trainers	Level 1 by video interview (4.1) Level 2-a by individual observation (4.2) Level 3 by interview to coordinator (4.3) Group Performance Evaluation (4.7)
2. Practical exercise 1: "Learn how to make a good presentation" (3.3.1)	Jan 8 – 9, 2004: 2 days	4 Epidemiology Trainers	10 medical education teachers of CEMADOJA.	Level 1 by questionnaire (4.7-table5, point6) Level 2 by pre-post tests (not shown here) Level 2 by observation sheet (not shown here)
3. Second ToT on ID "Applied ID skill training" (3.1)	June – July 2004: 15 days	Ito	6 epidemiology trainers (only 4 was subject to evaluation)	Level 1 by questionnaire (4.4) Level 2-a by self check sheet (4.5) Level 3 by mail report (4.6) Group Performance Evaluation (4.7)
4. Practical exercise 2: "Community participatory health promotion: Samaná Case Study" (3.3.2)	July 16, 2004: 1 day	6 Epidemiology Trainers	31 resident family / community doctors from 3 institutions	Level 1 by questionnaire (4.7-table5, point6) Level 2 by pre-post tests (not shown here)

background on medicine (medical doctors), with experience in epidemiology field work. For the second training, two new trainers were added. But because of absence during the assessment, only 4 were subject to the evaluation.

3.1.3. Preconditions for participation

For the first workshop: (1) experience in conducting a training program, understanding of the basic procedures of course implementation, and (2) basic PC operation skills in Word, Excel and PowerPoint.

For the second workshop, the requirement is to have participated in and/or achieved the objectives of the first training.

3.1.4. Implementation steps: (See Figure 1)

- (1) Learning the subject: The instructor conducted a two-day workshop on basic presentation to the trainers to teach how to plan, design and perform effectively a PowerPoint presentation.
- (2) Planning and preparation of the training program: Under the guide of the instructor, the trainers planned and prepared an instructional kit for the workshop (“Learn how to make a good presentation” for the first workshop and “Community participatory health promotion: Samaná Case Study” for the second workshop). The target group of the first workshop was CEMADOJA instructors of radiography and laboratory, and resident doctors of family /community medicine for the second. The output of the workshop was the developed instructional as described in the section 3.2.
- (3) Practical exercise: The trainer conducted the first workshop for 2 days, and the second for 1 day.
- (4) Evaluation of the training program: Under the guide of the instructor, the trainers collected data, processed and evaluated the result of the training using the evaluation tools included in the instructional kit. The evaluation tools consist of level 1 questionnaire (satisfaction), level 2 evaluation (pre- and post-tests, and observation sheet of the presentation)
- (5) Revision of the training kit: Based on the result of the evaluation, the trainers made some changes to the instructional kit.

3.2. Development of the instructional kit

As part of the ID training process and strategy

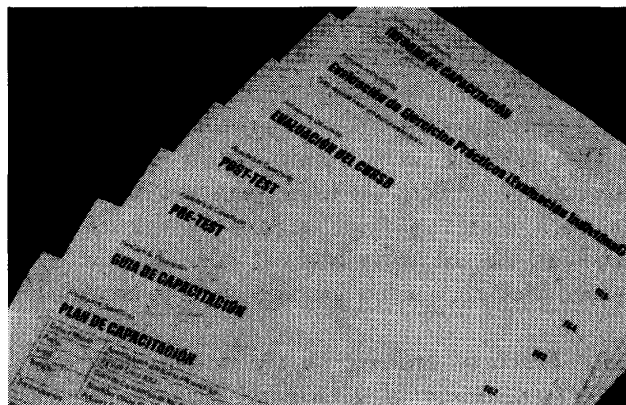


Fig. 2. Instructional Design Tools

to ensure the application of the training results, an instructional kit were developed for the 2 titles of “Learn how to make a good presentation” and “Community participatory health promotion: Samaná Case Study”. A prototype of the Instructional Kit was modified and adapted from the research paper of Ito, *et al.* (2001). The instructional kit consists of the Instructional Design Tools FC1-FC8 (Figure 2) and teaching aids. The following are details of the Tools:

- FC1: Training Implementation Plan: It is equivalent to a syllabus and includes basic information about the course such as title, target participants, instructor, objectives, preconditions, schedule, methodology, seminar room layout, teaching aids, equipment and stationery.
- FC2: Lesson Plan: It describes in detail teaching and learning activities, time to use each teaching aid, and important considerations for specific activities.
- FC3: Pre-test (Level 2: Learning)
- FC4: Post-test (Level 2: Learning)
- FC5: Questionnaire for course improvement (Level 1: Reaction)
- FC6: Practical Exercise Observation Sheet (Level 2: Learning)
- FC7: Evaluation Processing Sheet: to help trainers process and organize the data from the questionnaire and tests.

