Using Instructional Design for Faculty Development in a Post-Secondary, Technology-Enhanced Environment

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This article presents a straightforward instructional design framework that stresses the alignment of learning *outcomes*, learning *activities*, and *evaluation/feedback* (Berge, 2002). It focuses on student learning rather than instructional input and can be used in most, if not all, disciplines. It is phrased in language familiar to most faculty who have taught in classrooms. The model encourages faculty development and the continuous improvement of faculty members' skills in designing their *own* courses, rather than turning instructors into professional instructional designers or keeping them dependent on the design expertise of others.

In higher education, the most common model for course development involves faculty designing and redesigning their courses themselves, sometimes with the help of technology resource persons. At the very least, teaching and learning using technology requires a different type of course presentation compared to in-person classes. Technology can serve as a catalyst for redesigning the whole teaching and learning environment, not just the course materials. The role of the instructor, the instructional methods used, and learners' practice activities must often be changed to take advantage of a particular delivery system's characteristic strengths. For instance, online learning is well-suited for communications, collaboration, and information acquisition, but not for reading long text files (ION, 2003).

The important questions regarding technology-enhanced education are not those that focus on the technology, although those are important. The most important questions that should be asked are about what constitutes good teaching and learning. It is with this in mind that technology professionals involved with faculty assistance and development can use a straightforward instructional design model to guide faculty interested in using technology in their teaching to examine and answer for themselves questions that they may not have considered in the past. Faculty members often do not have the philosophical or practical knowledge regarding the systematic design of instruction to have asked or answered these important questions. This article presents a model of instructional design that was developed to assist faculty to structure or restructuring their own courses using technology for teaching and learning.

Instructional Design in the Service of Faculty Development

Instructional design is a discipline that employs systematic processes involving the use of learning and instructional theory to insure educational quality and optimal student learning environments. General principles of learning and instruction are translated into plans for instructional materials and learning activities (Willis, 2003).

Faculty Development

From the faculty perspective, in most ways, faculty development is self-development. At the heart of the effective improvement of teaching is an ongoing process of self-evaluation and obtaining feedback from others. Realizing this, universities often have faculty development programs, sometimes housed in libraries or university information technology service departments, that offer assistance to faculty members in achieving their goals (Kennedy, 1999). The stated purpose or mission of these faculty development programs includes goals to meet the needs for tomorrow's classrooms and to support excellence in teaching (Kolbo & Turnage, 2002). Technology is becoming a larger part of 21st century learning, and it has an important role in both online and in-person teaching.

On university campuses, a large part of faculty development involves activities directed at course development. A major part of the job of a faculty development professional is to consult with faculty members, to assist them in organizing course materials and their own thinking about teaching, and, more particularly, to do so in terms of student learning. Whether it is the first time a faculty member has

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thought seriously about teaching a course, or it is a veteran instructor rethinking one of his or her courses, an opportunity exists to improve teaching and learning.

The faculty development professional often has to help the faculty member articulate how the course materials will be presented and specify how students will interact with course resources, the instructor, and with other students. The faculty development specialist brings to the table his or her theoretical and practical knowledge about online learning and teaching. The faculty member knows the subject matter and often has experience with the student audience and where in the scope and sequence of the course content students persistently have problems with concepts or processes. Each person brings essential components to the course development process.

Focus on Key Principles First

Professional instructional designers often have the skills and knowledge to use a broad range of quite sophisticated design models when developing instruction. There are hundreds of available models (see, for example, Ryder, 2003), some focusing on behaviorism, cognitivism, or constructivism, and they are presented at various levels of detail. The focus of this article and the design model it describes is on faculty development, and on the continuous improvement of the faculty members' skills in designing their *own* courses, rather than turning each instructor into someone having the same skills as a professional instructional designer. A fairly straightforward design model has been developed that stresses alignment of learning *outcomes*, learning *activities*, and *evaluation/feedback* of the learner (Berge, 2002). It is phrased in familiar language that most faculty who have taught in the classroom can easily understand. The framework presented here works with both technology-enhanced learning environments and non-technology environments. But it is our experience that movement toward technology, in the form of blended or online courses, is the main reason faculty members seek assistance regarding course design or redesign.

