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FORMATIVE EVALUATION OF E-LEARNING PROJECTS WITH THE LOGICAL FRAMEWORK APPROACH

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Abstract: *Evaluation of E-learning projects is a topic of great interest and growing importance. The evaluation of a project is the construction of the overall judgement, based on a quali-quantitative determination of the benefits and costs associated, with scientific criterion, of a project (evaluand). The purposes of the evaluation of an e-learning project are different: to determine the impact on beneficiaries' performance, to compare projects, to support the improvement of projects in terms of socio-economic effects and impacts, on individuals and organizations, to support the applicant in the design phase. This last purpose is increasingly important for all the stakeholders of e-learning projects (i.e. universities, companies, communities, as well as students and employees), due to a global and highly competitive environment. Evaluation of e-learning projects takes into account the benefits and the costs due to the project, from its inception to the extinction of its effects. This paper, using the e-learning project as the 'unit of analysis', proposes and promotes the adoption of the Logical Framework Approach, in the designing phase of the E-Learning Project. It enables the proposers, as well as an external evaluator, to evaluate the project by assessing its coherence, that is the validity of the logical and causal links among activities, resources, outputs, purposes of the project proposal. The paper highlights peculiarities and weaknesses of this model for an effective evaluation.*

Keywords: *E-Learning project, Evaluation, Logical framework approach.*

1. INTRODUCTION

Evaluation of E-learning projects is a topic of great interest and growing importance. The evaluation of a project is the construction of the overall judgment, based on a quali-quantitative determination of the benefits and costs associated, with scientific criterion, of a project (evaluand). The purposes of the evaluation of an e-learning project are different: to determine the impact on beneficiaries' performance, to compare projects, to support the improvement of projects in terms of socio-economic effects and impacts, on individuals and organizations, to support the applicant in the design phase. This last purpose is increasingly important for all the stakeholders of e-learning projects (i.e. universities, companies, communities, as well as students and employees), due to a global and highly competitive environment. Evaluation of e-learning projects takes into account the benefits and the costs due to the project, from its inception to the extinction of its effects. This paper, using the e-learning project as the 'unit of analysis', proposes and promotes the adoption of the Logical Framework Approach (LFA) [1], in the designing phase of the E-Learning Project. It presents the application of the Approach to BAEKTEL, a project aimed to develop a technology platform to provide E-Learning, with Open Educational Resources. The LFA enables the proposers of the project, as well as the external evaluator, to evaluate the project by assessing its coherence, that is the validity of the logical and causal links among activities, resources, outputs, purposes of the E-Learning Project (EP). The paper highlights peculiarities and weaknesses of the mentioned approach for an effective evaluation.

The paper is organized as follows. Section 2 provides definitions and concepts of Evaluation of programs and Projects; section 3 deals with the evaluation of E-Learning Project,; section 4 reports the application of the LFA to an E-Learning project as prospective evaluation model; section 5 outlines implications and presents some conclusions for the research.

2. EVALUATION OF PROGRAM AND PROJECTS

The scientific debate on the evaluation of projects becomes more and more interesting in light of the large economic investments in projects and programs, and the difficulty of assessing the genuine and effective economic and social returns. This issue involves the E-Learning sector, as many others.

In general, and as a first approximation, evaluate means to give, recognize, a value in formal, clear and methodologically rigorous way, to a subject (evaluand) [2]. The evaluation as a process nature, being the set of activities related useful for expressing an opinion argued for an aim [3].

Evaluation is the activity aimed to study, evaluate and improve programs and projects in all their important aspects, including the diagnosis of the problem to address, their conception and design, their implementation and management, their effects and their efficiency [4]. Evaluation is a cognitive activity that provide a cognitive feedback to review an action intentionally performed (or intended to), designed to produce external effects, and follows strict and codified procedures [5].

According to the aims of the evaluator, the main objective of the evaluation, the evaluand, the sector/field, the developmental stage of the project, a wide range of evaluation approaches can be identified. On the basis of the developmental stage of a project the evaluation can be: formative (or prospective, or ex-ante), interim, summative (or ex-post). The formative evaluation considers as evaluand the project proposal. It enables to an external evaluator to compare, select, finance a project, but also enables the proponent to review and improve the project. The interim evaluation is aimed to improve the strategy, or the processes during the development. The summative evaluation aims to take lessons, insights, judgment and awareness about taken decisions and projects.