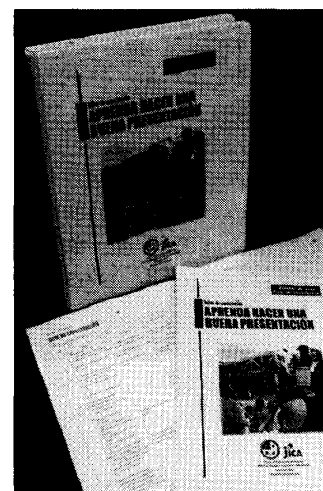


Fig. 3. Teaching Aids

FC8: Training Implementation Report: Based on the FC7, trainers will summarize the Level 1 & 2 Evaluation results, analysis and recommendations for improvement.

The teaching aids consist of a PowerPoint presentation (in both electronic data and hard copy) for each of the 4 modules, exercise sheets and handouts for the participants (Figure 3). For the second package, a video documentary is to be added.

3.3. Practical exercise on the development and implementation of a training program

As part of the practical exercise of the ID training, two training courses were developed and validated: "Learn how to make a good presentation" during the first workshop and "Community participatory health promotion: Samaná Case Study" during the second workshop. The following are details on them.

3.3.1. "Learn how to make a good presentation"

- (1) Objective of the training: The instructor of CEMADOJA will be able to perform an effective PowerPoint presentation. Specific goals are as follows: (a) identify the 3 criteria of an effective presentation; (b) plan a presentation considering the objective, message, resources and audience; (c) design the PowerPoint slides applying the basic techniques of visualization; and (e) perform an effective presentation applying the basic techniques.
- (2) Target audience: 10 medical education teachers of CEMADOJA.
- (3) Duration of the course: 2 days (6 hours x 2 = 12 hours in total)
- (4) Description of the content: The course is composed of 4 modules.
 - [Module 1] Basic techniques of an effective presentation. This module introduces the "3S" of an effective presentation: Simple, Short and Stimulating.
 - [Module 2] Planning a presentation. Every participant will design his/her own presentation, clarifying the message, and how and to whom it is to be communicated.
 - [Module 3] Designing a presentation. The participant will learn and apply the basic visualization techniques such as size, color typography, and learn how to insert pictures and clip arts using PowerPoint.
 - [Module 4] Performing a presentation. Participants will perform the presentation in a group, and evaluate one another.

- (5) Theme of the exercise: to introduce the facilities and activities of CEMADOJA to the visitors with a 5-slide and 5-minute presentation.

3.3.2. "Community participatory health promotion: Samaná Case Study"

- (1) Objective of the training: Based on the experience of Samaná for the community participatory health promotion, the participants will learn about community participatory health promotion. Specific goals are that, after the training, the participants are able to: (a) describe what community participatory health promotion is, based on the Samaná case study; (b) explain how problems were identified and what strategy was applied; (c) identify what activities were done based on the strategy; (d) identify the methodology utilized for the planning, monitoring and evaluation of the activities; and (e) identify the results, benefits and advantages of participatory health promotion.
- (2) Target audience: 31 resident Family / Community doctors from 3 institutions.
- (3) Duration of the course: 1 day (6 hours)
- (4) Description of the content: [Module 1] role of the Family/Community Doctor for health promotion; [Module 2] identified problems and strategy; [Module 3] activities and means used; [Module 4] methodology; [Module 5] results, benefit and advantages
- (5) Exercise: group discussion and presentation on application of the given case study.

4. EVALUATION OF THE RESULTS

The evaluation was done from 2 points of view: Individual achievement and progress on group performance.

The individual achievement evaluation for the present program, based on the Kirkpatrick classification, consists of reaction of the learner (Level 1), learning (Level 2), and application of the learning (Level 3).

For the evaluation of group performance, was compared the performance observed before ID training, during first ID training and during second ID training.

4.1. Participant Reaction (Level 1) for the first ID training (n=4)

The assessment was done by video interviews

with the 4 trainers, asking what they learned from the workshop. Some of the interviewees focused on teaching skills and PowerPoint presentation tips. Two interviewees stated that the practical exercise on teaching others helped them improve their teaching skills.

Here are excerpts of the comments extracted in the video interviews:

Trainer A: It was a great experience for me. I feel more confident using PowerPoint. I have found a new capacity for teaching. My self-confidence is positively affecting the participants of the course and my colleagues. It makes me very happy that I learn more by teaching.

Trainer B: I learn a lot. Until now, I was doing my job (of ID and teaching) just with my own knowledge and intuition. Now I know how to do it well, and I have the techniques and tools to do my job better. I found that many things that I believed was doing well, were not. Through the practical exercise, I learned what I have to change and improve.

Trainer C: As a teacher, I was feeling that something was missing to transfer my knowledge better. It is still not enough, but I have now something to continue. I am very grateful to Mr. Ito for his work. It was very hard training, but as a professional I have to improve my teaching skills.

Trainer D: The important things that I learned are that a presentation shouldn't be boring; should be simple, short and stimulating; and rehearse before the presentation and check if the objective is achieved.

4.2. Learning (Level 2) of the first ID training (n=4)

The evaluation on the 7 objectives of the training was done by observation using check

sheet. The criteria are as follows:

5 = can do well without the help of an instructor;

4 = can do OK without the help of an instructor;

3 = can do with some help of an instructor;

2 = can do with much help of an instructor;

1 = cannot do; (-) no data available.

