Evaluating Learning Activities: A Design Perspective

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Abstract

This project outlines an action research project that explores how an Instructional Design department in a single-mode distance education institution can collect formative evaluation on learning activities in online learning environments. A research framework was proposed that consisted of three phases: design, analysis and evaluation. The first phase of the project was conducted to collect learning activity designs, determine the best way to represent them, and capture instructional designers' perceptions of good design. A generic template for representation was developed and will be used to create both a learning activity repository and data collection tools for the next phase of the project.

Keywords: Learning design, learning activity evaluation, praxis

Introduction

In Distributed Learning (DL) environments there is an implied separation between the learner and the learning resources, other learners and the instructor, either by time, distance, or physical space. The *glue* that binds the learning experience together, the learning environment, needs to be carefully designed to create optimal conditions. Attention has been paid to various forms of evaluation in types of learning activities in eLearning environments, (Bernard & Lundgren-Cayrol, 2001; Jahnke, 2010; Lou & Kim MacGregor, 2004) and at the same time there has been a focus on evaluating learning designs and design patterns (Agostinho, Bennet, & Lockyer, 2011). What seems to be missing in the research is a focus on how data that is collected from learners and instructors can be fed back into a process for improving and refining course design in a systematic way. This project aims to combine these two aspects by examining how an Instructional Design (ID) team can develop a meaningful process which uses learner feedback as well as professional reflection to improve their practices, policies and learning activity designs.

This action research project is situated within an instructional design department in an open learning division that develops and delivers over 400 independent-study (print and web-based) and paced-cohort online courses. The Instructional designers (IDs) are responsible for managing the development of all new courses and major revisions of existing courses, and lead teams that include contracted subject matter experts (SMEs), media developers, editors, and technical staff. There has been a shift from designing courses for individual, independent study to online, collaborative environments. This project came out of a departmental need for building formative evaluation tools to help improve the quality of the learning experiences and to more effectively gather feedback on activity designs.

This project focuses on planning, developing, implementing and then revising an evaluation process that will help determine the effectiveness of learning activities, designs and courses. As the online paced cohort model is still relatively new to the institution, the team is particularly interested in feedback on those activities which require interaction between the learners.

Departmental goals

- To develop engaging and meaningful distance learning experiences.
- To create a set of promising design patterns that work in the organizational context.
- To develop a methodology to evaluate learning activity designs/patterns so that they can be improved.

Research questions

- What are the characteristics of an effective learning design?
- What are the guiding principles and rules that the learning design team works within? How can making these principles explicit improve practice?
- Do students see the characteristics of these guiding principles and effective learning design in the courses?
- How do students perceive the value of independent and interactive / collaborative learning activities?

Literature review

Evaluation

The evaluation of learning activities and materials in technology enhanced learning and distance environments covers a wide spectrum of activity, ranging from the granular assessment of individual learning objects to individual course evaluations to extensive program evaluations that occur at an institutional level. At the institutional level, traditional forms of evaluation have focused on factors such as quality assurance, policy, overall impact of a program, context, accountability and other types of measures such as cost effectiveness, completion rates, levels of student satisfaction (of the entire experience) and course grades (Simonson, 1997). Jung (2010) argues that traditional forms of evaluation used by institutions are problematic in that they often overlook the student's perspective. In both face-to-face (F2F) and distance learning higher education environments, course evaluation usually only occurs at the end of a course, and is designed for the most part to measure teaching effectiveness, rather than the course materials. Frick, Chadha, Watson and Zlatkovska (2009) found that though end of course evaluations show a correlation between high course evaluation scores and student achievement, they often do not indicate how teaching can be improved or how learners can better attain course outcomes.

At the other end of the granularity scale, there have been many studies into the evaluation of learning objects and their effectiveness (Akpinar, 2008; Krauss & Ally, 2005). Again, little effort has been made to evaluate how these chunked activities are perceived by learners or used in the learning process. In a 2007 study, Kay and Knaack note that in a review of 58 articles on learning objects, only 11 studies focused on evaluation and, of those, only two examined the actual impact on the learning itself. Noting this absence of research, Kay (2011) developed a model to evaluate what was termed *web-based learning tools* (WBLT, also known as learning objects) using a three-pronged approach, which included learning, design, and engagement. Another research focus has been on student perceptions and practices around certain types of activities, such as online discussions, role-playing, and computer mediated project-based learning, to name a few. These types of studies focus on collecting data from a variety of sources, including student surveys, interviews and content analysis, and often provide recommendations for procedures, design improvements and facilitation. In one example, Beckett, Amaro-Jiménez and Beckett (2010) examined graduate students uses of online asynchronous discussions (OADs) and found that though most students perceived them as useful, they were also often disappointed and frustrated by the lack of teaching presence. Through the findings of their study on computer

conferencing, Bernard and Lundgren-Cayro (2001) developed a matrix that outlined different stages and components of collaborative online learning, which could then be used as a framework during the design process. The results of these types of studies highlight the effectiveness of different pedagogical approaches and can provide a basis for theoretically generated design principles which provide suggestions for evidence-based change. They don't, however, provide a feasible model for evaluating course activities and materials on an ongoing basis as part of constant improvement cycle for change – one of the aims of this project.