Evaluations can apply to various evaluands, such as products, projects, programs, organizations. The typical evaluand in the field of Education and Learning is the project. The project is a temporary endeavor undertaken to create a unique product or service [6]. From a managerial perspective it is a unique set of activities designed to produce a definite result, with a clear start and end date, and a clear allocation of resources [7] (Bowen, 1996). Characteristics of the project are: complex accomplishment, uniqueness of the output, limited duration, clear and agreed goal, continuous process of planning and control of different resources, interdependent constraints of time-cost-quality [8][9].

All the projects, despite their uniqueness, can be analyzed with a single descriptive model: the Project Life Cycle (PLC). The PLC borrows the approach from the Biology, and describes the project as a temporal sequence of developmental stages, thus providing a frame the analysis and comparison among projects.

Evaluation is one of the PLC's phases. The principal subject of the evaluation of a project are all the results/changes that arise because of the project implementation. The literature converges toward the adoption of a time-based approach to the analysis of this results.

Projects and Programs results can be distinguished in fact, in: outputs, outcomes and impacts [4][10][11][12]. Outputs are the products and/or services carried out from the project implementation. Outcomes and impacts are both effects of the output, that are observable along the time in the project environment or on stakeholders. Outcomes are the specific changes in behavior, in knowledge, in skills, in the state and level of activity/operation of the project target (i.e. participants,

beneficiaries, companies, processes, etc.). Outcomes reveal in the short-term (from 1 to 3 years), or in the long-term (over a period of 4 to 6 years). Impact is the fundamental change, wanted or not wanted, intended or unintended, that occurs in organizations, communities, or systems as a result of a project (it reveals in the long term, within 7-10 years) [11]. A 'cause-effect' relation regulates the mechanism of creation of outcomes and impacts, whose structure can be linear or systemic (complex).

Linearity and Complexity of the cause-effect relations among the results of a project, are quite important, as they distinguish projects from programs; programs differ from projects because programs are focused on the consequences (outcomes) instead of results (outputs) [13]. Moreover a project is usually linear in producing effects, while a program, has not linear relations mechanism between outputs and effects [9].

3. EVALUATION OF AN E-LEARNING PROJECT

Although there are documented evaluations of human interventions dating back to 2.200 BC [14], the issue of Project (and Program) Evaluation became especially important in the United States of America in the 60's, during the period of the social programs known as *Great Society*, launched by Kennedy's and Johnson's administrations. Extraordinary public investment in social programs was financed, but the impact of those investments remained largely unknown.

E-learning is part of a new dynamic that characterizes educational systems in the 21st century, resulting from the merge of different disciplines, such as computer science, communication technology, and pedagogy, since majority of the definitions contained characteristics of more than one discipline [15]. The definitions existing in the literature focus on different elements of e-learning. Four groups of definitions can be identified: technology-driven, delivery-system-oriented, communication-oriented, educational-paradigm-oriented [15].

According to this last one perspective, E-Learning can be defined as "the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services, as well as remote exchange and collaboration" [16]. A value-oriented definition of E-learning, sees it as a broad combination of processes, contents, and infrastructures to use computers and networks to scale and/or improve one or more significant parts of a learning value chain, including management and delivery [17]. E-Learning supports the educational processes utilizing information and communications technology to mediate synchronous as well as asynchronous learning and teaching activities" [18].

Despite the large amount of definitions, reflecting the different foci of analysis, there are still few definitions of E-Learning as *project*, reflecting a managerial focus.

A project of E-Learning can be defined as a temporary endeavour aimed to creating an ICT-based infrastructure, to deliver support services to education, learning, whose effects are detectable along the time, in terms of higher effectiveness/efficiency of learning, wider and higher competences of individuals and organizations, positive impact on social and economic wealth of the beneficiary.

A fundamental role in performing the evaluation of a project is played by the Evaluation Model (EM). EMs are approaches that assist evaluators in designing and carrying out useful, effective evaluations [19]. The terms approach and model, referred to evaluation are often used in an alternative way, although there are some differences in meaning. Evaluation approach is the method, or the mental attitude, or the particular perspective by which the evaluation is gathered, while the model is the description of the structure and/or function of the object it represents.

Many EMs exist. Stufflebeam [20] identified 22 approaches, Linzalone and Schiuma [21] distinguished 57 models.

The E-Learning Project (EP) is characterized by a complex and hard to capture system of results/benefits, due to: intangible nature of the results (learning and knowledge), difficulty of quantifying them in economic, social, cultural terms, heterogeneity of the various benefits delivered. All these criticalities of the EPs requires a higher and better attention to the design phase of the EP, through an ex-ante evaluation able to assess the if the project will deliver the benefits it addresses.