As shown in the Table 2, the trainers A and C reached the satisfactory level of achievement by more than 3 points, with an average of 3.3 in the post-test with progress of 1.9 and 1.6, respectively. The trainers B and D reached mostly 2, with averages of 2.3 and 1.8, respectively. But compared to the pre-test, the progress was 1.1 and 0.7 point, respectively. The trainer D had 2 topics with no progress: topics 3 and 6. As the department head, she was busy with other responsibilities during the workshop and unable to concentrate on the workshop. On average of the 4 trainers, the pre-test score is 1.4 and the post-test one was 2.7, showing an improvement in their skills. Two of the participants did not reach the level of 3. As the workshop was designed and implemented as team work, the trainers A and C covered the weaknesses of the other 2 trainers, obtaining satisfactory results as a whole. The result of the objective 7 for the trainer D is not available due to her absence during the evaluation.

4.3. On the Job Application of the learning (Level 3) of the first Training:

The interview with the project coordinator during the second assignment to CEMADOJA yielded the following results on application of the first ID training at work.

(a) The implementation of the presentation skill training on two occasions after the January 2004 ToT training was reported. The director of

Table 2. Level 2 Evaluation Results of first ID Training (n=4)

No.	Course Objectives	TrainerA			TrainerB			TrainerC			TrainerD			Aver.4 Trainer		
		Pre	Post	Prog	Pre	Post	Prog	Pre	Post	Prog	Pre	Post	Prog	Pre	Post	Prog
1	Can establish training objectives	2.0	3.0	1.0	1.0	2.0	1.0	2.0	3.0	1.0	1.0	2.0	1.0	1.5	2.5	1.0
2	Can elaborate evaluation tools	1.0	3.0	2.0	1.0	2.0	1.0	1.0	3.0	2.0	1.0	2.0	1.0	1.0	2.5	1.5
3	Can elaborate instructional guide	1.0	3.0	2.0	1.0	2.0	1.0	1.0	3.0	2.0	1.0	1.0	0.0	1.0	2.3	1.3
4	Understand effective presentation points	2.0	4.0	2.0	1.0	2.0	1.0	1.0	3.0	2.0	1.0	2.0	1.0	1.3	2.8	1.5
5	Can elaborate effective power point slides	1.0	3.0	2.0	1.0	2.0	1.0	2.0	3.0	1.0	1.0	2.0	1.0	1.3	2.5	1.3
6	Can perform effective presentation	2.0	4.0	2.0	2.0	3.0	1.0	3.0	4.0	1.0	2.0	2.0	0.0	2.3	3.3	1.0
7	Can evaluate the result of the training	1.0	3.0	2.0	1.0	3.0	2.0	2.0	4.0	2.0	-	-	-	1.3	3.3	2.0
	Average	1.4	3.3	1.9	1.1	2.3	1.1	1.7	3.3	1.6	1.2	1.8	0.7	1.4	2.7	1.4

CEMADOJA also expressed his high satisfaction on the results during the second visit. (b) Based on the presentation training results and the successive presentation workshop II in June 2004, 20 of the participants successfully presented their research papers at the international conference of medical research at CEMADOJA in July 2004. Now, the presentation seminar became a part of the standard course at CEMADOJA for all the trainers and students of medical education, and this is the most important evidence that the knowledge and skills transferred through the presentation seminar are applied and helped CEMADOJA improve the trainers' and students' skills at work.

4.4. Reaction (Level 1) of the second ID Training (Table 3)

The evaluation was done by questionnaire with 5 grades: excellent = 5 points; very good = 4; good = 3; fair = 2; deficient = 1. Each category has 4 questions, with 20 questions in total. The questionnaire which is composed by questions shown in the table 3, was applied to all 4 participants (CEMADOJA's epidemiology trainers). In general, the participants' evaluation was satisfactory, except question 4 of the Table 3. Two participants did not clearly understand the objective of the training at the beginning of the course. For the next time, the training should reach a consensus on the objective and expected final achievement. Comments from the participants

include the following: (1) the resident doctors in community medicine should apply the theory in practice; (2) the presenters should reinforce the knowledge of the previous presenter; and (3) the training should be combined with practical activities in the community.

4.5. Learning (Level 2) of the second Training

This evaluation was done with a questionnaire form for self-evaluation of the learner. The scale and criteria are the same as in 4.1.2. Among the 4 trainers, A, B, C have joined the first ID training, while D joined from the second ID training. The methodology of application was different from 4.1.2. Despite some bias due to an optimism often seen in the Caribbean people, the authors observe quite satisfactory results in achievements of the

Table 3. Level 1 Evaluation Results of second ID Training ($n=4$)

