To the question of evaluation in open, distant and e-Learning

Maria Pannatier

Abstract:

Nowadays open, distance and e-learning is a growing demand and practice. But at the same time little attention is given to organizing and carrying out the evaluation research of this particular education format by the ODeL educators themselves. The existing evaluation frameworks are being ignored. Moreover, the problems of data collection, assessment and evaluation are rarely put on the agenda in the learning design process. Though still, evaluation remains the equal stage of ODeL design and constitute one of its success factors, if integrated with the implementation stage. The efficiency of implementation of ODeL can be enhanced by continuous assessment and evaluation at each design stage. The stakeholders need to reflect on and be aware of what evaluation means for ODeL, at which stage of innovation they find themselves, why to carry out the evaluation and how, what they would like to know about their ODeL systems, which of the evaluation methods suit best their particular case, what state-of-the-art tools for data mining and statistics analysis are at their disposal. Generally, all these challengers need to be tackled while constructing the evaluation road map that will help to provide the synergy between implementation and evaluation. The paper offers a qualitative analysis of the strategies, principles, methods and tools of the evaluation in ODeL to improve its implementation and performance.

Keywords:

Open learning, distance learning, e-learning, learning design, implementation and evaluation, evaluation models, evaluation tools, evaluation frameworks.

ACM Computing Classification System:

Applied Computing, Computing in Other Domains, e-Learning

Introduction

"Every time we try something new, it is important to consider its value. (Davidson E.J.)"(Ruhe & Zumbo, 2009)

The digital age, open knowledge society and knowledge-based economy stimulate the growth of technological innovations. But is it really, as described by P. Drucker, a «change that creates the new dimension of performance» for education? Are advances in educational technologies efficient enough to make us revise the understanding of teaching and learning – what we refer to as pedagogy? Are we aware of the influence and consequences of the ICTs integration in the learning process? How can quality assurance in education be sustained with and by technologies at all levels and with all age groups? How can the ICTs in education meet the demands and needs of the individual learner, particular field of knowledge, knowledge-based society and modern state, how to engage learners more effectively and develop the 21st century skills for the future employees?

These are the most critical challenges I have always confronted in my previous research and development for technology enhanced and distance learning and like many other practicing educators all over the world have been conscious of and willing to tackle but, unfortunately, was not able to due to focusing on content design and process support issues, lack of analytical tools, professional competence and resources. And these challenges are all about evaluation. So, let us have a closer look at why we evaluate ODeL, what we evaluate and how we evaluate.

1 The essence of evaluation for ODeL

«Evaluation is «the process of determining the merit, worth and value of things and evaluations are the product of that process» (Scriven, 1993, p. 1). «Evaluation is an attempt to judge the worth, value, or quality of something» (Coldeway, 1988). «Evaluation is a process giving attestations on such matters as reliability, effectiveness, cost-effectiveness, efficiency, safety, ease of use and probity. Evaluation provides evidence and evaluative claims with respect to the worth, value and improvement of individuals, programs, projects, services, and organizations (Stufflebeam & Shinkfield, 2007)». (Ruhe & Zumbo, 2009, p. 8)

The design and implementation of ODeL is guided by evaluation. For instance, evaluation activities can determine educational needs (i.e., needs assessment), how to improve a program/course (i.e., formative evaluation), and whether, or to what extent, a program/course has achieved its desired outcomes (i.e., summative evaluation). Evaluation can also determine whether certain standards are being upheld, and thus, can prove very useful in the accreditation process. Evaluation and implementation activities can form a cyclical feedback turn where the results of one inform the activities of the other. In this way, ODeL design and implementation can be continuously improving to meet the needs of an ever-changing learning community.

