



## Using The Extended Model ADDIE In Companies' Internal Training

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**SUMMARY:-** Objective of this empirical study is to examine, through literature review and quantitative research, the main phases and procedures compose the extended ADDIE model in the enterprises of the greek market. The quantitative research took place through the delivery of structured questionnaires to human resources managers, in enterprises with structure and size adequate for design and implementation of entrepreneurial training activities, and to training companies. On empirical level is probably one of the few studies with such content in the greek market. On methodological level is also one of the few studies with the use of factor analysis on macro-level. The findings of this study evinced partial use of the extended ADDIE model and outlined the main phases and procedures of the integrated training design model used by the companies in Greece. The findings of this empirical study are direct applicable to companies wish to improve the effectiveness of training activities, using the ADDIE model as part of their learning function.

**Keywords:-** ADDIE, ISD, Instructional Systems Design, Entrepreneurial Training, Training Needs Analysis, Training Evaluation, Training transfer.

### I. INTRODUCTION

The intensely competitive environment requires flexibility and adaptability from companies. Companies respond to this demand in various ways. They make structural changes and organize work around teams, they push specialists to be close to the source of problems and take immediate decisions and they reinforce flexible actions. They make investments in information technology to manage the retention and transfer of knowledge, but they also invest in human capital to increase the collective stock of knowledge and capabilities (Salas & et al., 2012).

The most important incentive is the need for learning and the development of employees' skill, regardless of their level in hierarchy in the company. Learning in companies is achieved mainly, but not always, through training. Sometimes training fails to produce learning and large amount of learning takes place outside training. Learning, however, is always the desired result of a training action (Salas et al., 2012).

The first models for the optimization of the training activities focused on the phases of training needs' analysis, design and implementation. Modern research takes into account the factors that influence the effectiveness of training such as transfer of acquired training at work, participation and motivation in training, performance measurement, individual differences of the learners etc. However, it is important to approach training as a system and not as a single event. A system that takes into consideration the actions before, during and after the training (Coultas et al., 2012).

This research, focuses on the to investigate the application of the model ADDIE (Analysis Design Development Implementation Evaluation, Analysis Design Development Implementation Evaluation), which is a system for designing and implementing internal training actions in the companies. the research was conducted in active companies of the the Greek market, and the model ADDIE is considered as the most widespread form of Instructional Systems Design (ISD).

### II. THEORETICAL PART

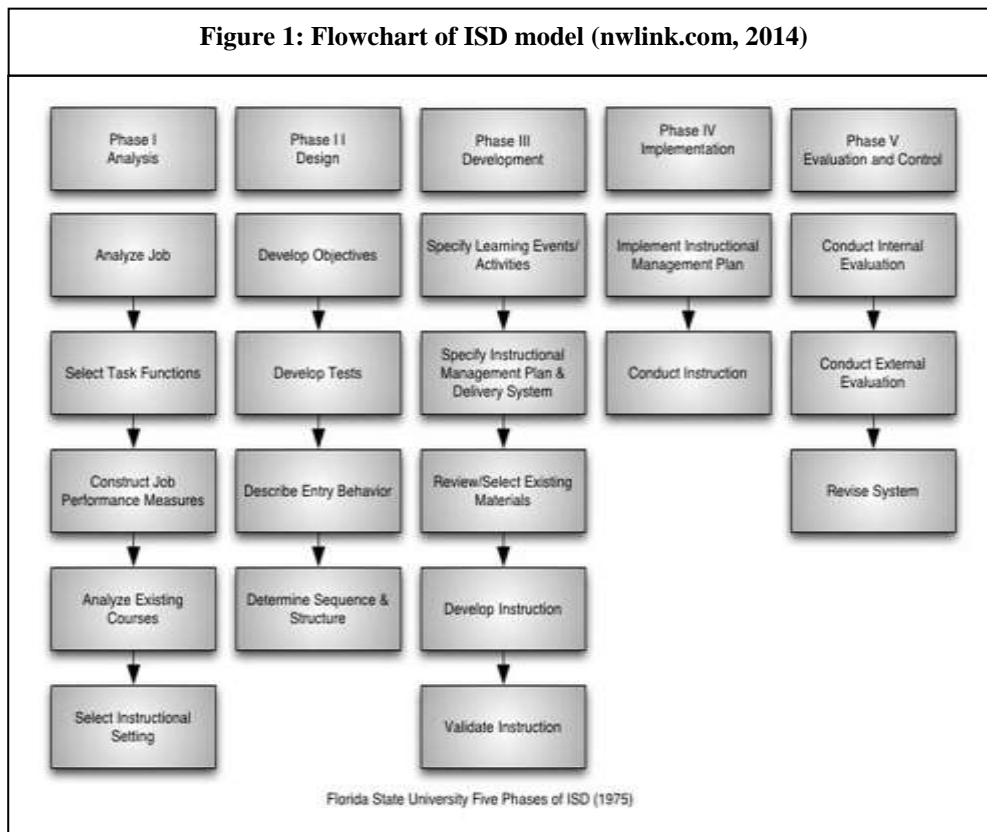
Boudreau & Ramstad (in Salas et al., 2012) believe that business success in today's highly competitive environment should be achieved not only in financial terms but also in human resources level. The companies