No.	Question	Excellent	Very Good	Good	Fair	Deficient
A. Course Evaluation						
1	Personal expectation was fulfilled	1	3			
2	Improved my knowledge and understanding on the subject	1	3			
3	The contents was relevant to my work	3	1			
4	Was presented clearly the objectives of the course at the start		2	2		
B. Teaching aids						
5	Was given materials in appropriate moments	1	3			
6	The quality of the material was appropriate for the course	1	3			
7	The materials was covering all the contents	2	2			
8	Course materials helped the learning	1	2	1		
C. Coordination of the course						
9	Participants selection		4			
10	The coordinator was attempt to the participant demands	1	3			
11	Facilities was appropriate	1	3			
12	Course was implemented according to the program	1	3			
D. Methodology						
13	The course design support the interaction between participants	1	3			
14	The course provided relevant tools to be applied to the work	2	2			
15	Methodology of evaluation utilized in the course		3	1		
16	Balance of the Theory and Practice	2	2			
E. Quality of the Instructors						
17	The presenter expressed with clarity	2	1	1		
18	The presenter shows enough experience and knowledge	2	1	1		
19	The presenter managed the time appropriately	1	2	1		
20	The presenter could keep the interest of the participants	1	3			

Table 4. Level 2 Evaluation Results of second ID training ($n=4$)

No.	Objectives of the ID Training	TrainerA			TrainerB			TrainerC			TrainerD			Aver. of 4 Trainers		
		Pre	Post	Prog	Pre	Post	Prog	Pre	Post	Prog	Pre	Post	Prog	Pre	Post	Prog
1	Can establish training objectives	2.0	4.0	2.0	2.0	4.0	2.0	2.0	5.0	3.0	2.0	4.0	2.0	2.0	4.3	2.3
2	Can elaborate evaluation tools	2.0	3.7	1.7	1.7	3.0	1.3	1.7	3.7	2.0	1.3	3.0	1.7	1.7	3.3	1.7
3	Can elaborate instructional guide	1.0	2.0	1.0	1.0	2.0	1.0	2.0	4.0	2.0	1.5	2.5	1.0	1.4	2.6	1.3
4	Understand effective presentation points	2.0	4.0	2.0	2.0	4.0	2.0	2.0	5.0	3.0	3.0	4.0	1.0	2.3	4.3	2.0
5	Can elaborate effective power point slides	2.0	3.0	1.0	2.0	3.0	1.0	1.7	3.0	1.3	2.0	2.7	0.7	1.9	2.9	1.0
6	Can perform effective presentation	2.3	3.8	1.5	2.8	3.8	1.0	1.8	4.5	2.8	2.0	4.3	2.3	2.2	4.1	1.9
7	Can evaluate the result of the training	1.8	3.0	1.3	1.8	2.8	1.0	1.8	5.0	3.3	2.0	3.3	1.3	1.8	3.5	1.7
8	Can develop original contents	1.0	2.0	1.0	1.0	2.0	1.0	2.0	3.0	1.0	2.0	3.0	1.0	1.5	2.5	1.0
	Average	1.8	3.2	1.4	1.8	3.1	1.3	1.9	4.1	2.3	2.0	3.3	1.4	1.8	3.4	1.6

objectives. The table also shows that, while the participants perceived high progress in the objectives 1, 4, 6, but relatively low progress in the objectives 5 and 8.

4.6. On the Job Application of the learning (Level 3) of the second Training:

There is no concrete evidence of the application of learning. But one of the CEMADOJA participants informed the authors by e-mail that CEMADOJA is proceeding to request authorization for a program by the epidemiology trainers during the second ID training, as part of the curriculum of the Family/Community medicine residence program under the Ministry of Health of the Dominican Republic. The training coordinators also plan to apply the content to the field practice

of health promotion, expanding the program to two-year field exercise for the second and third year of the ongoing course.

4.7. Progress observed in group performance

The Table 5 summarizes the progress of the improvement observed in the following topics: (1) ID of the training program; (2) development and utilization of the teaching aids; (3) teaching strategy and didactics; (4) development and improvement of the content; (5) change in the attitude of the trainers; and (6) reaction of the participants. Given the critical situation before the ID training, many new innovations were adopted by the Epidemiology trainers, changing drastically the quality of their training.

Table 5. Progress Observed in first and second ID Training

Topics	Before the ID training	During first ID training	During second ID training
1. Instructional design of the training program	The epidemiology trainers were only preparing the title and schedule of the course.	An implementation plan, a lesson plan, and evaluation tools (questionnaire, pre- and post-tests) were developed. An implementation report was written.	An implementation plan, a lesson plan, and evaluation tools were developed. An implementation report for a new subject was written.
2. Development and utilization of teaching aids	The handout was made by just copying and pasting from various books. Sometimes it used some sample statistical data of epidemiology.	Every trainer developed original presentation slides, elaborated and distributed an original operation guide. For the exercise, they prepared photo data and clip art.	Every trainer developed original presentation slides and prepared activity sheets for the group work. For the case study, they utilized video documentary pasting in the PowerPoint presentation.
3. Teaching strategy and didactics	Because of the lack of knowledge of didactics, the course was mainly lecture-based. The content was mostly descriptive and was not showing concrete key points of the learning topics.	The course was conducted with a minimum of lectures and spent more time on the practical exercise on planning, elaboration and implementation. The planning stage was done through group discussion and presentation by participants. During the slide development exercise, 4 trainers were fully involved in guiding the participants. The evaluation of the presentation workshop included the peer assessment method.	Due to the characteristics of the subject, the exercise was basically theoretical, but the trainers tried to make it more practical as possible by teaching strategies such as: (1) learning based on a case study of the Dominican Republic; (2) identifying the key points for each session; (3) use of learning games, group work activities, and videos.
4. Development and improvement of the content	Until now, no original content was developed. Also except for minor adaptation, neither evaluation nor improvement of the existing content was done.	On the given subject, content and conditions, the trainers developed a course on presentation skills, an implementation plan, a lesson plan and assessment tools. Also they conducted evaluation and improved the content.	On the given subject and basic information, the trainers conducted research and collected information in the field (Samana province), and, after the analysis, organized an original content. There, also they conducted evaluation and revision. The most important improvement was that the trainers extracted a generalized process that could be applied to other contents in the future.
5. Change in the attitude of the trainers	The suitability of the existing content was not discussed. Motivation for conducting the course was also very low.	A very positive attitude and high interest was seen in improvement of the effectiveness of the lesson. The participants tried to use many original ideas to make the training more enjoyable and effective.	The trainers responded enthusiastically to the designing of an original and creative content by identifying the best strategies to make the course more practical and applicable. As in the previous course, they applied active learning methods such as games, group dynamics, and group discussions.