The first decision to be made is whether to conduct the evaluation in the ODeL design phase or after the ODeL has already run. "Evaluation should be practiced continuously through the design, development and implementation cycles to ensure that things work as anticipated and intended" (Moore & Kearsley, 1996, p. 120),

and evaluation is a critical component of course design (Tennyson, 1997). The best course designers go through several cycles of formative evaluation (Visscher-Voerman & Gustafson, 2004)». (Ruhe & Zumbo, 2009, p. 8)

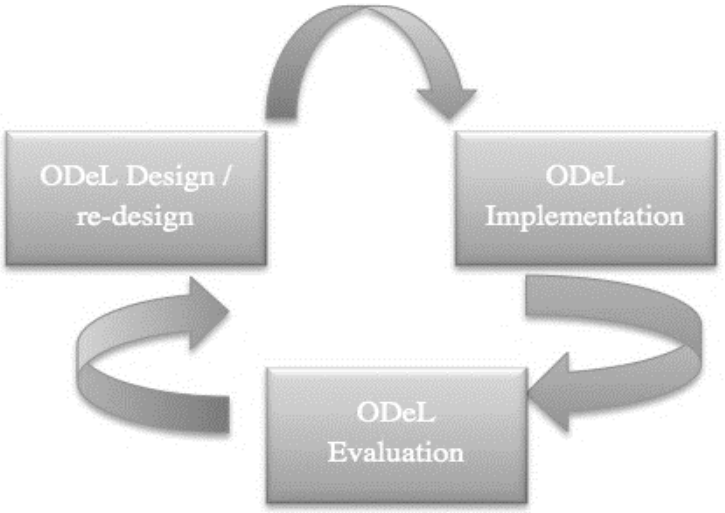

Figure 1. The interdependence of ODeL implementation, evaluation and re-design

2 ODeL and innovation

One of the success factors of ODeL evaluation is considering it as an innovation. When starting to plan the implementation of an ODeL course or a program, it is important to realize that its reception like any other innovation may go through phases from awareness to full integration. Unfortunately, in many cases when developers do not treat ODeL as an innovation, it leads to its implementation failure, ODeL being buried in oblivion or left at the design stage, and what is more, proclaimed as an inefficient mode of education delivery. Those who are convinced of the value of the ODeL program will quickly go through the innovation phases as opposed to others who are more reticent to accept the program and might not get past the phase of awareness. For this reason, the ODeL developers must be aware of all the attitudes, and the purpose of the ODeL implementation must be communicated to the stakeholders.

"Potential users must be aware of a problem that the innovation can solve, be aware of the innovation itself, believe that innovation can solve the problem, be in favour of the innovation, and see a role for themselves in using or adopting the innovation." (Smith & Ragan, 2005, p. 304)

ODeL awareness means ODeL adoption, which is critical to its success as an innovation. The innovation must be widely adopted in order to self-sustain. Within the rate of adoption, there is a point at which an innovation reaches critical mass. Diffusion manifests itself in different ways in various cultures and fields and is highly subject to the type of adopters and innovation-decision process. (Rogers, 2003)

As an innovator aiming for his ODeL program to be accepted and used to its full potential, he needs to use effective methods to convince the stakeholders of the value of the learning process or program. He needs to show the audience how the adoption of this program will benefit them. One way is to identify "potential adopters by adoption category: innovators, early adopters, early and late majority, and laggards. In situations in which persuasion is needed and appropriate, strategic planning of engagements can be based on these classifications. For example, innovators do not need to be persuaded to change because they are doing the innovating; whereas efforts to persuade laggards are not likely to be successful; and early adopters are often the most important individuals to persuade since they are most likely to both accept an innovation and they are also often opinion leaders for the majority." (Smith & Ragan, 2005, p. 306)

3 Evaluation approaches (models[1])

Next, let us have look at the various available evaluation approaches that can help ODeL professionals to improve their ODeL through evaluation when appropriately chosen or applied in a newly developed model. ODeL evaluators need to understand the major evaluation paradigms that shape research methods and evaluation practice. An evaluation model is a set of theoretical concepts that serves as a road map to guide evaluation practice. You would never think of walking to some unknown point without a good map. Similarly, you need an evaluation model to guide you when you evaluate an ODeL course or a program. Without a model, you risk getting lost, missing important information, and being unduly influenced by the conflicting demands of stakeholders.

