Cascade Approach to Training: Theoretical Issues and Practical Applications in Non - Formal Education

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Abstract

In this article we attempt to examine an approach that has been used in large scale training interventions, that of the cascade or multiplier model. In the first section, we examine the literature related to the theoretical issues of the model and some of its applications in different contexts. The second section deals with the requirements for the implementation of the model, while in the third section we present in short four different applications of the model in the field of adult education in Greece. This evidence demonstrates that cascade model is among the best choices when we have to deal with a great number of participants, while also simultaneously facing deficiencies in time and budget.

Keywords: Cascade, training, distance education, Greece

1. Cascade Model: Definition and Theoretical Issues

Among the numerous models for implementing further education and training interventions, cascade model is, maybe, one of the less referred to, although in some specific circumstances it can be considered as the best choice. Attempting to elaborate the content of the term *cascade model* we shall first quote one of the definitions of the word "cascade" provided by Oxford Dictionary - "flow downwards in large amounts". In the cascade model, a first cohort or generation of trainers is trained in a specific subject and after they are qualified, or considered adequate or proficient as trainers in that specific issue, they become the trainers of a second cohort or generation (Cheese, 1986; Hayes, 2000). This procedure can be repeated for another and another cohort or generation.

Each repetition of training is usually called *phase* or *stage* of the cascade procedure. It is apparently a top-down approach to deliver training, while it is also considered as a method to transfer or diffuse knowledge in an organization (Jacobs & Russ-Eft, 2001; Jacobs, 2002) without using whatsoever training, but mainly through deploying informal learning activities. The strong expanding nature of the model, in terms of the number of final recipients, is the reason why it is also known as multiplier approach to training (Dichaba & Mokhele, 2012; Ono & Ferreira, 2010).To provide an example of the implementation of cascade model, let's assume that we have 20 experts (first cohort - first phase) and each one of them educates 20 trainers, resulting to a total of 400 qualified trainers (second cohort -second phase). These trainers can educate a total of 8.000 trainers (third cohort -third phase). Just in the fourth round of implementation, we can have 160.000 final recipients of the initially designed program or intervention, and that is the reason why this model is considered as having a huge multiplier dimension. In terms of mathematics, cascade model could be seen as a geometric sequence having as common ratio the constant number of trainees in each group.

The number of recipients of each phase could be calculated by the formula $a_n=ar^{n-1}$ (where a represents the number of trainers, n represents the phase and r is the number of trainees in each group). Applying all these to the above mentioned example we can have for the third phase $a_3=20.20^2$, i.e. the total number of recipients (8.000).
International experience provides some examples of successful application of the cascade model. Jacobs and Russ-Eft (2001, p. 498) indicate that the first reported use of cascade model was associated with on-the-job training programs in World War II in the framework of Training Within Industry effort, while during the 1980s many organizations, such as Xerox and Ford, adopted that model.

Cheese (1986, p. 248) reports the implementation of cascade model for the training of 3.000 managers in a six months period, and also refers to another implementation with 50.000 participants. The Namibia project called INSTANT (In-Service Training and Assistance for Namibian Teachers) was based on the cascade model (Peacock, 1993), and the same happened with further education programs that accompanied reforms in Botswana's educational system (Prophet, 1995; Mc Devitt, 1998). In Sri Lanka the Primary English Language Project (PELP) included cascade training with about 6.000 teachers of primary education as final recipients (Hayes, 2000), and in Botswana 1.000 teachers were educated in intensive two or three days workshops (McDevitt, 1998). Human Rights and Legal Education (HRLE) initiative in Bangladesh encompassed cascade training (Rafi, 2010) based on seminars having a six days duration. South Africa is another country where training based in the cascade model accompanied educational reforms (Ono & Ferreira, 201; Dichaba & Mokhele, 2012).

2. Requirements for implementation of the cascade model

Based on the above mentioned sources, as well as on key issues that arose from the application of cascade model programs in Greece, we shall attempt to delineate the preconditions and specifications of the model. What we observe from the various implementations of the model in dissimilar contexts and for different target groups are that, there are some preconditions in the majority of cascade model applications:

(i) Usually there is a lack in trainers of trainers. For example, if the number of final recipients is 100.000, a number of about 5.000 trainers of trainers is necessary. Given that it is difficult to have such numbers of first class trainers, an intermediate phase is required to train those 5.000. In that case, just 250 trainers of trainers are needed to implement training, and if we add one more phase, we reduce the initial number of trainers to around ten. Thus, many cascade model applications start with such a few numbers of trainers, in fact they start with a few high level experts who act as the trainers of the first phase.