6. Reaction of the participants	The supervisor warned that the motivation and interest of the epidemiology participants was very low, as many participants were sleeping during the lesson.	<p>Results of the questionnaire to the participants of the Presentation Workshop show notable improvement.</p> <p>(1) methodology: excellent, 89%; very good, 11%</p> <p>(2) evaluation of the trainers: excellent, 44%; very good; 56%</p> <p>(3) applicability of the content: excellent, 100%</p> <p>The questionnaire data are from 10 valid answers from 10 participants (trainers of the radiology and biology sections of CEMADOJA). The evaluation was done with the following criteria: 5 (excellent); 4 (very good); 3 (good); 2 (fair); and 1 (poor).</p>	<p>The results of the questionnaire were as follows:</p> <p>(1) clarity of the objective: [5] 92%; [4] 8%</p> <p>(2) handling of the subject by trainers: [5] 88%; [4] 4%; [no answer] 8%</p> <p>(3) achievement of the objective: [5] 85%; [4] 8%; [no answer] 8%</p> <p>(4) understanding of the content: [5] 81%; [4] 19%</p> <p>(5) participants satisfaction: [5] 81%; [4] 19%</p> <p>(6) teaching aids: [5] 100%</p> <p>(7) applicability of the content: [5] 100%</p> <p>The questionnaire data are from 26 valid answers by 31 participants of the seminar on participatory health promotion activities.</p>
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5. DISCUSSION

5.1. Validity of the conducted training

From the results of the evaluation of ToT at CEMADOJA, the reaction of the learners was relatively positive and the results of the assessment on learning were quite satisfactory, and a significant change of practices in designing, implementation and evaluation of the training program was observed in the participants. The adaptation of the courses developed during the exercise as regular courses of CEMADOJA demonstrates the remarkable impact of the training on CEMADOJA as well as each of the epidemiology trainers.

5.2. Consideration on the effectiveness of the developed program

Among research projects for the effective design of the instruction, the ADDIE (analysis, design, develop, implement and evaluate) model by Dick and Carey (1990) proposed a detailed process for Instructional Design. The ADDIE model faces criticism that it is not always possible in work situations to follow each of its steps. In CEMADOJA's ToT, by using pre-made formats called Instructional Design Tools developed by Ito *et al.* (2001), it was possible to apply the standardized ID model.

In addition to the ADDIE model, CEMADOJA's case applied the sequencing strategies based on the Reigeluth Elaboration Theory (Reigeluth 1999). The Elaboration Theory, commonly known as the Zoom Lenz Model, is an extension of spiral

Table 6. ADDIE and Objectives of Two ID Training

ADDIE	first ID training	second ID training
Analysis & Design	(1) Set training objectives*1	(1) Design new course *2 (2) Set training objectives
Develop	(2) Prepare evaluation tools (3) Prepare lesson plan (4) Design effective presentation (5) Prepare slides	(3) Prepare evaluation tools (4) Prepare lesson plan (5) Design effective presentation (6) Prepare slides
Implement	(6) Conduct the course & perform presentation	(7) Conduct the course & perform presentation
Evaluate	(7) Evaluate the learning and course management	(8) Evaluate the learning and course management

*1 & *2 include the process of analysis of the training needs, audience and content.

sequencing of Bruner (Bruner 1960), where the learners master a topic or task gradually in several phases, instead of topic by topic as traditional topical sequencing does. As shown in Figure 4, in the Zoom Lens Model, learning starts with the most simplified and realistic subject of a comprehensive task as whole, and then continue with a more complex version of the task until the desired level of complexity is reached. The advantage of this model for the designer is that the task analysis and sequencing can be done simultaneously. For the learner, from the first lesson he or she can experience the simple model of a whole task as applicable skill and the motivation for learning is enhanced. In case of CEMADOJA's ToT, the trainers experienced the whole process of Instructional Design from the first stage, acquiring the idea of the complete ID process for development of the training program.