The evaluation models vary in their relative emphasis. But evidence, values, and consequences as the main dimensions for the ODeL are present in all program evaluation models. Even when one or two are predominant, the others are in the background (Ruhe & Zumbo, 2009). Classic methodologies, for example, bring research evidence to the foreground and ignore values and consequences. Similarly, the accreditation- and management-oriented models emphasize inputs, outputs, and consequences, but values are still implied because these studies usually offer directions for ODeL improvement. Similarly, contemporary models, which affirm multiple perspectives and stakeholder participation, bring values into the foreground, and evidence is in the background. The evaluation models are briefly summarized in Table 1.

4 Evaluation methods

Let us briefly analyze which methods can be used in evaluation of ODeL program no matter whether effectively integrated into its evaluation model or used as a separate evaluation tool (the last is least preferable). Methods-driven evaluations center on an appropriate research design and methodology; the emphasis is on technical quality, not a comprehensive assessment of merit and worth. This category includes **experimental studies, case studies,**

[1] In some literature on evaluation the tem "model" is used to describe the set of theoretical concepts guiding evaluation structure and process, tought usually the terms "approach", "model", "framework" are used interchangeably.

qualitative methods, quantitative methods, mixed-method studies, cost–benefit analysis, accreditation and others. The primary limitation of questions- and methods-oriented approaches is their narrow focus, often a research question, which is not directly connected to a comprehensive assessment of the overall merit and worth of programs. (Stufflebeam, 2001).

Table 1. Evaluation approaches (Roberts, Coutts, n.d.)

1. Historical Perspective *(Guba and Lincoln, 1989)*	• the measurement generation • the generation of description • the generation of judgment • responsive constructivist evaluation
2. Functional approach (*Patton, 1986)*	• formative • summative
3. Approach focused evaluation	• experimental - characterized by the work of Rossi and Freeman • goal oriented - characterized by the work of Popham, Owen and Rogers, Mayne, Dart • decision focused - characterized by the work of Stufflebeam • user oriented - characterized by the work of Patton • stakeholder focused - House, Mertens, Weiss, Roberts • responsive - characterized by the work of Guba and Lincoln and Stake, Pawson and Tilley, Truman, Mertens and Humphries, Dart

Research questions commonly involve cause and effect, such as "Did ODeL result in higher student performance, as measured by means of course grades?". A question may involve multiple variables of cause and effect, such as "What are the various factors that contribute to student retention?" or "What is the relative importance of each variable?" With mixed methods, quantitative and qualitative data are blended to provide an analysis of both outcomes and process. Mixed-methods studies result in greater validity, generalizability, and usefulness than qualitative or qualitative methods alone (Stufflebeam, 2001).

Evaluators' goal is descriptive, that is, to define the significant features of the ODeL, analyze qualitative and quantitative data, create plausible interpretations, and build a comprehensive description of how the ODeL performs. This comprehensive evaluation of ODeL performance will also give recommendations for ODeL improvement. In other words, each ODeL is a case or unit of analysis, and each ODeL evaluation is a case study. The goal of evaluators is to obtain a comprehensive, in-depth "picture" of the ODeL as a working system.

To achieve this goal, they need to:

1. collect data on the chosen aspect or all four aspects of the «unfolding model»[2], i.e scientific evidence, relevance / cost-benefit, underlying values and unintended consequences;

2. use quantitative and qualitative methods as equal, parallel methods. (Ruhe & Zumbo, 2009, p. 106)

As a whole, mixed methods provide the kind of richness, depth, and coverage required for a comprehensive understanding of ODeL. The evaluators will be collecting and comparing quantitative and qualitative data from multiple and diverse sources. By comparing documents with interview and survey data, they can obtain a comprehensive picture of the value of ODeL as it is actually implemented.

Whether an evaluation is focused on benchmarks and usability, or structured around general evaluation questions/criteria/aspects, a variety of assessment tools are available to gather data. ODeL can be evaluated with quantitative or qualitative methods. Use of the online education system can be tracked resulting in usage statistics, as well as qualitative observational notes. For instance, electronic observations can document frequency, types, and content of online communications. Communications can also be monitored regarding the extent to which course topics are discussed, the depth to which these topics are discussed, and interactivity characteristics of the messages.