In order to represent and analyze the mechanisms of the system, and allow an explicit, even prospective analysis, through the analysis of the individual components of the project [22][23], it is necessary to capture the ''transformation processes that turn interventions into outcomes'' [23] and thus, make evaluation findings robust, and reach of explanatory power.

The function of the evaluation model is to make clearer the system and allows for more explicit analysis of the project through analysis of the components of the system, which is the promise of a ''white box'' approach. Furthermore, this type of analysis of the inner components and the logic of the system can enable needed analyses leading to improvement of 'theoretical model' of the project [22].

4. APPLICATION OF THE LOGICAL FRAMEWORK APPROACH FOR THE FORMATIVE EVALUATION OF AN E-LEARNING PROJECT. A CASE EXAMPLE.

Internal coherence of the project, is the coherence of the links among the elements of the project, like objectives, sub-objectives, results, effects and transformation functions (assumptions), on which the project rely on, and according to which the project will achieve its objectives and produce its effects. Internal coherence of the project means that the logical and causal links between the different elements of the project (activities, results, objectives) are consistent. The scientific literature recognizes the critical role of the 'internal coherence', in the design phase, for the ultimate success of the project. Internal coherence is a key element of analysis both for the project's funder, and for the applicant organization.

There are different EMs that focus on the internal coherence of the project. Among them there is the Logical Framework Approach [1].
The LFA can be defined as a simple and effective methodology to assess the internal coherence and consistency of a project, through the identification of key management elements (activities, resources, outputs, purposes / objectives), functions (social, technical, economic, environmental, etc.) that trigger the changes (assumptions), and the exploitation of the causal links, through a graphical-textual model that takes the form of a Matrix (Logical Framework Matrix).
According to the Logical Framework a program or a project is seen as a causal sequence of events. Actions to implement it are, in sequence:

a. identification of project objectives;
b. identification of causal relationships existing within the project (the "project logic"): inputs, activities, outputs, specific objectives (results), global goals (impacts);
c. identification of "conditions" or "assumptions and risks" or "external factors" whose presence is indispensable for the realization of the causal chain.

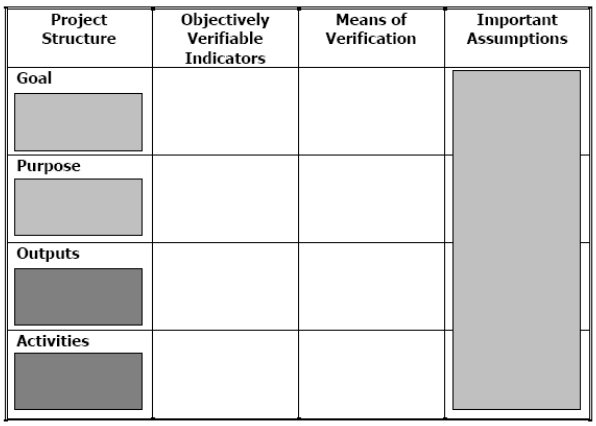

Figure 1: LFM's structure [24]

Once filled the LFM, the project evaluation activity requires to check/assess the coherence activities-assumptions-outputs, then step to the superior level to asses if the causality of outputs-assumptions-purpose is coherent, and so on.

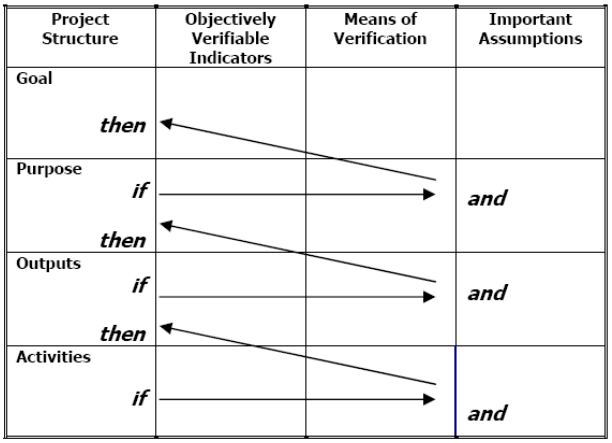

Figure 2: LFM's logic of analysis [24]