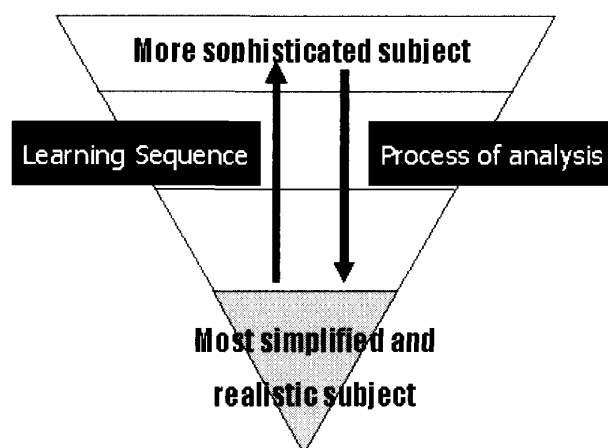


Fig. 4 The Zoom Lens Model
Translated from original figure of Nojima *et al.* (2005)

Because of the subject for the exercise, the presentation skill workshop matched the need of the institution and the trainers, the motivation was enhanced and the product of the exercise remains as a regular course at CEMADOJA. In the second ID training, the exercise for course development got more complicated and difficult by adding the step of research and creation of new content. Again, the topic for the exercise was relevant to the institutional need. Thus after the training, the product of the exercise remains again as part of the regular program of CEMADOJA. Through this exercise, the trainers' understanding and retention were strengthened before proceeding to the next sequence of learning.

5.3. How can the continuity and sustainability of the transferred knowledge and skills enhanced?

In his book "Diffusion of Innovation" (1982), E. M. Rogers mentions 5 factors that affect people in the perception of innovation: relative advantage, compatibility, complexity, trialability and observability. Not all the factors are always fulfilled, but research shows that these factors affecting effective adoption of an innovation. The Table 7 shows how CEMADOJA's case relates to each of these factors.

Rogers also described the five steps on how an innovation is adopted at an institution: (1) an institution recognizes the need for innovation; (2) the institution will judge if an innovation will solve an existing problem, and decide to adopt it or not; (3) the innovation will be re-defined and adapted to the characteristics of the institution (sometimes restructure of the institution may occur in order to adopt the innovation); (4) the meaning of the innovation is clarified among the members of the

Table 7. ToT Relations with Factors of Innovation

Factor	Relations with CEMADOJA's epidemiology trainers' training
Relative advantage (degree to which it is perceived as better than what it supersedes)	(1) Through the learning of electronic presentation, trainers can improve the quality of daily activities (epidemiology lesson). (2) Through the training to other departments' trainers, they can improve presence in CEMADOJA.
Compatibility (consistency with existing values, past experiences and needs)	In the post-training interview, the epidemiology trainers said that, until now, they conducted the training only by generic knowledge and experience, but felt the need for ID. On the other hand, the naming of "development of a presentation technique workshop" and the task given to epidemiology trainers to be trainers to other trainers increased the motivation of the trainers.
Complexity (difficulty of understanding and use)	The learning process was done in 4 steps: (1) introduction to ID; (2) planning of a presentation workshop; (3) development of the materials; and (4) evaluation of the workshop. During the first step, the trainers learn the whole process of ID, and then, through the practice of planning, implementation and evaluation of the presentation workshop, they learn how ID is done.
Trialability (degree to which it can be experimented with on a limited basis)	The presentation workshop is only for 2 days and very simple. As the participatory health promotion seminar has content worth one day, the participants can repeat the same course by themselves. The entire process for development, implementation and evaluation was designed as simple as possible.
Observability (visibility of its results)	The evaluation of the workshops shows that the trainers themselves identified that their presentation skills, ID skills and knowledge improved. The supervisors also recognized the positive impact of the presentation seminar in improving the presentation of the international seminar organized at CEMADOJA. Through this evidence, administrators adopted the presentation workshop as one of the regular courses of CEMADOJA.

institution; (5) the innovation will be standardized as part of regular activities.

According to this process, it seems that the most critical point for institutional adaptation and sustainability of an innovation depends on how much the proposed innovation fulfilled the existing and most pressing need of the institution. On the other hand, an innovation is not always adopted and sustained in an institution even if an institutional need exists. It depends on how much the proposed innovation fulfills both the need of the individual members and that of the institution. In this training program, the authors selected a subject that is relevant to the institution as the

topic of the practical exercise. Thus the Director of CEMADOJA decided to incorporate the program as one of its standard training programs. Before the second ID training, the Epidemiology trainers conducted the presentation seminar twice more at CEMADOJA, and expected to continue giving this training on request. In this way, the training program found the opportunity to apply what has been learned and generate benefits to compensate the investment for it. Meanwhile, this will help the trainers improve their presentation skills, ID skills, and teaching skills.

The second ID training exercise subject was incorporated as part of the first year program of the Family/Community Medicine Residence program. The coordinator of the program plans to develop together with the epidemiology trainer the second course on participatory health promotion with field practice for the second and third year curricula of the program.

All the evidence shows that this training was relevant to CEMADOJA's daily activities and can become routine activities. The Figure 5 summarizes how the program was done.

5.4. Role of the Instructional Kit to develop the ID ability of trainers and standardize the quality of instruction

The Instructional Kit was developed with two objectives.