Table 2: Data Sources (Ruhe & Zumbo, 2009)

Documents	Course outline Course development grant Notes on course history # Committee meeting notes Textbooks
Quantitative data sources	Student records (e.g., grades, attendance) Tutor feedback # Grades and completion rates # Performance tracking statistics
Qualitative data sources	Interviews Focus groups # Transcripts of online discussions Webpage evaluation checklists

Traditional evaluation methods are useful in ODeL education environments as well. Participants can be interviewed by telephone, gathered for focus groups (when possible), or surveyed.

[2] One of the model for online education evluation that presents evaluation methods as as a system and can be easily customised. See Ruhe, Zumbo, 2009 for more information about the unfolding model.

A pre-designed course evaluation instrument such as the Instructional Assessment System (IAS) Online (Office of Educational Assessment, 2002) is a useful tool for gathering evaluation data. IAS Online is a web-based assessment of post-secondary courses through the Internet. A custom online database is created for the instructional program undergoing evaluation, and users may select standard evaluation items or create new items unique to the course or instructional program. An HTML form is another interesting survey tool for obtaining evaluation data. HTML forms, or surveys, can be built into an online course for immediate feedback regarding the medium, content, format, design, and structure of the course. (Balanko, 2002)

Regardless of the types of evaluation methods employed or the scope of the evaluation plan, evaluation activities should be guided by the ODeL national or regional evaluation standards # Table 2. They assist evaluators in designing and implementing evaluations that are useful, feasible, appropriate, and accurate. In addition to being of benefit to evaluators, the standards (frameworks) are helpful for users of evaluation findings to judge an evaluation's quality.

5 Evaluation frameworks

The literature on ODeL evaluation is growing. For ODeL program leaders and evaluators who are developing an evaluation, there exist several basic frameworks for looking at the quality of online environment, courses and teachers, etc. There also is a growing body of theories and studies from which evaluators can draw lessons and adapt methods; evaluators need not reinvent the wheel. At the same time, they must exercise caution when applying findings, assumptions, or methods from other studies, as ODeL programs and resources vary tremendously in whom they serve, what they offer, and how they offer it. What works best for one ODeL program evaluation may not be appropriate for another one. Sometimes the best approach to successful evaluation is being proactive. When considering an evaluation, ODeL leaders should first identify the various stakeholders who will be interested in the evaluation and what they will want to know.

You are free to either choose from a handful of the reviewed frameworks, or decide to develop our own evaluation model for your particular ODeL taking into consideration local evaluation challengers and recommendation. The EADTU E-xcellence Quality assurance in e-learning framework ('EADTU', n.d.) or the UNESCO Institute for Statistics GUIDE (UNESCO Institute for Statistics, 2009) can be considered as a self-evaluation tool to set and monitor guidelines for high-quality ODeL design.

For example, the UNESCO framework uses a holistic approach and four steps innovative model aiming at development of the basic indicators for ICTs in education for their further specification and further development. It uses the methods of development of professional competences in the form of skills and competence matrix. It uses the guidelines for the development of the teachers' ICT competence as its main tool. So, UNESCO with its strategic partners from the ICT industry developed and started to implement UNESCO ICT Competency Framework for Teachers, ICT-CFT. This document is the basis for the development of the national (regional) standards for the ICT competence of the teachers that is considered to be strategically and politically important for ICTs implementation.

As for EADTU E-xcellence, it is a guideline for e-learning quality assurance in higher education.

Quality Assurance in e-learning is a part of EADTU – European Association of Distance Teaching Universities activities and is available for its members and partners. It uses community based and knowledge sharing approach for evaluation based on benchmarking. With its flexible system easily integrated in the existing evaluation criteria as a model it aims at creating the innovative university education quality assurance system focused on ODeL and blended learning quality evaluation. It offers a set of 33 criteria (including sub-criteria and indicators) in 3 main domains (strategic management, content development and content delivery) in the form of implementation of the set of processes aimed at development, monitoring, evaluation and quality assurance of eLearning educational services. It uses such tools as manuals, auditors' notes, online tools (quick scan or full assessment).