The LFM has been used as formative Evaluation model in the development of the proposal of the project BAEKTEL (*Blending Academic and Entrepreneurial Knowledge in Technology Enhanced Learning*, http://www.baektel.eu). BAEKTEL was initiated with the main goal of building an Open Educational Resource (OER) network offering educational materials by higher education (HE) institutions and best practice examples by enterprise experts. The network is conceived as multilingual, which means that resources can be published in different original languages, with adequate support offered for their translation. The conceptual model of the ICT solution for BAEKTEL OER framework envisages a network of nodes offering OER content and a central repository, the BAEKTEL Metadata Portal (BMP), where metadata, providing all important information on the network resources will be stored, thus enabling their centralized search and browse.
The initial network consists of six nodes located at different Western Balkans (WB) universities participating in this project, with one of them hosting the BMP.
BAEKTEL will last 3 years, and involves a Consortium of 9 Universities and 2 Companies.
BAEKTEL is a cooperation project, granted under the European Union development program Tempus IV - 6th Call. The LFA is an approach adopted by all major international organizations dispensing development aid, and among them by the European Commission. The LFA is the mandatory model for evaluation that applicants were required to develop and submit within the mentioned Call. Baektel is an innovative project, the technology platform is implemented on an experimental basis, and is not relevant the analysis of training needs and the courses to be activated, rather the analysis of the experience of learning of users (students and workers).

5. CONCLUSIONS

Kahan and Goodstadt [25] conceive evaluation as a set of research questions and methods properly articulated to review processes, activities and strategies, with the aim of achieving better results; the LFM helped in reviewing the supported in developing and reviewing the project design of BAEKTEL. According to Kahan and Goodsatdt, actually, the LFM developed for BAEKTEL (Figure 3) was undertake following some basic, even coherently linked, questions regarding activities, resources, outputs, Objectives, indicators of achievement and assumptions/ risks. The project has been financed, so up to now it is possible to state that the rigorous understanding of the project's developed by means of the LFA, has been successful against the external evaluation, that is the evaluation administered by the EU Agency that grants the Program. Of much interest will be the summative evaluation, that will allow to understand if, and to what extent, the adoption of the LFA in the designing phase of BAEKTEL has influenced the effects and the impact on users and beneficiary communities (such as Universities, Enterprises, Public Administrations) involved in the EP. The positive response of the external, formative evaluation of BAEKTEL, provide a positive feedback that encouraged the authors to present in this paper, its LFM.