Though there is an expansive body of literature on learning design development, very little research specifically targets *evaluating* learning designs or activities, particularly from the learner's perspective. In their Mod4L project report, Falconer, Beetham, Oliver and Littlejohn (2007), outline their use of a wiki for *instructors* to evaluate a set of learning designs. Laurillard (2008) proposes a framework, but again, this focuses on designers, educational technologists and instructors evaluating learning designs, with a focus on pedagogy which, though beneficial, does not include the learner perspective. Noting that many of the evaluation frameworks that have been developed focus on some aspect of the materials, such as intention, use, learning outcome or other, but not all, Bundsgaard and Hansen (2011) propose a holistic framework that focuses on two separate concepts, learning materials (artifacts) and designs for learning (which they define as how these artifacts are then organized and articulated, in space and time, to support learning). Their three-step evaluation approach examines the (a) *potential for learning* (the affordances and challenges of the materials and proposed competencies), (b) the *actualized learning potential* (the potential for learning when the design is enacted as planned for a given context) and (c) *the actual learning* (whether or not learners meet the proposed competencies). They suggest the complex framework be used as a heuristic for design – as a method that could "investigate and demonstrate under which specific circumstances learning materials actually work in real settings" (p.42). Another recent study by McNaught, Lam and Cheng (2011) may also provide insight as their model uses a combination of an evaluative matrix of the learning design, student questionnaires, and an evaluation of student achievement on an embedded authentic task. For our purposes these models might outline a much briefer exploration, and could provide a basis for gathering evidence to validate whether or not a planned learning sequence was actually realized by learners.

The literature confirms that evaluation is an important process, but many of the tools and methods that are currently used are not appropriate for our context because they are either too broad, too granular or don't include a learner perspective.

Design practice

Campbell, Schwier and Kenny (2006) frame instructional design as "an active practice based on community, practical reasoning, personal perspective, and semantic innovation involving memory and leading to action" (p. 15). Instructional Designers need to be flexible and reflexive, creative and structured, and open and responsive to new ideas, technologies, theories and complex situations. As many have pointed out, design is messy, complicated, full of "wicked problems" and often improved through discussion, reflection, and criticism (Goodyear & Retalis, 2010).

How do successful designers wade through this complexity? Early literature on Instructional Design highlighted the use of systematic models such as ADDIE (Analysis, Design, Develop, Implement, Evaluate) or Systematic Design of Instruction (Dick, Carey & Carey, 2001). More recent research has found that designers, particularly those who are experienced, often use a more eclectic and responsive approach to their design tasks. Campbell et al., 2006 argue that traditional models such as ADDIE, restrict the design process rather than foster creative processes and state that "'messiness' should not be a problem to overcome but should lead to a stimulating environment…" (p.15). York and Ertmer (2011) echo their findings, and in their research on ID uses of heuristics found that few experienced IDs mentioned the use of models.

Yanchar and Gabbitas (2010) highlight that current design practice can be characterized as *eclectic*, where in practice designers create a *conceptual toolkit* which includes theory, models, principles and philosophical frameworks used to make decisions. They argue that we need to go even deeper and critically examine what they term *design sense* through a "critical dialogue where there may be a clash of divergent views" (p.390). They suggest through conversations with SMEs, exploration of the literature or, as we are exploring in this project, through direct feedback from stakeholders such as the learners, a 'critical flexibility' can occur within the design team.

So how do instructional designers incorporate this critical turn in their practice? In their research interviews with designers, Williams, South, Yanchar, Wilson and Allen (2011) were told by one participant that "evaluation is dead" and many participants indicated that clients and stakeholders were no longer interested or would invest in summative or product evaluations. Their explorations revealed, not surprisingly, that evaluation is built into all aspects of a designer's practice: "Instructional designers are learners who are trying to help learners while they collaboratively face complex

ecologies and rapidly changing circumstance" (Williams, et al., p.904). In this project we aim to structure and formalize an inherently tacit reflection and evaluation process.