need employees who are able to perform successfully their daily work and to adapt to constant changes in the business environment (Salas et al., 2012). These abilities can be largely developed by the design and implementation of training programs with planned and systematic activities to acquire knowledge and skills and create lasting changes in work behavior (Salas et al., 2012).

The internal training is one of the most important factors for the development of employees and a key to business success (Huerta et al., 2006). There are many studies devoted to the analysis of the links between training and operational results, but very few are dedicated to the process of effective planning and implementation of company training actions (Huerta et al., 2006).

### III. THE INSTRUCTIONAL SYSTEMS DESIGN (ISD) MODEL

The ISD model is the core of any training program, since nearly every program implements the ISD or some variation of it. It is designed to solve performance problems which stem from the lack of training or learning. Figure 1 shows the flow chart created at the University of Florida in collaboration with the Ministry of Defence of the USA. The model is based on the systemic approach, which was popular after the Second World War. It is the most popular model in use today, with several modifications to incorporate new technologies and ideas. However, the presentation with a flowchart is good as a presentation tool, but it does not reflect the dynamics of the model. It presents a selected number of steps in each phase that may be essential or not, and it ignores steps that may be necessary (nwlink.com, 2014).



The ISD model always starts from the analysis, trying to produce the best result. Afterwards, there is the procedure of backwards scheduling (nwlink.com, 2014). It is more a model which provides means for performing operations oriented to humans. It is the map that guides instructional and learning activities (Grimaldi & Engel, 2007).

Figure 2 shows a dynamic diagram of the model ISD (Merrienboer, op. Cit. In nwlink.com, 2014), where there is emphasis on feedback and evaluation and the importance of collecting and distributing information among the five phases.

Figure 2: Dynamic diagram of the model ISD (nwlink.com, 2014)

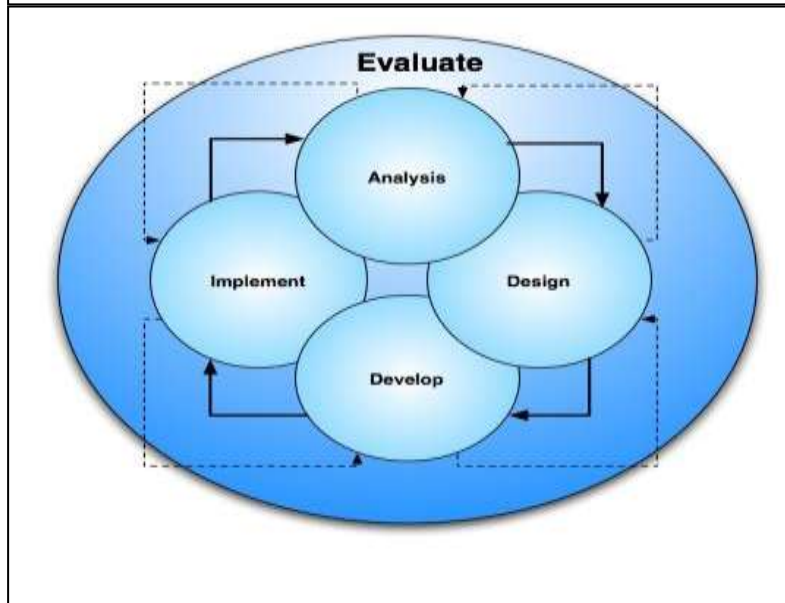
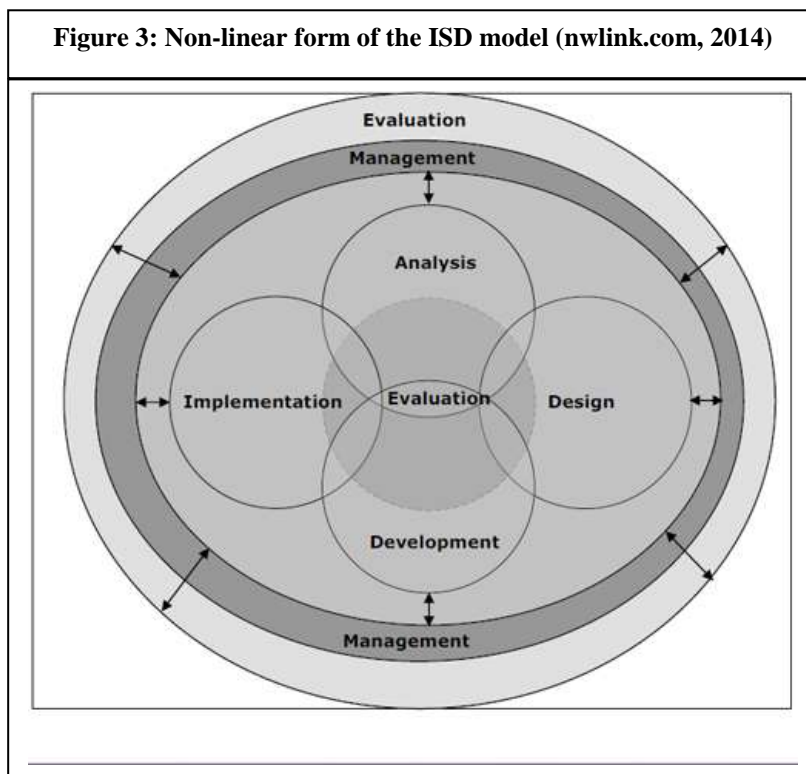