Deciding on how much instructional design language to include when consulting with faculty takes some experience and skill. Sometimes, faculty are interested in the theoretical background and rationale for the model; more often, they are just looking for something that is not unnecessarily complex to use that will work consistently for them, and that is close to processes they are already using. A large part of the faculty developer's task is to persuade instructors to talk about how they are currently teaching their course or how they teach in the classroom, to determine their teaching style and what they consider their responsibilities as teachers to be. When teaching and learning is moved online, for example, faculty roles change (Berge, 1996) and part of a faculty development person's job must be to determine how best to assist faculty with those changes. Embedded implicitly or explicitly in this process are fundamental principles that generally work, regardless of the faculty member's educational philosophy. For instance:

- Faculty want to feel competent in what they are doing and have a desire to improve their teaching skills.
- Instructors should provide clear guidelines for three kinds of interaction: student with content, student with other students, and student with instructor.
- Well-designed discussion assignments facilitate meaningful cooperation among students.
- Students should present course projects.
- Instructors need to provide two types of feedback: information feedback and acknowledgment feedback.
- Online courses, in particular, need frequent deadlines and checkpoints to assist students to pace their learning through a course.
- All assignments and practice activities should be relevant and contribute to student learning outcomes.
- Challenging tasks, sample cases, and praise for quality work communicate high expectations.
- Allowing students to choose project topics incorporates diverse views into courses, and especially with online courses.

The above includes modifications of Chickering and Gamson's (1987) "Seven Principles of Good Practice in Undergraduate Education" made by Graham *et al.* (2001) for online courses. Depending upon the individual faculty member, some of these principles may be emphasized more than others, but all are based on a half century of educational research (Chickering & Reisser, 1993) and have served as a framework to help faculty members improve their teaching practices.

An Outcomes-Based Model for Course Development

The model presented here can be used to plan a half-hour workshop, a 10-minute piece of computer-based training, or a 16-week course. This is because it focuses on providing a structure and framework into which almost any content can be placed. Since this model allows faculty who are designing their own courses a lot of latitude in their choices, instructors do not feel that the course design and development process hampers their creativity or academic freedom. Therefore, it meets a lot less resistance than more complicated models framed in instructional design terminology. This model is also consistent with the tenets of *Outcome-Based Assessment.* Increasingly, many applied disciplines, such as engineering, business, accounting, and health care professions, are being called upon by industry and others to instruct

students in doing specific tasks that will be faced in the workplace. Such specific instruction calls for specific assessment. Outcome-based assessment is one of four components of an educational process that includes:

(1) *Defining educational targets*—outcomes definition;
(2) *doing things to achieve the targets*—helping students reach outcomes (teaching);
(3) *checking to see that targets are being met*—assessment (outcome-based assessment); and
(4) *changing* actions to ensure that targets are being met or, in some situations, modifying targets so they are achievable—responding to assessment results (Zundel *et al.*, 2000).[1]

The model presented here divides the course design process into five aspects and, while described in a linear fashion in this article for clarity and convenience, it actually represents an iterative process. These aspects are:

- Performance/Outcomes
- Course Resources
- Practice Activities
- Interaction
- Assessment/Feedback

The accompanying worksheet (see Figure 1) is divided into five columns that represent each of these aspects. The following sections describe the elements of the model in detail.

Performance/Outcomes

Performance outcomes provide students with a clear statement of measurable performances that will be required of them at the end of the instruction. Outcomes at the course level are often cumulative, with the final result being the sum of meeting a number of interim performance outcomes. These interim outcomes are often written for each session or module of a course and can be assessed individually or when demonstrated as part of a final assessment event. Performance outcomes assist faculty in the design of their instruction, as course design should begin with the *end* in mind. The choice of learning resources made available to the students, the practice assigned to the students in the application of the concepts they are learning, the kinds of interaction assigned, and the choice of appropriate assessments are all aligned with those outcomes.