5.4.1. Support the learning process

With regard to design of the course, evaluation tools and the teaching-learning process at the "Plan" stage, guide accurate implementation of the course by the use of a lesson plan at the "Do" stage, and help collect data, process and summarize the results of the evaluation at the "See" stage. All this is done using the Training Forms FC1 - FC8. (*FC: Formularios de

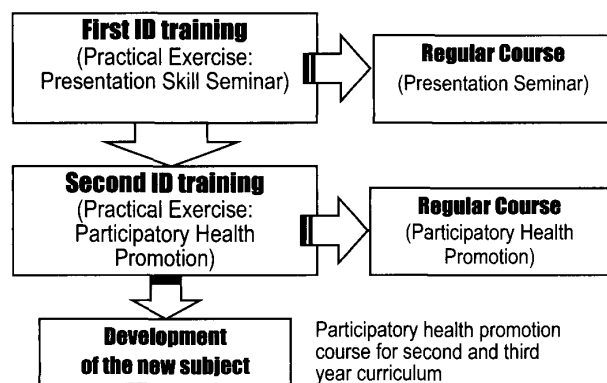


Fig. 5. Diagram of TOT at CEMADOJA

Capacitacion) By following the preparation of the training forms, a trainer will experience the actual process of Instructional Design.

As a result of the ID training using the training forms, even a beginner of ID can develop a complete package of the Instructional Kit relatively easily.

5.4.2. Standardize the quality of the instruction

Although the quality of instruction depends on the quality of the trainer, an Instructional Kit is a powerful tool of the trainer to maintain the minimum necessary quality of the content, methodology and process. It is thus very important that the preparation of evaluation sheets, lesson plan and syllabus be clear, logical, and precise. The validation process by formative evaluation will refine the quality of the Instructional Kit.

6. PROPOSING A PROTOTYPE FOR TOT

6.1. Proposing the "Composite Model"

Based on CEMADOJA's experience, a prototype of the training system is proposed to enhance the effectiveness and continuity of the training program. Why? Because in the field of international development, there are so few technical resources and instruments to help capacity development of the trainers. As a result, many international development projects are conducting ToT program by generic experience of the trainer and by repeating try and error. The proposed "Composite Model" provides instructors with framework of the ToT which is based on the theoretical and practical know-how. This minimizes the cost and increase the effectiveness, especially helping institution to improve the quality of their trainers and training program. Cemadoja's experience shows visible results on products, improvement of didactics, content and teaching aids, change in the trainer's attitudes, impacts on their trainee, and above all, the sustainability of the activities. This model comprises a practical pattern of the training program and instruments that generate visible results. The use of the proposed training kit and evaluation tools, which are parts of this model, helps ToT instructors to develop their own ToT program efficiently and effectively.

6.2. How "Composite Model" works

The Figure 6 shows how the "Composite Model of ToT" is implemented. In the Figure 6, the

stages 1 and 3 are the input of the instructor, while 2 and 4 are on-the-job application, and 5 is starting of the new routine of course development. **Stage 1:** This is the first step of the training. The instructor will develop the basic ID skill of the trainers.

1-1 The instructor will hold a model workshop on the subject to work on during the practical exercise. This will give an image of expected results of the practical exercise. The pre-test of the ToT ID training should apply here.

1-2 The second step is to develop the Training Kit by using the Instructional Forms. The Training Kit will consist of the following: (1) Instructional forms: IF1-Training Implementation Plan, IF2-Lesson Plan, IF3-Pre-test (Level 2: Learning), IF4-Post-test (Level 2: Learning), IF5-Questionnaire for course improvement (Level 1: Reaction), IF6-Practical Exercise Observation Sheet (Level 2: Learning), IF7-Evaluation Processing Sheet, IF8-Training Implementation Report; and (2) Teaching aids: they will depend on the availability of the equipment and stationery, but a typical model can include

presentation materials (PowerPoint slides or flip charts), audiovisual materials if available, and handouts for the participants such as exercise sheets.

1-3 Implementation of Course A as practical exercise. Before and after the course the evaluation tools (IF3, IF4, IF5) are to be applied. During the practical exercise, the observation sheet (IF6) will be applied.

1-4 Using IF7, the results of the evaluation data are processed and a synthesis is extracted, completing IF8, the summary of the evaluation.

1-5 Based on the results of IF7, revision or improvement proposed in IF8 is applied. At the end of the training, a post-test of the ToT ID training should be applied.

Stage 2: This is the first on-the-job application stage of the learning. This should be implemented by the trainer who was trained in the stage 1. If possible, the instructor can monitor the implementation and give suggestions for evaluation and improvement.