(ii) Cascade model seems to be the superlative choice when the number of final recipients is very high, the total cost of the intervention is considered a crucial factor, and the time available is very limited. In many cases, cascade model programs accompany reforms or large scale interventions, where we seek almost instantaneous results. Such interventions could be educational reforms, changes in curriculum, NGO projects, e.t.c.

(iii) In most cases, participants of all phases are mainly of relatively high educational level, in order to be able to handle short duration training involving in most cases self-learning activities. In the majority of cascade model applications worldwide, participants are teachers, trainers, or volunteers.

(iv) As already, stated, cascade model has a strong intrinsic top-down and hierarchic nature, for that reason active participation of recipients is required as a counterbalance. This active participation could include deployment of participatory training methods and techniques (for example, buzz groups, role play, and debate) and could also be a response to expressed educational needs and demands of target groups.

(v) Given that in most cases we have to deal with large scale interventions, quality assurance and formative evaluation in all phases of the application are essential, so as to ensure that the final recipients should be at the level of the first generation. A common problem, in cascade model applications without paying attention to intermediate ascertainment of results and outcomes is the decrepitude in the last phases.

(vi) In some occasions, mainly when the number of final recipients is high and the total duration is considered as long, a solution could be to implement a cascade model of mixed-method; a combination of face to face training and distant study of educational material. The distant study could be "traditional" distance education or e-learning supported study of synchronous or asynchronous type. In all these cases the educational material of printed or electronic form should be developed respecting in full the adult education principles and participants needs (Karalis & Koutsonikos, 2003; Korres-Pavlis, Karalis, Leftheriotou, & Barriocanal, 2009; Vorvilas, Karalis, & Ravanis, 2011).

(vii) For the evaluation of the results, many procedures or indices could be used. Besides the satisfaction levels of participants, their readiness, and self-esteem to implement the subjects of training is a very crucial factor. The proportions of participants that complete their training as well as the percentage of the participants who succeed in the accreditation procedures are indices for the evaluation of the intervention. The preparatory actions of a cascade model training intervention include first of all the educational needs analysis of the participants of all phases, taking into account that needs could be different from phase to phase. The careful selection of the very first trainers is another crucial factor.

(viii) Given that, the number of the first phase trainers is always very small (from ten to twenty), it is preferable to select experts in the subject of the specific intervention. As already mentioned the preparation of educational material is of high importance, mainly when we have mixed-method cascade programs. To assure quality as the cascade model unfolds it is necessary to establish a committee for the continuing monitoring of the training; in some cases the most appropriate choice is to include in such a committee the trainers of the first phase.

3. *Evidence From Applications of The Cascade Model In Greece*

In this section, we will provide evidence from large scale cascade model training interventions in Greece during the last fifteen years. Among 233 countries and independent territories, Greece is ranked in position 83 by population, 96 by area and 45 by GDP per capita (it should be noted that Greece has an almost unique characteristic; in the Greek territory there are more than 200 islands a fact that causes difficulties to large scale or national level educational programs). This characteristic could be considered as one of the factors that cascade model programs are among the first choices for the organization of training programs addressed to high numbers of final recipients.

All programs presented here fall into the field of adult education and concern training of trainers for both pillars of adult education; continuing vocational training activities (programs that are connected with economy and employment) and general adult education programs (programs for leisure time and personal development) and were funded by the European Social Fund. Despite the fact that from the early 1980s adult education in Greece was characterized by quantitative expansion and qualitative improvement, there was no provision for the training of trainers (Vergidis & Karalis, 2004; Kokkos, Koulaouzides, & Karalis, 2014). That need was acknowledged as urgent in Greek and European Union policy texts, so a huge effort to train the first 10.000 trainers in Greece was undertaken by the year 2000.

The whole project started at 2002 and was assigned from the Accreditation Center for Continuing Vocational Training (EKEPIS) and the Ministry of Labor to a consortium of bodies (Trade Union Confederation, private organizations), having as leading organization the Hellenic Open University the only institution in Greece to provide distance education at tertiary level. This first application of cascade model in Greece was designed by A. Kokkos, professor of adult education at Hellenic Open University and scientific director of the program[1].The total duration of the program was 300 hours, 75 of them in four intensive face to face meetings and the rest 225 corresponding to the study by distance of educational material of about 1000 pages. At the end of the program, the participants were accredited as adult educators for the system of continuing vocational training activities via a specific procedure, the microteaching (exemplary teaching for 20 minutes). In the first phase of the cascade application, 12 experts in the field of adult education were educated to act as trainers for the next phase, where they educated the first trainers of trainers in groups of 20 (a total of 250 trainers). Those 250 trainers were accredited as trainers of trainers by EKEPIS so as to educate them about 10.000 trainers of Greece.