Wider Objective:	**Indicators of progress:**	**How indicators will be measured:**	**Assumptions & risks:**
What is the overall broader objective, to which the project will contribute? - to foster partnerships between HE institutions and enterprises (blending of academic and entrepreneurial knowledge within an OER - publishing of OER by HE institutions, and by experts - improve the quality and relevance of OER - enhance knowledge and experience exchange between universities and enterprises (virtual mobility)	*What are the key indicators related to the wider objective?* - Raised awareness about the knowledge sharing possibilities - Improved knowledge sharing possibilities between universities and enterprises - Increased number of available online courses - Increased number of OER content users - High quality HE available for free	*What are the sources of information on these indicators?* - Through survey among students and enterprise members - User statistics gathered over the BAEKTEL platform - Number of free online courses offered over the BAEKTEL platform	
Specific Project Objective/s: *What are the specific objectives, which the project shall achieve?* - to establish an OER framework for fostering technology enhanced learning (TEL) within HE institutions and life-long learning within enterprises - to provide training for producers of OER materials - to produce course materials	**Indicators of progress:** *What are the quantitative and qualitative indicators showing whether and to what extent the project's specific objectives are achieved?* - Defined procedures and methodology on the creation of OER, in compliance to EU practices. - Increasing number of Academia and enterprise members creating OER content - Increasing number of users of OER content.	**How indicators will be measured:** *What are the sources of information that exist and can be collected? What are the methods required to get this information?* - Test quality of created instructions and their easiness of use through feedback questionnaires. - Survey of the users of the platform (quality of OERs, impact on the learning experience) - Statistical data on OER usage.	*What are the factors and conditions not under the direct control of the project, which are necessary to achieve these objectives? What risks have to be considered?* - Possible lack of interest among Academia members in participation in OER content creation. - Lack of interest among students to invest extra work in learning and knowledge sharing.
Outputs (tangible) and Outcomes (intangible): *Please provide the list of concrete DELIVERABLES - outputs/outcomes (grouped in Workpackages), leading to the specific objective/s.:*	**Indicators of progress:** *What are the indicators to measure whether and to what extent the project achieves the envisaged results and effects?*	**How indicators will be measured:** *What are the sources of information on these indicators?*	**Assumptions & risks:** *What external factors and conditions must be realized to obtain the expected outcomes and results on schedule?*
1. Analysis and review of Open Educational Resources (OER) principles and practice	- Familiarization with the existing EU legislation.	- Progress report and short overview of existing practice and principles pertaining the project.	- Availability and accessibility of legislation defining the practices and principles regarding the OER content
2. Establishing a framework for OER development in WB PC (Conceptual model of ICT solution for BAEKTEL OER)	- Developed detailed procedures for publishing OER - Created software model for BAEKTEL solution. - Acquired necessary H/W, S/W	- The procedure and guidelines document, workshop outcome reports and status report on acquired equipment.	- Coordination of all activities needed for ensuring the agreement on defined policies - Organization and success of public procurement for the equipment and its acquisition.
3. Development of the technological *BAEKTEL* infrastructure (Trained persons responsible for preparation of OER)	- Developed software solution for publishing multilingual OER with search capabilities. - Trained teachers	- Reports from partners on H/W and S/Winfrastructure. - Public accessibility to OER platform. - Reports from trainers(quality of initial created OER) - Number of trainees passed through training	- Ensuring that all communication links and H/W and S/W infrastructure work. - Completion of work on software solution on time by development team.
4. Development of initial domain specific OER content repositories	- Creation of educational and expert materials for OER repositories - Formed a representative learner group (RLG) - Improved content on RLG's feedback	- Availability of published content widely and freely - Feedback from representative learner group - Reports on learner group feedback - Review of the published course materials	- Providing teachers access to learning content - Willingness of teachers and experts in OER quality and production
5. Quality Control and Monitoring	- Created work plan at the beginning of the project. - Production of Quality Assurance reports - Benchmarking of OER against others' EU universities - Inter-project coaching	- QA reports and reports on experience gathered from inter-project cooperation	- Failure to create a quality work plan at the beginning of the project and low interest in collaboration with external members
6.Dissemination	- The project website is created and updated - Dissemination activities for achieving visibility - Student Information days - Round tables are organized	- Review of quality of dissemination materials - Number of visitors of the project's website - Survey of quality among entrepreneurial associates -Number of participants at dissemination conferences.	- Ensuring effective marketing of the project - Interest of the media (media presentations and interviews, open conferences and journal articles)
7. Sustainability	- Developed dissemination and sustainability strategies for implementation at partner universities - Created committees for training and organization support for ensuring continuous inflow of adequate OER	- Reports on defined strategies - Number of members at formed committees - Volume of newly created OER content -Number of participants at conferences and acceptance of the program by new universities.	- Universities, HE authorities and entrepreneurial institutions are willing to cooperate in implementation of the programme
8. Management	- Coordinated project activities and ensured financing. - Organized of coord. meetings - Organized 3 annual project coord. meetings	- Progress reports - Monitoring reports - Final report	- Project team is stable during project life time.
Activities: *What are the key activities to be carried out (grouped in Workpackages) and in what sequence in order to produce the expected results?* - They are reported in a Gantt Chart (WPs; Wp1. Analysis and review of Open Educational Resources (OER) principles and practice, WP2. Establishing a framework for OER development in WB PC, WP3. Development of BAEKTEL infrastructure, WP4. Development of initial domain specific OER content repositories, WP5. Quality Control and Monitoring, WP6. Dissemination, WP7. Sustainability, WP8. Management)	**Inputs:** *What inputs are required to implement these activities, e.g. staff time, equipment, publicity, publications etc.?* ***- Staff working days:*** a total of 2699 days ***- Coordination Meetings:*** 529 days ***- Equipment:*** computers, tablet, network router, server SAN storage,1 video projector, web publishing software, digital cameras, monitor, tripods, microphones, digital pens, Final Cut Pro X, Camtasia Studio, Autodesk Sketchbook Pro, Wacom Intuos5 M, Replacement pen for Intuos, Replacement nibs for Intuos pen, Wireless Router, WEB cameras, scanners, smartboard, server OS software, web conference software ***- Printing and Publishing:*** Report on existing practice and principles, legal and technological conditions; Manual for publishing OER content, Conceptual model of the ICT solution, Training material and educational and expert materials for OER repositories, Student evaluation questionnaires, monitoring reports, Advertising brochures and project promotional material, Materials for coordination meetings ***Other costs:*** External preparation video recording and media preparation		**Assumptions, risks and pre-conditions:** *What pre-conditions are required before the project starts? What conditions outside the project's direct control have to be present for the implementation of the planned activities?* - High commitment by project partners - Risk: low/slow reaction by management offices at the universities - Availability of university management structures for signing the agreements - Availability of staff to support agreed issues - Multi-activity timetabling for planned visits to permit efficient use of resources. - Planned distribution of workloads. - Infrastructure in-place at all partners institutions to permit planned activities to take place.