6 Challenges and recommendations for OdeL evaluation

Of course, evaluating ODEL is not altogether different from assessing any other type of education program, and, to some degree, evaluators may face the same kind of design and analysis issues in both cases. Still, ODeL program evaluators may encounter some unanticipated challenges in the virtual arena owing, for example, to the distance between program sites and students, participants' unfamiliarity with the technology being used, and a lack of relevant evaluation tools. For example, a limited number of frameworks to help evaluators describe and analyze programs, or tools, such as surveys or rubrics, they can use to collect data or assess program quality. Another common challenge when students are studying at a distance is the difficulty of examining what is happening in multiple, geographically distant learning sites. And multifaceted education resources—such as vast Web sites offering a wide range of features or virtual schools that offer courses from multiple vendors—are also hard to evaluate, as are programs that utilize technologies and instructional models that are new to users.

Furthermore, evaluations of ODeL often occur in the context of a strategically loaded debate about whether such programs are worth the investment and how much funding is needed to run a high-quality program; about whether ODeL really provides students with high-quality learning opportunities; and about how to compare distant and traditional approaches. Understandably, funders and policymakers—not to mention students and their parents—want data that show whether ODeL can be as effective as traditional educational approaches and which online models are the best. These stakeholders may or may not think about evaluation in technical terms, but all of them are interested in how students perform in these new programs. At the same time, many ODeL program leaders have multiple goals in mind, such as increased student engagement or increased student access to high-quality courses and teachers. They argue that test scores alone are an inadequate measure for capturing important differences between traditional and ODeL settings.

So, the following recommendation must be taken onto consideration when conducting ODeL evaluation:

1) meet the needs of multiple stakeholders and choose evaluation approach accordingly,
2) build on the existing base of knowledge,
3) evaluate multifaceted online resources,

4) find appropriate comparison groups,
5) seek if the comparative study is appropriate,
6) solve data collection problem,
7) gather valid evaluation data,
8) take the program maturity into account,
9) translate evaluation findings into action.

7 Learning analytics as a growing field in educational evaluation

According the authors of the edX course on Learning Analytics offered by the University of Texas Arlington "capturing and analyzing data has changed how decisions are made and resources are allocated in businesses, journalism, government, and military and intelligence fields. Through better use of data, leaders are able to plan and enact strategies with greater clarity and confidence. Data drives increased organizational efficiency and a competitive advantage. Simply, analytics provide new insight and actionable intelligence".

In education, the use of data and analytics to improve learning is referred to as learning analytics (LA) and educational data mining (EDM). Analytics have not yet made the impact on education that they have made in other fields. That's starting to change. Software companies, researchers, educators, and university leaders recognize the value of data in improving not only teaching and learning, but also the entire educational sector. In particular, learning analytics enables universities, schools, and corporate training departments to improve the quality of learning and overall competitiveness. Research communities such as the International Educational Data Mining Society (IEDMS) and the Society for Learning Analytics Research (SoLAR) are developing promising models for improving learner success through predictive analytics, machine learning, recommender systems (content and social), network analysis, tracking the development of concepts through social systems, discourse analysis, and intervention and support strategies.

The use of analytics in education has increased in recent years for four primary reasons: a substantial increase in data quantity, improved data formats, advances in computing, and increased sophistication of tools available for analytics. ('analytics_tools.docx', n.d.)

Table 4: LA Tools ('analytics_tools.docx', n.d.)

Data Cleansing/Integration	http://www.pentaho.com
Statistical Modeling (predictive models)	https://www.r-project.org
Network Analysis	http://edutechwiki.unige.ch/en/SNAPP
Linked Data	http://www.ted.com/talks/tim_berners_lee_on_the_next_web.html http://wiki.dbpedia.org
Visualization	http://code.google.com/apis/chart/

8 Evaluation road map

To be successful in ODeL evaluation any educational institution or a program leader needs to decide upon the evaluation strategy and framework applied or introduced, evaluation criteria and tools used, type of evaluation methods applied, the way evidence are collected. All these issues are reflected in the implementation plan that is developed by a team of innovators or a special structure or department for evaluation. It is important that the evaluation report is presented and shared with the all stakeholders including the following parts:

- Brief description of the institution and ODeL, stakeholders involved, aims of evaluation, political and social context.
- Evaluation and implementation strategy and approach.
- Formative or/and summative evaluation preferences.
- Type of experiment, number of participants, etc.
- Justification of the choice of the evaluation model or a framework.
- Evaluation question and dimensions of the evaluation study.
- Outline of evaluation criteria.
- Methods of collecting and presenting data.
- Evaluation tools and sources. Examples of evaluation materials.
- The expected benefit of evaluation and implementation for the ODeL, and development perspectives in an evaluation report.
- Training the evaluators and participants, if needed.

Conclusion

Implementation and evaluation of ODeL are interdependent processes. Highly interactive instructional design that is aligned with student-centered pedagogy forms an effective ODeL. Evaluation activities that assess alignment of pedagogy, educational activities, and desired learning outcomes, plus address specific issues of usability and benchmark achievement, provide valuable information for continual improvement. In this way, evaluation plays an important role in moving the power of ODeL from promise to practice.

However as promising and powerful as ODeL may be, it is important to acknowledge potential disadvantages. Warnings of possible problems should not be overlooked such as compromised higher education values, overestimated usefulness of online technologies, and threats to student literacy and student ethics.

Despite these drawbacks, ODeL does have promise as a fast-growing form of accessible education. It is far too important if educators attend carefully to pedagogy and design when implementing online education. Furthermore, it is essential that evaluation activities inform these practices, as it will result in educational experiences of the highest quality.

The future research agenda in this area is to be focused on presentation and analysis of the case studies and real practices of the institutions implementing this or that evaluation model, on the issues of professional development of educators planning to take up an implementation and evaluation initiatives, as well as analysis of the eLearning standards both national and international available for the evaluators.

References

[1] analytics_tools.docx. (n.d.). Retrieved April 26, 2017 from https://d37djvu3ytnwxt.cloudfront.net/assets/courseware/v1/77e9d8bae4a6934f8614f5189dc0c0c8/c4x/UTArlingtonX/LINK5.10x/asset/analytics_tools.docx

[2] Balanko, S. L. (2002). Review and resources: Online education implementation and evaluation. Retrieved April 26, 2017 from http://concave.stc.arizona.edu/stc/docs/uw/online-ed-imp-eval.pdf

[3] EADTU. (n.d.). Retrieved 26 April 2017, from http://e-xcellencelabel.eadtu.eu/

[4] Richards, G. (2011). Measuring Engagement: Learning Analytics in Online Learning. Retrieved from https://www.academia.edu/779650/Measuring_Engagement_Learning_Analytics_in_Online_Learning

[5] Roberts K., Coutts J. Methods, Monitoring, Evaluation and Reporting of Extension. (n.d.). Retrieved April, 26 2017 from http://www.apen.org.au/images/PDF%20documents/APEN%20Forum07%20papers/Roberts__Coutts___Methods_Monitoring_Evaluation__Reporting_of_Extension.pdf

[6] Rogers E.M. (2003). Diffusion of Innovations, 5th Edition. Retrieved 26 April, 2017 from https://books.google.ch/books?id=9U1K5LjUOwEC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

[7] Ruhe, V., & Zumbo, B. D. (2009). Evaluation in distance education and e-learning: the unfolding model. New York: Guilford Press.

[8] Smith, P. L., & Ragan, T. J. (2005). Instructional design (3rd Edition). New York.

[9] Stufflebeam Daniel L. (2001). Evaluation Models. New directions for evaluation, no. 89. Retrieved from http://onlinelibrary.wiley.com/store/10.1002/ev.3/asset/3_ftp.pdf?v=1&t=j1ypvbmm&s=f586a403098e4b6fc341ed8f0f48a044dfae6921

[10] UNESCO Institute for Statistics. (2009). Guide to measuring information and communication technologies (ICT) in education. Montreal: UNESCO Institute for Statistics.

Maria Pannatier
doctorate candidate
The University of Geneva, Genève, Switzerland
pannatier.maria@bluewin.ch