Methodology

We chose an action research approach because educational problems are situated, complex, multi-dimensional, and often related to one's own practice. Effective educational research needs to be iterative and "develop into a participatory and collaborative process of deepening reflection, more controlled and critical practice and the establishment of more educationally defensible situations and institutions" (Carr & Kemmis, 1986, p.185). In this project, we need to go beyond where most traditional research stops, and plan an *action* phase where policies/plans, procedures, and programs emerge (McPherson & Nunes, 2004).

The following project research framework (Figure 1) outlines three distinct phases of research activity.

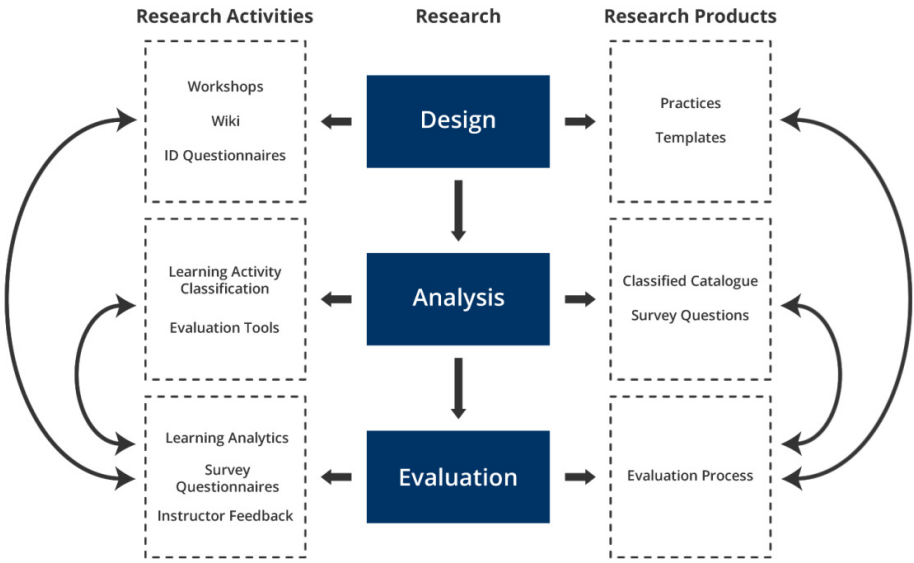

Figure 1. Action Research Framework for three phases of project

1. Design: Determine current design practices
   - Collect activity designs, determine the characteristics, when/why they are successful, facilitator and learner requirements.
   - Create an activity repository and generic template catalogue that allows learning designs to be shared and used with course development teams.
   - Continue to add to the learning activity design repository. This phase will be continuous and iterative and can be built into the professional development practices for the instructional design department.
2. Activity Analysis
   - Using the characteristics outlined in the first phase of the project, create a catalogue of activities that will be evaluated with facilitators and learners.
   - Determine survey questions for evaluation tools, the types of analytics that need to be gathered, and further questions for facilitator/learner focus groups.
3. Learning Activity Evaluation
   - Analytics-activity data from LMS that demonstrates learner and facilitator engagement, activity levels, etc.
   - Activity feedback from the learners and instructors from survey questionnaires.
   - Follow-up with structured feedback from facilitators.

As Cohen, Manion and Morrison (2011) point out, action research is a "systematic learning process ... open to surprises and opportunities" (p.300). Through our systematic approach in each of the phases we have re-evaluated our questions (previous outcomes and literature review), created a tentative plan (what data do we need and how can we collect it) and then taken action (further development of activity templates, development and delivery of questionnaires, workshops).

Data collection methods

We incorporated two methods of data collection: workshops and learner surveys. During workshops with our ID team, we used a wiki to collect data to evaluate good design practice and the effectiveness of learning activities from a designer practice, arriving at some guiding principles for design. We administered learner surveys to all students enrolled in online, paced courses over two semesters (402 students in 31 different courses), asking them to comment on the general course structure and the value of the independent and interactive learning activities. We received 113 student

responses and collated the data (frequency tables, graphs and comments) to share with the ID department. We then held further workshops to engage in a discussion of how to incorporate this learner feedback into future practice and design and to develop templates of successful learning activities. We critically examined Yanchar and Gabbitas' (2010) *design sense* to achieve a *critical flexibility* which would in turn be incorporated into our practice. A follow up survey questionnaire, with five open-ended questions, was then sent via email to get ID perspectives. An open-source CAQDAS software tool, Weft QDA, was then used by the researcher to code the ID responses to look for themes.