Figure 3 shows a non-linear form of the ISD model where there are two cycles of evaluation, the modulator (inner circle) and the total (outer circle). In this approach, the five phases are ongoing activities taking place throughout the instructional design (nwlink.com, 2014).

Figure 3: Non-linear form of the ISD model (nwlink.com, 2014)



The standard ISD model form divides the instructional design process into five phases (nwlink.com, 2014):

1. Analysis: Studies the environment in order to understand and to describe the activities required in order to eliminate a performance gap.
2. Design: Defines educational goals, in the content of the action plan.
3. Development: Presents the products which were specified in the Design phase.

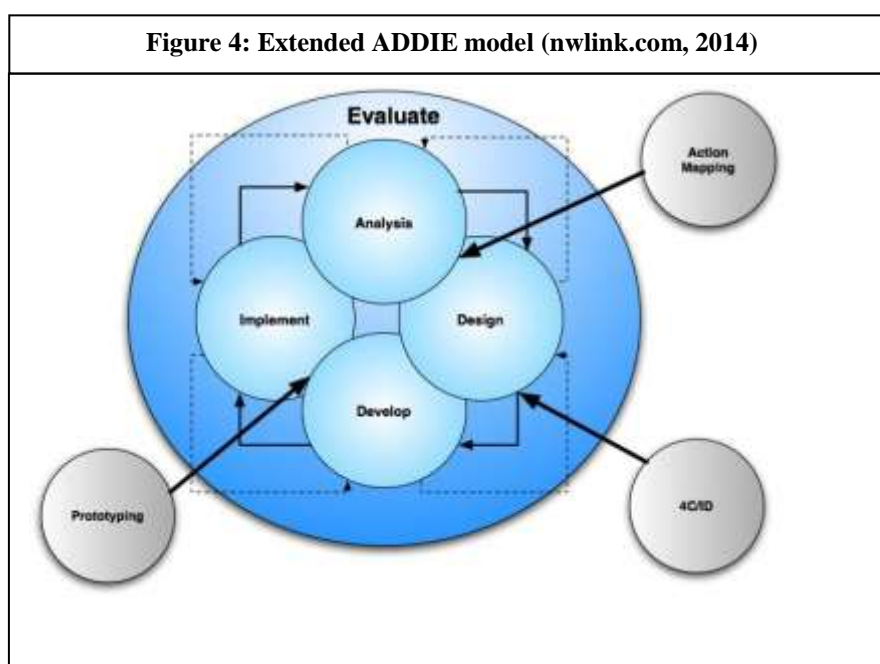
4. Implementation: Performs training activities in different ways and methods.
5. Evaluation: Determines whether the learning process and the learners have achieved the desired results. It is either formative or summative evaluation.

The ISD model uses a holistic, systemic approach regarding training, which stems from cognitive and behavioral psychology. It uses Bloom's taxonomy to cover the three areas of learning: cognitive, psychokinetic and emotional. The emphasis is now in the improvement of people's performance and not in the implementation of the training program (Myers, Watson, & Watson, 2007).