2-1 Implementation of the training using the improved Training Kit. The procedure will be basically the same as in 1-3

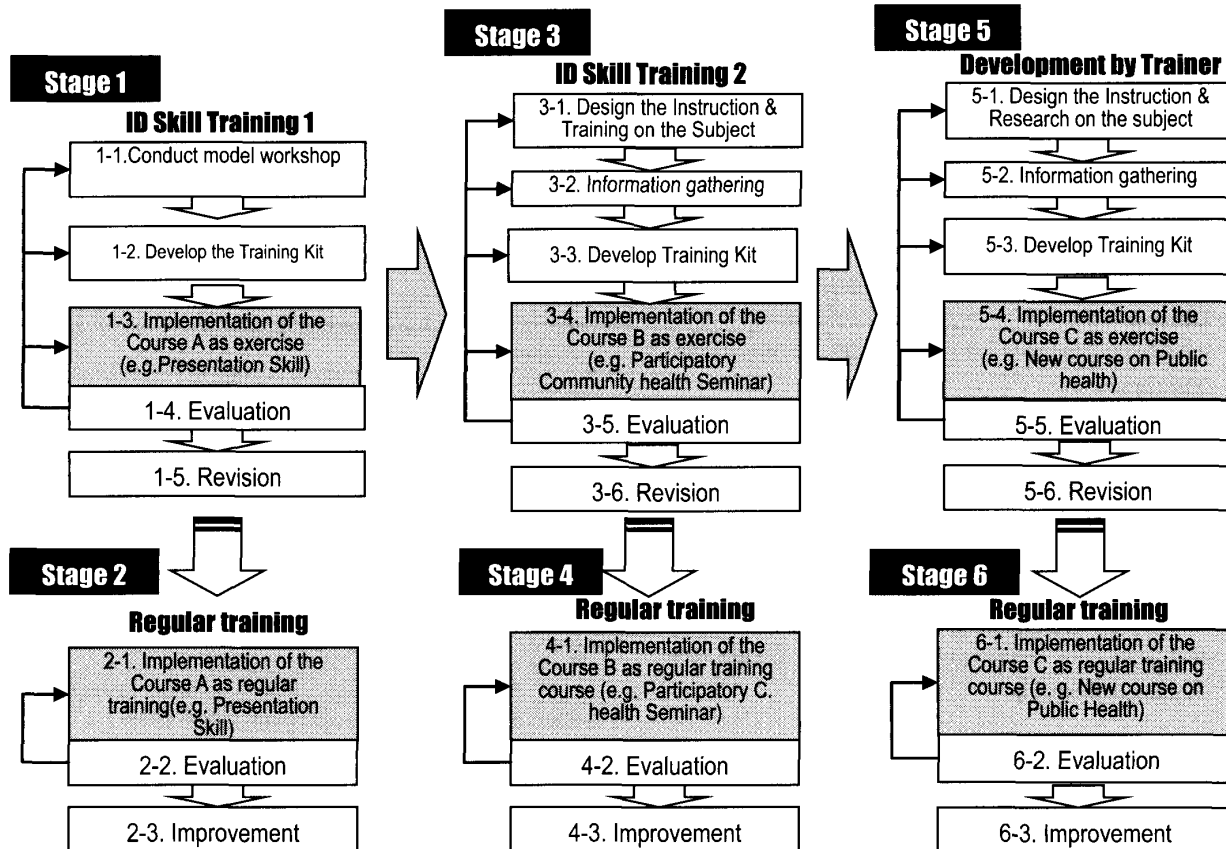


Fig. 6. "Composite Model" for Training of Trainer

2-2 Evaluation of the results: same as in 1-4

2-3 Improvement: same as in 1-5

Stage 3: This is the second ID training of the trainers. The difference from the first ID training is the addition of 3-2, or information gathering. While in the first ID training, the subject and content of the exercise were given by the instructor, in this stage, the instructor will provide the subject and some information, but some firsthand information should be collected, analyzed and organized as new content.

Stage 4: Implementation of the course developed in the stage 3 will be done by the trainers, following the same process as in 3-4, 3-5 and 3-6.

Stage 5: While the stages 2 and 4 were just the implementation exercise, this step is a practical test to prove that the trainers have acquired necessary knowledge, skills and experience to develop by themselves a training program.

Stage 6: This is the stage for the application of the developed course as a routine activity.

Here are a few important tips for implementation.

- (1) Before the ToT program, the institutional needs on the training program should be assessed. Usually skills on information science are in high demand, especially digital presentation skills. The first ID training topic can be a common and general skill. To start, try to identify a simple subject as a one- or two-day course.
- (2) For the second ToT program, a technical topic related to the subject taught by the trainers can be selected. Interview the section head, department head and/or head of the center, to identify the subject for improvement or new development.
- (3) During the ToT training, encourage and motivate trainers to be really professional trainers.
- (4) On-the-job application, especially in the stages 2, 4, 5 and 6, does not usually depend on the decision of the trainer. The head of the department, section or center has to commit to its implementation.
- (5) Evaluation is one of the weakest points in most training institutions. A checklist for the manager can facilitate application of all the evaluation tools.

7. CHALLENGES

This ToT ID training was implemented with several previous trials in similar projects elsewhere. The next challenge is to identify components of the training that can be adopted and converted as WBT to develop hybrid training of on-site training and WBT and improve the cost effectiveness in following up on the stages 2, 4, 5 and 6. Another challenge is to identify cultural factors that affect technology transfer among different countries and find appropriate strategies to support successful training in international development assistance.

The gap between what instructional design theories recommend and real-life situations of training institutions makes it challenging to develop simpler and more practical systems, tools and methodology to improve the performance, applicability and sustainability of transferred knowledge and skills.

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