Learning outcomes are statements that specify, in measurable or observable terms, what students are required to demonstrate (i.e., to know or do) at the end of a sequence of instruction—a learning session, course, or program. The terms "learning outcomes" and "performance outcomes" are used interchangeably in this model, with the caveat that learning must be expressed by observable performance of some kind. One difficult concept for faculty to grasp is that learning and performance outcomes describe a course of study in terms of the learner's gain or output, rather than in terms of the instructor's teaching or input. Learning outcomes are stated at the beginning of a course of study, and students then acquire knowledge and practice so that the outcome assessment measures the students' mastery of those performance outcomes.

Instructors commonly state objectives in terms of ensuring that a student "understands" or "appreciates" a particular topic. Understanding and appreciating are cognitive activities, so are difficult to see or to measure. How will a student know, and demonstrate, when he or she has reached an acceptable level of understanding or appreciation? How will the instructor know, or not? On what can feedback be given to the student? In a properly stated performance outcome, the student may be asked to perform some action, describe/perform a process, identify and distinguish between several different elements, compare two opposing views, reflect on personal experience, use specific cognitive or manual tools and/or equipment, explain a concept, redesign an object, evaluate some data, or use or derive an equation. There are a number of action verb lists that can be consulted when writing performance outcomes that translate cognitive outcomes into observable performances (see, for example, Kizlik, 2003).

Course Resources

These are all the "content resources" that students will have to assist them in the accomplishment of their learning tasks. Resources can be in any form of media, such as paper (textbooks, readings etc.), video/audio, or electronic. They can also include the instructor, other students, their fellow workers, or family members, and can be in the form of processes and procedures that they learn and will apply. These may be processes such as how to solve equations, how to conjugate verbs, how to debug a C++ program, or the components of a business plan and how to build one. Not all resources need to be provided by the instructor; it is an excellent learning activity for students to seek out and share their own resources.

It is often useful to list separately as resources many of the items that have traditionally been considered as learning activities. Why? Because students are acquiring raw materials from which they build intellectual, motor, and affective knowledge and skills they will use during their practice to reach the performance outcomes.

[1]While we realize some authors draw distinctions among some or all of the following terms, for our purposes here, "outcome-based assessment" includes assessment concepts such as "criterion-referenced," "competence-based," "performance-based," and "competency-based" (see Graziano *et al.*, 2000; Zundel *et al.*, 2000).

Performance Outcomes	Course Resources	Practice Activities	Interaction	Assessment
What do you want students to demonstrate they have learned to do; how and how much?	What are the resources that students will have to work with? (Textbook, readings, videos, etc.)	What and how do you want students to practice, using the Resources to meet the Performance Outcomes?	What interactions would allow students to demonstrate movement toward performance objectives?	How will you and the students know that the Performance Outcomes have been met?

Figure 1. Planning worksheet.

Information is "course content"—raw material found in resources such as books, videos, lectures, or interactions with others. In and of itself, information has little value to a particular student, unless that student uses the resource to build something, including intellectual structures (through practice), or to *do* something.

Processes and procedures are not what most instructors think of as resources but as instructional outcomes. The acquisition of processes and procedures is, however, not the final endpoint in instruction. At work there are a myriad of "how to" processes and procedures to be learned and applied. These are resources for a worker, and some can be applied across applications, or used to extrapolate from one application to another.

The same kind of process learning occurs in a college classroom. What is the process for analyzing character and plot in short stories? What is the process for creating a lithograph? What is the procedure to follow "to prepare a stained section for microscopic examination?" What procedure do you follow to solve quadratic equations? What process do you use to estimate the load-bearing strength of steel beams? Students learn the process steps by observation, personal study (reading or watching a video), or some other method. Still, the knowledge acquisition precedes using the process to achieve some ultimate outcome.

Practice Activities

Students need to practice the application of the knowledge they are gaining. This practice should be in the same forms as their final assessments, and may mark successive steps to that goal. Student learning falls into two general levels: "learning to be" and "learning what and how" (Brown & Duguid, 2000). Learning to be a member of their discipline involves using appropriate vocabulary and problem-solving methods to address issues of concern to their discipline. This can be accomplished by instructor-planned discussion, papers, reports, case studies, and by working alongside faculty in an apprentice mode.