At the end of this cascade model intervention, about 8.200 trainers of continuing vocational training in Greece were accredited. Data from the evaluation report of the program (Kokkos & Karalis, 2009) show that participants were very satisfied with the training they received. In scale 0-4 the average score for the general impression of the program was 3,7, the interest the program caused to them received an average score of 3,7, while the opinion formed of their trainers received the greatest score (3,9), something that clearly declares the endurance of the monitoring procedure and the initial preparatory actions (educational material, training of trainers in the first two phases). A very significant element for the success of this large scale intervention was that only a proportion of 8,5% of the final recipients declared that they were not ready to act as adult educators. The second application of the cascade model in Greece was in the field of general adult education. The General Secretariat of Lifelong Learning and the Institute for Continuing Adult Education (IDEKE) implemented a nation-wide program to educate the educators of general adult education as well as a considerable number of executives who operated the Centers of Adult Education (KEE).

[1] We should mention that in the first two applications presented here, A. Kokkos was the scientific director having the responsibility to design, implement and monitor the programs. For the other two applications the author of this article was the scientific director. All data presented here are deriving from the official evaluation reports and relevant papers in conferences and collective volumes.

Two types of programs were designed, based on a mixed-method cascade model, the first of them with a total duration of 100 hours and the other with a total duration of 25 hours (in both cases about 40% of the total duration had the form of face to face meetings). Before the beginning of the program the about 70 trainers of trainers received a preliminary education and the educational material was prepared and tested. The development of the educational material (more than 750 pages) was based on distance education principles and incorporated contemporary approaches of adult education, such as transformative learning (Karalis, 2010; Raikou & Karalis, 2011). The unfolding of the program lasted two years (2007 and 2008) and according to the data collected through questionnaires a proportion of 84% of participants considered the program as "very good" or "excellent" (Dimitrouli & Peristeri, 2011; Leftheriotou & Korres-Pavlis, 2014).

The third application of the cascade model was done again by the General Secretariat of Lifelong Learning and IDEKE during 2010 and 2011 with 152 trainers of trainers, while a Learning Management System was set-up to provide the possibility for e-learning activities. A proportion of 88,5% of the final recipients considered as "very good" or "excellent" their trainers and 81,3% of them were very satisfied by their participation. According to official data more than 8.000 educators of general adult education were trained through these programs.

The fourth application of the cascade model aimed at accompanying a great reform in the field of adult education in Greece, the foundation of Lifelong Learning Centers (KDVM) in all municipalities of Greece. KDVM had as mission to provide general adult education to citizens of all ages and educational levels. Training of trainers of KDVM was assigned to Hellenic Open University and the educational material was the same with the previous two programs of General Secretariat of Lifelong Learning. The first phase of the cascade model comprised of the training of the first generation trainers (12 experts) who were destined to act not only as trainers of trainers but also as their mentors for the whole duration of the program. The trainers of the first phase were tutor counselors in postgraduate programs for Adult Education at the Hellenic Open University, having a remarkable experience in adult learning and distance education.

The selection of the trainers of the next phase (90 trainers) was a matter of important consideration and the decision was to select them among those who were accredited as trainers of trainers in the first program referred in this section of the article (trainers of trainers for the cascade model of 2002). The third phase involved the education of 4.200 educators of KDVM in 224 programs that were implemented in 11 cities of Greece during the years 2013 and 2014. These programs had a total duration of 37 hours, 13 of them being face to face meetings. The final recipients of the program felt ready to act as educators in KDVM at great proportions: 86,3% of them declared they were ready to work in KDVM, while only 2,8% of them thought they needed more training. A proportion of 64,6% answered that the program covered their educational needs, while positive opinions for their trainers were declared by 94,3% of the respondents in evaluation questionnaires.

4. Conclusions

In this article, we tried to highlight the main characteristics, advantages, and requirements of cascade model interventions in training and education. Based on the international experience, as derived from the literature review, we can draw the conclusion that Greece is one of the few countries that this model has been implemented in a large scale; more than 20.000 adult educators were trained through the application of the cascade model in four different cases during a period less than fifteen years.

Experience gained from the implementation and evaluation of these programs, shows that the cascade model could be the best choice if we have to deal with great numbers of final recipients in parallel with limited time and cost. The very positive opinions of the participants in all these four cases, revealed the advantages of this model - most of them already described in relevant literature. Based on this evidence we can draw the conclusion that the crucial factors in implementing cascade model interventions are the following: design based on final recipient's needs, careful selection of the experts and first phase trainers, continuous monitoring of the program's unfolding and well-prepared and comprehensive educational material.

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