#### IV. The ADDIE Model

The factor which determines the design and development of companies' training actions is the performance gap caused by the lack of knowledge, skills and "inappropriate" behavior. Therefore, a "paradigm" that incorporates both modern theories of learning and education and the growing interest in optimizing the investment in internal training activities is necessary. The extended ADDIE model is a response to the above requirements with proven success (Branch, 2010).

The ADDIE model is the foundation of all educational planning models. It is a flexible model for the design of educational activities and a subset of the model ISD. It is not a fully operational model but it refers to a family of models that share a common structure (Branch, 2010). When the ADDIE model was presented, it was strictly a linear model (Figure 1). Then it entered into a dynamic trajectory, when the last phase changed from "Evaluation and Control" to "Evaluation" (nwlink.com, 2014). Several ID models may be used in conjunction with ADDIE. Consequently, ADDIE becomes an extended model (Figure 4). This research will explore the ADDIE model by adding the phase of "transfer of acquired training", according to the proposal of Gustafson and Branch (1997).



#### V. RESEARCH PART

The in-company training is one of the most important pillars on both the development of the human resources (Huerta et al., 2006) and on gaining a competitive advantage. In the implementation of company training actions numerous ISDs are used; the core of most of them is ADDIE model (Myers et al, 2007).

This research focuses on the field of internal training at companies operating in the Greek market. The research questions are:

1. What is the significance and the frequency of the implementation of the phases of the extended ADDIE model (with the phase of transfer of acquired knowledge), according to the Greek business market?
2. Are the procedures which used in each phase of the extended ADDIE model satisfactory for the successful implementation of the company training actions?
3. Can the system for planning and implementing the company's training actions be described based on the ADDIE model?

The answers to these questions will help in drawing conclusions for the use of systemic modeling in in-house training and for the phases and procedures that should be included in a comprehensive ISD.

## VI. SAMPLE

The research focused on companies which, according to their size, area of expertise or "philosophy", have the structure and resources for an autonomous education department and the ability to develop their own educational policies (Huerta et al., 2006). It was conducted with a non probability sample, as convenience sampling, since it was impossible to find a full list of companies with these criteria (Gorard, 2003).

350 questionnaires were sent by email to the 500 largest companies (in terms of profitability for the year 2012), operating in the Greek market (<http://www.tovima.gr/finance/article/?aid=440092>), and to 24 large companies (consultants in education) involved in the design and implementation of training programs (<http://www.sesma.gr/index.php?id=347>). Sending the questionnaires by email to such a large number of participants was chosen according to the proposal of Fink (2013) for oversampling, which is essential for achieving the objective of sampling, since the response rate is about 20% (Fink, 2013; Bourque & Fielder, 2003).

The response rate was 13% (48/374), quite small, but not unusual for such research. Response rates which have been reported are 13.6% in an empirical research in Slovenia (Dermol, & Cater, 2013), 19,2% (Fox, & Doyle, 2001), 27,8% (Huerta et al., 2006) and 28% (Marin-Diaz et al., 2011). In a relevant research in Greece, the reported response rate was 58% (Alamisi, 2012).

## VII. METHODOLOGY TOOLS

The research was carried out using a questionnaire, whose role is to provide standardized answers to all the issues to be investigated (Brace, 2004). The questionnaire was divided into two parts. The first part investigated the frequency of application of the individual processes in the main phase of the extended ADDIE model. The second part consisted the collection of information for the entire model. The five-point scale Likert (1-5) was used, with the addition of the off-scale measurement of the choice "I do not know" (Oppenheim, 1992).

Data was collected by using different techniques, to ensure validity. First data source was the literature review on a theoretical level. Afterwards, there was a review of empirical studies and research. Third source of data were large (in terms of profitability) companies operating in the Greek market and training experts in the planning and implementation of internal company training actions.

Data analysis was performed using Excel and SPSS. The Excel spreadsheet was used mainly for recording the responses and calculating simple statistics (mean and variance). Then the data from spreadsheets were imported to the statistical package SPSS for the descriptive and factor analysis.

## VIII. FINDINGS

**Question 1:** What is the significance and the frequency of the implementation of the phases of the extended ADDIE model (with the phase of transfer of acquired knowledge), according to the Greek business market?