Learning "what and how" involves learning to correctly manipulate the tools, both material and cognitive, that are common to the student's discipline. This can range from practicing writing memorandums and reports using specified content and formats, performing medical procedures, creating financial and risk management plans, designing and building computer chips, etc. Consistent practice in the style of their final assessments allows both students and faculty to monitor learning during the semester and provides early warning of misconceptions or learning difficulties.

Students need to practice using processes and procedures if they are to be learned. This sometimes starts with hygienic instances—the tidy problems in the textbook. As skills and knowledge develop, the cases can be scaled up to very untidy, real-life problems. Other instructors like to start out with authentic, messy problems, helping students to solve intermediate problems as they are discovered. Either way may work, depending on the student characteristics and other factors. Try both until experience can guide the design.

Sometimes practice activities are intellectual processes—how to think through a problem, for instance, or how to take and react to a particular ideological stance. Students can be given problems to solve and "show their work," or they can be asked to take one side in a debate, or write a paper from a particular viewpoint. To develop a case for or against an issue, inquiry requires students to critically think about and research various points of view other than their own. In many practical and applied courses, this is easily addressed. A process that a student must learn may be to "develop and print black and white film in the darkroom." So where does the student practice? In the darkroom! If a student is required to learn how quenching works with metals, and the effects of different temperatures and quenching mediums, where do they practice? In the lab! If students are required to learn sociological principles, where do they go after they have read the book and watched the video? Into their lives and their memories to see if they can match theory with practice.

In an Economics class that was held in a medium-sized classroom of about 50 on Mondays, Wednesdays, and Fridays, the professor typically lectured and worked problems on the whiteboard, providing students with process resources. As a part of their out-of-class assignments, small teams of two or three students gathered online to work and discuss problems based on what had transpired during the in-class demonstrations. A graduate assistant held "office hours" online for several hours in the evenings Tuesdays, Thursdays, and Sundays. She was available (in a real-time chat room) within the LMS (learning management system) that was used for the class to answer questions about assigned problems and readings, or to help with overcoming difficulties the study teams could not resolve in a reasonable time themselves. The students were practicing, among other things, the application of the process that had been demonstrated to them, and they had to create their own process as well.

Interaction

Interaction, especially in the form of discussion (Brookfield, 1986) is a learning activity, so it should be deliberately planned into a course. One of the instructor's jobs is to provide an environment, or forum, where readings and other activities can be discussed. Students can rehearse their understanding and ask questions in relative safety from embarrassment or harm that might be found in the workplace. This is also a place where students can practice the language of

their discipline, making vocabulary tests unnecessary. Students should be required to use the language and terminology of their discipline correctly, both in the way questions are asked and by following the instructor's modeling. When using the design model worksheet for planning interaction, the questions that become the key discussion starters are listed. If the students are going to interact with each other in teams or groups, these are identified too, along with other activities they will be doing. For instance, in online learning, discussion is particularly important because, in contrast to a classroom course, in an online course a silent student is totally invisible.

> The curriculum of an online course should be designed to cause dialogue among the students. During online discussions, the participants collect information and send it to the virtual classroom for comments, critiques, and more discussion. In order to generate this type of information, students must actively seek out the required material. The synergy of the discussion is itself a learning tool. With that in mind, much of the information presented to the class can come from the participants themselves. (ION, 2003, n.p.)

Through discussion and interaction with others, the students share their experiences, try out different ways of looking at their own experiences and those of others, and explore multiple perspectives and views that often conflict with their own. They can practice the discipline-specific cognitive problem-solving methods they are learning, and express the results in the language of their discipline.

Assessment/Feedback

The questions being asked of the faculty member who is designing instruction include what type of assessment is going to allow the students to demonstrate that they have acquired the competences[2] or attained the performance outcomes for the course. Is student learning going to be assessed at the middle and/or the end of the learning semester? Will students be assessed continually by assigning graded homework, quizzes, or tests, or will they be assessed using a portfolio or final project, or in some other way?

Structuring feedback is a key component to designing effective instruction. Feedback can take the form of instructor-to-student, student-to-instructor, and student-to-student interactions. The more opportunities for feedback in all these forms throughout the learning process, the more opportunities students have to assess their own performance and to make changes in their learning or performance strategies.