Findings and data analysis

Learner surveys

Though the learner data is of great interest in and of itself, and worth a more thorough analysis, as the focus of this study was how an ID team could use this data to evaluate learning design, only a short overview of the results of the learner responses will be included here.

Closed-response questions

As Cohen, Manion and Morrison (2007) suggest, exploratory data frequency tables and cross-tabulations can provide a good overall view of the data. The visual frequency tables tell us that generally the learners feel that the activities in the courses are contributing to their learning, are relevant, well organized, well-spaced and a good use of their time, thereby exemplifying the guiding principles and characteristics of good learning design identified by the ID team. The tabular data provide the frequency of responses, but it is also interesting to look at percentages, and the visual representation provided in Tableau©, gives a better overall sense of the trends in the data and allows the user to manipulate the data, isolate the responses for specific courses, or groups of courses (by program or major), and then compare and contrast the data between categories.

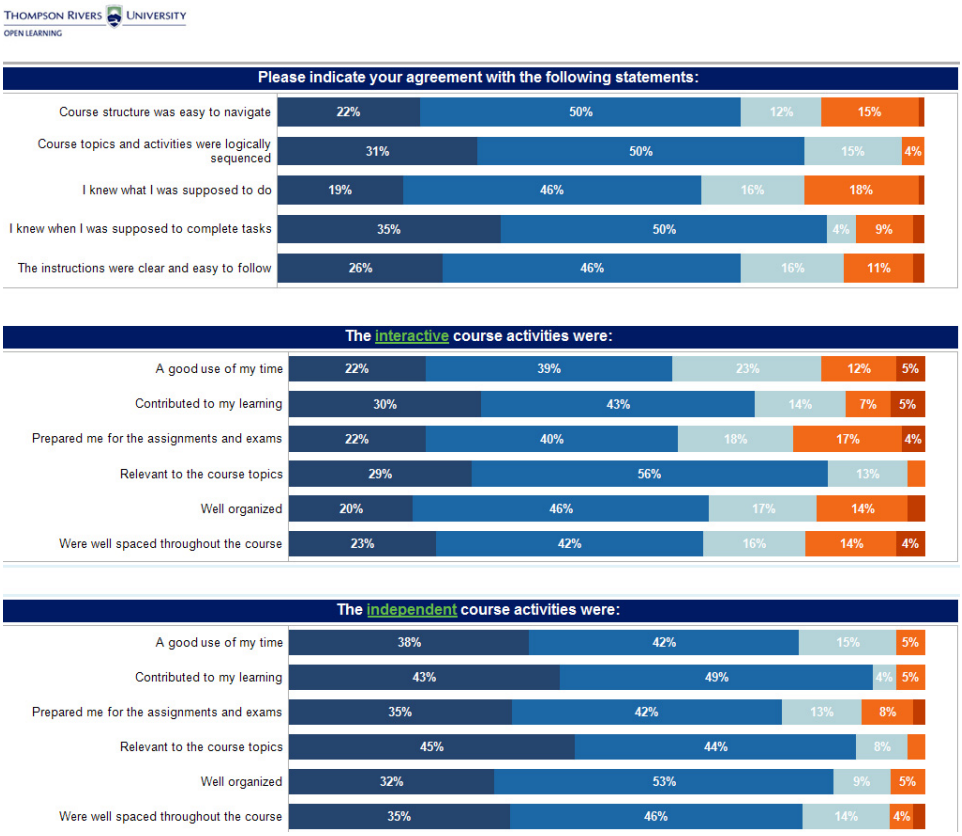

Figure 2. Dashboard view in Tableau©, showing overall frequency percentages of student responses.

Overall we can see that most respondents *Strongly agreed* or *Agreed* with the statements about their courses. Interestingly, learners were more positive about the relevance of the independent activities vs. the interactive activities. There were no *Strongly disagree* responses for the independent activities, and a higher percentage of students rated these positively (SA or A, 84%), than the interactive activities (69%). If you compare only the statements "Independent/Interactive activities were a good use of my time" you can see a significant difference – 80% positive responses (SA and A) for independent activities vs. 61% for the interactive activities. To determine the underlying causes of these differences, we would need to probe more deeply, which is reflected in the ID responses to the data (discussed further in the next section). However, these responses raise questions about the perceived value of interactive activities and could have an impact on future design, leading the ID team to be more

explicit about the nature and value of collaboration or to be even more selective about the inclusion of these activities.