Figure 3: BAEKTEL's LFM

LITERATURE

[1] Rosenberg, L., Posner, L., *The logical framework: A manager's guide to a scientific approach to design and evaluation,* Practical Concepts Incorporated, Washington, D.C., 1979.

[2] Fraccaroli, F., Vergani, A., *Valutare gli interventi formativi*, Carocci, Roma, 2004.

[3] Bezzi C., *Il disegno della ricerca valutativa*, Angeli, Milano, 2001.

[4] Rossi P. H., Lipsey M. W., Freeman H. E., *Evaluation: A Systematic Approach*, SAGE publications, Thousand Oaks, CA, 2003.

[5] Palumbo M., *Il processo di valutazione. Decidere, programmare,valutare,* Franco Angeli, Milano, 2001.

[6] Project Management Institute, *A Guide to the Project Management Body of Knowledge*, *3rd Edition,* Project Management Institute, Newton Square, Pennsylvania, 2004.

[7] Bowen, H. K., *Project Management Manual*, Harvard Business School Background Note, 1996.

[8] Archibald, R.D., *Project Management. La gestione di progetti e programmi complessi*, Franco Angeli, Milano, 2004.

[9] Cantamessa M., Cobos E., Rafele C., *Il Project Management. Un approccio sistemico alla gestione dei progetti*, Isedi, Torino, 2007.

[10] W. K. Kellogg Foundation, *Logic Model Development Guide*, available at: www.wkkf.org (accessed january 2014), 2004.

[11] W. K. Kellogg Foundation, *Evaluation Handbook*, available at: www.wkkf.org (accessed november 2013), 1998.

[12] Shapiro J., *Monitoring and Evaluation*, available at: http://www.civicus.org/new/media/Monitoring%20and%20Evaluation.pdf (accessed 24 april 2014)., 1996.

[13] Office of Government Commerce, *Managing Successful Programmes: Delivering Business Change in Multi-Project Environments*, HM Stationary Office, London, 2005.

[14] Shadish W. R., Cook T. D., Leviton L. C., *Foundations of program evaluation: Theories of practice*, Sage, Newbury Park, CA, 1991.

[15] Sangrà A., Vlachopoulos D., Cabrera N., *Building an Inclusive Definition of E-Learning: An Approach to the Conceptual Framework*, The International Review of Research in Open and Distributed Learning, online at http://www.irrodl.org/index.php/irrodl/article/view/1161/2146, 2012

[16] Alonso, F., López, G., Manrique, D., & Viñes, J. M., *An instructional model for web-based e-learning education with a blended learning process approach*, British Journal of Educational Technology, 36(2), 2005.

[17] Aldrich, C., *Simulations and the future of learning: An innovative (and perhaps revolutionary) approach to e-learning*, San Francisco: Pfeiffer, 2005.

[18] Jereb, E., Šmitek, B., *Applying multimedia instruction in e-learning,* Innovations in Education & Teaching International, 43(1), 2006.

[19] Stufflebeam D.L., Shinkfield A.J., *Evaluation Theory, Models, and Applications*, Jossey-Bass, San Francisco, CA, 2007.

[20] Stufflebeam D.L., *New directions for evaluation*, no. 89, Spring 2001, Jossey-Bass, San Francisco, CA, 2001.

[21] Linzalone R., Schiuma G., *A critical review of Program and Project evaluation models*, Measuring Business Excellence, Vol. 19, Issue 3, pp. 90-99, 2015.

[22] Dyehouse M., Bennett D., Harbor J., Childress A., Dark M., *A comparison of linear and systems thinking approaches for program evaluation illustrated using the Indiana Interdisciplinary GK-12*, Evaluation and Program Planning, Vol. 32 No. 3, p. 187-196, 2009.

[23] Chen, H., *Practical program evaluation: Assessing and improving planning, implementation, and effectiveness*, Thousand Oaks, CA: Sage Publications, 2005.

[24] Food and Agriculture Organization of the United Nations, FAO, *Project Cycle Management Technical Guide*, retrieved http://www.fao.org/Participation/english_web_new/ 2001.

[25] Kahan B., Goodstadt M., *The IDM Manual: Suggested Guidelines - 3rd ed.,* Centre for Health Promotion, University of Toronto, 2005