- The "Analysis" is the phase in which greater weight is attributed (27.04%), a finding consistent with the findings of the empirical research (Smith & Hayton, 1999; Tao et al., 2006) and studies (Salas & Cannon-Bowers, 2001).
- The "Implementation" phase of the training (16,87%) is considered more significant. This rank is expected, since this is the phase with the highest frequency of application and the result of the majority of development actions of human resources. It was found from the literature review, that the implementation phase has not been investigated empirically.
- The "Transfer of the acquired training" from training at work displays the smallest frequency of application to businesses in Greece (average 2.61) despite of its expressed significance (16.74%). It is the phase that exhibits remarkable gap in terms of empirical research procedures (Velada et al., 2007).
- The "Design" phase of the training actions includes the selection of strategies and training methods. It is usually applied in Greek companies and it is considered as significant (14.91%).
- The "Development" phase is considered less significant (12.93%), which is also confirmed by the frequency of application (average 2.90). It is the phase with minimal empirical and theoretical justification (Al-Khayyat, & Elgamal, 1997).
- The "Evaluation" phase is less significant (11.72%) and it is not implemented frequently (average 2.71), which was also found in research in Great Britain and India, where only 35 % and 36.5% of businesses respectively evaluate training (Fox, & Doyle, 2001).

**Question 2:** Are the procedures which used in each phase of the extended ADDIE model satisfactory for the successful implementation of the company training actions?

Companies which operate in the Greek market do not express any strong "disappointment" from existing models/procedures. Therefore, the non-implementation of some phases of the ADDIE process is likely due to a business decision and not to a lack of corresponding "know-how".

Least effective are the models/processes of the "Transfer of acquired training" phase, where 50% (22/44) of the respondents consider them from "unacceptable" to "adequate" (value 2). This percentage is consistent with both the low frequency in the application of this phase (average 2.61) and the usual occurrence of problems during its implementation.

In the "Evaluation" phase, the used models are considered merely "satisfactory" (average 2.93). The percentage of those who evaluate the models from "unacceptable" to "poor" reaches 32.6% (15/46), a figure that contrasts with the small percentage of those who report problems in the implementation phase (13.3%, from "always" to "often").

For the other phases (Analysis, Design, Development, Implementation) the models/procedures are considered "very satisfactory" crisis, which is consistent with the "rare" troubleshooting.

**Question 3:** Can the system for planning and implementing the company's training actions be described based on the ADDIE model?

An internal training system based on the extended ADDIE should include all phases and procedures identified by literature review. However, these phases were not fully verified by the empirical research into business in the Greek market.

The system for the design and implementation of training actions consists of building blocks (modules), each of which performs a specific "role" in the system where inputs are transformed through a controlled process into outputs (results), which are, in turn, the inputs of another building block. Specifically, each module must include:

- Analysis: performance analysis, analysis of educational needs (in relation to the performance gaps), job analysis (relative to business goals), establishing educational objectives (covering performance gaps), definition of the training system, establishment of the necessary educational resources, management and planning.
- Design: job analysis (relative to knowledge, skills and behavior), employees analysis (relative to knowledge, skills and behavior), identification of training objectives (in relation to knowledge, skills and behavior), development of control and feedback processes for learners, review of "Analysis" phase products.
- Development: development of monitoring system, development of educational strategies, content development, developing training tools, review of the products (formative evaluation), conducting pilot tests (formative evaluation).
- Implementation: selection of trainers, selection of trainees, training management.
- Evaluation: establishing benchmarks, developing evaluation tools, conducting pilot tests of stabilization tools.
- Transfer of acquired training: measuring work performance before and after training, measuring work performance before and several months after the training, conducting tests for several months after the training to measure conservation knowledge / skills and attitudes.

## **IX. CONCLUSIONS**

This research investigates and validates the extended ADDIE model at key stages and at individual level processes. The findings of the research can be summarized in the following key points:

- The extended ADDIE model (with "Transfer of acquired training") is part of the ISDs used by businesses operating in the Greek market, since the procedures are applied partially but satisfactorily.
- The use of ISD by companies operating in Greece is creating a learning climate that helps them achieve their business goals without exhausting their budget.
- The phases "Analysis", "Implementation" and "Transfer of acquired training" are assessed by companies in Greece as the most important to achieve optimal learning effect.
- The phases "Analysis" and "Implementation" show the highest frequency of application by companies operating in the Greek market.
- The lack of appropriate models and procedures hinders the measurement of the efficiency of transferring the acquired training to work, as reported by companies of the Greek market.

- The extended ADDIE model should be a strategic part of the learning process of business in Greece (ASTD Research Study, 2010), because in a sense the ADDIE process is a learning process itself (Korte, 2006).

The findings are directly applicable by companies which plan internal training activities. Companies can directly apply any of the phases that offer value to the effectiveness of training activities. In learning level, the study of the model/process can provide the incentive for companies to implement these processes although they did not to consider them as important in the first place. The implementation of the extended ADDIE model can improve the company's training actions and but also provide a perpetual learning process development of people and businesses.

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