Open-ended questions

Learners identified course structure (sequencing, clarity of instructions, pacing/timing) as strengths, reflecting the IDs own guiding principles. They also saw the following activity types as most useful: linking, formal assessments, discussions, reading, applied, reflective and independent. Interactivity was also seen as a valued part of the courses.

Paradoxically, when asked to comment on the least useful activities, learners included course content (course topics, workload and resources often commenting about there being too much work or content) and interactive (discussion forums, group projects) and reflective activities.

What stood out for most of the IDs was that the most comments, both positive and negative, were about interactivity. Learners were polarized on whether or not they found discussions, group projects and group tasks, such as problem solving, a good use of their time. Though not a surprising result, it is a topic that many of the ID participants identified as needing further exploration

Values of current design practices

On average 75% of learner respondents felt that the courses met their needs, they knew what they needed to do, and the activities helped them meet their outcomes. In viewing this frequency data, both in the workshop and then individually, the IDs reported that overall they felt this indicated our designs result in good quality courses.

In the questionnaire Instructional Designers were first asked to reflect on what the data revealed about core design values. The following principles were highlighted by more than one designer:

- Clarity and Organization – clear instructions, logically organized, well sequenced, well spaced activities.
- Relevance – activities are relevant and tied to learning outcomes.
- Variety – blend of individual and interactive activities, there is a value placed on interaction.
- Student focused – cognizant of student workload issues.

- Awareness – of instructor impacts, workload and requirement to communicate design intentions.

As one participant highlighted, the ID group value the following:

> *"Consistent instructions, activities and assignments, logically sequenced design, relevant, interspaced, well organized activities which build skills or prepare students for the assignments, inclusion of activities which promote student interaction."*

This isn't surprising as our team consists of a core group of experienced professionals, all of whom have been educators for a minimum of ten years. In a recent review of the literature on design principles, MacLean and Scott (2011) echoed some of the above elements of a learning design cycle which includes ten steps, many of which are included in the above core principles list: needs analysis, learning outcomes, course structure (sequencing, organization), specify content, overall design (mapping to learning outcomes), students and tutors (supported by induction procedures), assessment strategies, development (coordination of team), implementation (plan for maintenance and management, accessibility), and finally evaluation (strategy).

Conclusions and reflection

The learner questionnaire data provided the IDs with insights into processes and student perceptions of the courses. This data give a preliminary impression that the ID team's core design principles are resulting in courses that are clear, well organized, relevant, have a variety of interactive and independent activities and that there is an awareness of student workload and instructor requirements. ID responses indicate a shared interest in personal and departmental improvement through sharing, discussion, reflection and planned creative action (*praxis*, as defined by Smith (2011)). Almost all the ID responses had reflective elements or ideas for improvement. As one participant highlighted,

> *"I think the best practice in any profession comes from praxis, the application of a theory or idea within a field of practice, analysis of that practice, reflection, improved application, etc…This type of study promotes this type of continuous improvement."*

The ID team was willing to engage in what Yanchar and Gabbitas (2010) call *critical flexibility*, characterized as a type of practice-oriented inquiry, *the antithesis of habit*, that can help designers "avoid complacence…and seek a deeper, possibly transformed, understanding of what they do and why they do it" (p.319).

This research signifies initial steps to build a formative evaluation process that will provide direct feedback on the learning activity and designs. A need for more specifically targeted data was identified, as IDs were interested in how learners perceive and interact with certain types of activities (i.e. group projects, or a series of online discussions), as well as in sequencing and discipline specific issues.

Future goals

In reflections on the learner data, the ID team identified some core design principles. These can now be used, along with the other factors that were outlined as areas of interest for change (processes, practices, outcomes), to develop a formal set of core principles for guiding design practice. The learner feedback data was shown to be an important factor when reflecting on practice, as designers examined their basic assumptions about what and why activities are successful, but other factors, such as those that can outline how to improve processes (sharing with colleagues, developing activity templates) will also need to be taken into consideration when building a reflective model for change. Williams et al. (2011) support the notion that there is value in formalizing the implicit evaluation tasks that IDs perform in their everyday practice, stating "A willingness to identify and negotiate with stakeholders, perform needs analyses, conduct pilot tests, modify based on feedback, and complete other activities associated with more formalized evaluation could facilitate the process of producing quality instruction, even when formal evaluation was not feasible" (p.905).

This research project has also had an effect on policy and action, informing a new process for evaluating learning design at the course level. This research survey has been revised and is intended to be administered to students after a course has been offered the first time. Instructional designers will combine this information with feedback from the Open Learning faculty member who facilitated the course and a review of learning analytics from the learning management system. Designers will use this information to make revisions to improve the quality of the course and the learning experience.

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