[2]Performance is directly observed. Competence is inferred from performance.

It is critical to make sure that assessments and practice activities are congruent. There is no point in having the students practice in ways different from those that will be used for their assessments, or to practice that which will not be assessed. If students are learning a manual process, for instance, a pencil-and-paper test may be used to determine if they know the steps in the process or the appropriate applications of the process, when to use that process instead of some other, and the criteria for choice. But, if it is a manual skill they are to acquire, then they must at some point demonstrate it manually (such as setting up a piece of equipment).

Students' critical thinking/understanding/learning can be assessed in the tangible products of cognitive activity, such as what they write and post in the discussion conferences, and in other written assignments. The instructor cannot see what is going on inside the students' heads until they make their learning manifest in some way. So, the instructor must design specific assessments—write a paper, develop a plan, document a process, make a video of specific performances—that allow the students to demonstrate they have acquired the competence designed into the course.

Feedback used as assessment permits students to correct their practice and, often through successive approximations, more closely match the standards and expectations set for them by the instructor, or set for themselves. The goals of feedback may include some or all of the following:

- ensuring accuracy of content acquisition, performance, and understanding;
- providing guidance, coaching, and modeling of the learning goals;
- facilitating social interchange and building of relationships;
- increasing student motivation and maintaining the focus of the learning activities;
- providing evidence for certification of credit; and
- providing information helpful for improving the course now and in the future (Berge, 2002).

Feedback is dependent on interaction. Both feedback and interaction are central to meeting the *expectations* of teachers and learners in education and therefore are primary goals of the educational process.

Using the Worksheet

Keep in mind that part of the faculty development professional's job here is to work himself or herself out of a job. The focus is on helping faculty members with the skills necessary to return to designing and developing their *own* courses. Still, if done properly, faculty members know that they can seek the advice from the development consultant in the future, and often do, when other instructional design or course development questions arise.

The worksheet (see Figure 1) can be used at any level in the course design process, but it is usually wise to start with performance outcomes at the course level, and then proceed to individual course modules.

Instructors are first asked to talk about how they are currently teaching the course, what it is they believe the students should take away with them, and what students should be able to demonstrate they can do. It often takes some time and patience in talking with each instructor, with the faculty development professional making notes on the board, to begin to translate what the instructor is saying into the terms of the design model. Much interpretation occurs along the way. Many faculty do not know how to think in terms of performance objectives, and matching resources, practice activities, and assessment to those objectives. It simply is not part of their vocabulary. They tend to think in terms of syllabi, assignments, and covering a set amount of course content during the learning time period, whether in a classroom or online.

As the faculty development consultant explains and works through the model with an instructor for one (or several) of the performance outcomes at the course level, it does not take long before the instructor begins to change his or her thinking pattern. The most important role for the faculty development professional is to point out and reassure faculty that much of what they are already doing fits within the model. Having instructors work through at least one of the course level outcomes for themselves, and discussing it with the consultant as they proceed, provides an opportunity for the instructors to obtain feedback regarding their newfound understandings. It is not just a mechanical process of teaching instructors how to fill in the columns on the model's worksheet, but rather it is often a process of changing the way faculty think about the way they organize teaching and learning.

Conclusions

Discussion between an instructor and the faculty development consultant regarding what students must demonstrate to the instructor and themselves to show their mastery of the course performance outcomes is a key to effective course development. The instructor needs to decide what students should be able to *show* that they can do after the learning event. Faculty can then focus on what activities will make the learning meaningful, relevant, and transferable. Aligning the learning activities and assessment with those performance outcomes is the secret to effective planning in course development. This is true for any instruction, regardless of where it is delivered, or by what means.

Technology has become an important part of today's classrooms. By definition, online education is impossible without technology. To the extent that faculty members rely on technology, as part of their vision for improving their teaching, faculty development efforts must help instructors consider and rethink the course design methods that they use. It is often technology, in the form of online education, that brings faculty members and educational technology and faculty development specialists together to discuss instructional design, thus improving the student's learning experience. □

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