Beyond The Flipped Classroom: Redesigning A Research Methods Course For e^3 Instruction

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ABSTRACT

The "flipped classroom" has gained in popularity as a new way to structure teaching in which lectures shift from in-class events to digitally-based homework, freeing up class time for practice exercises and discussion. However, critics note such a teaching strategy continues emphasis on the less effective techniques of the lecture as transmission-based knowledge dissemination. They urge rethinking from single instructional tasks to learning environments that promote not just assignment goals but also knowledge application and broader learning outcomes. What do we want students to be able to do? Instructional design is a formal body of theory that has years of testing and evidence for effectiveness that may provide a framework for re-envisioning course design. A 2013 book by M. David Merrill, First Principles of Instruction, attempts to examine the body of instructional design theory for commonalities and develop a set of general principles and processes that can guide the development of such learning environments for instructors. The emphasis is on project-centered learning with a focus on students applying knowledge in ways that "reverse" action from the end of a course to the beginning to implement effective, efficient and engaging (e^3) learning. This paper examines some of the key principles and provides an example of e^3 implementation from a research methods class.

Keywords: Flipped Classroom; Instructional Design; Course Development

INTRODUCTION

The flipped classroom is a new buzz word for improving instruction that has gained attention through major reports and multiple examples showing it can improve student learning as well as increase student engagement (Bergmann & Sams, 2012; EDUCAUSE, 2012). The premise of the flipped classroom, also sometimes referred to as the inverted classroom (Houston & Lin, 2012; Lage & Platt, 2000; Lage, Platt, & Treglia, 2000), is to use technology to move in-class activities to outside the classroom. As most commonly proposed for higher education, the flip means moving lectures from the class to pre-class homework, while reserving class time for having students do the problems and exercises that have traditionally been the domain of out-of-class assignments.

A common assumption in the flipped classroom is that new technologies make it easy to convert instructor lectures through digital recordings and place these online for student access outside of face-to-face class time (EDUCAUSE, 2012; Tucker, 2012). As a result, students can review lectures in advance of class, then have class sessions for working together on the assignments that traditionally would have been done as homework. Not only are students seen as gaining through working together on "homework" problems in class, but instructors are able to more quickly see where students are struggling and provide remedial support.

Advocates argue that by using class time for student discussion, collaboration and problem-solving, the traditional lecture-based mode of instruction can be replaced by a more student-centered learning that is not only more effective but also achieves larger goals of 21st century skills (Bergmann & Sams, 2012). The increased emphasis on higher order thinking, team work, and problem-solving are seen as critical components in modern

learning theory (Bransford & National Research Council, 2000; Pink, 2006; Willingham, 2009). The flipped classroom is gaining support at all levels of education, including in primary, secondary and post-secondary classes.

However, critics have argued that the flipped classroom as most commonly applied in higher education does not go far enough to replace teacher-centered lessons with student-centered instruction (Manjinder, 2012). Despite the difference in what happens inside classrooms, too often the instruction remains centered on teacher lectures, a passive or transmission form of education that assumes the teacher has the knowledge and must communicate it to the learners (Tucker, 2012). One analyst argued that flipping "is simply a time-shifting tool that is grounded in the same didactic, lecture-based philosophy. It's really a better version of a bad thing" (Ash, 2012). Further, some have pointed out that recorded lectures may be little more than the traditional assignment of reading a textbook, now enhanced through modern technologies (Mackice, 2012). Instead of reading for context, students absorb content through audio and, in some cases, visuals of a talking head or outlines from presentation software (Sadaghiani, 2012). Students learn through the words of experts, be these textbook writers or their own instructor.

An additional issue opponents raise is that assignments often remain unchanged from those used as homework in the past other than the timeframe in which these are completed, failing to fully embrace collaborative learning and authentic assessment (Tucker, 2012). The same lectures and assignments from the traditional classroom remain and the "new" teaching does not require any significant effort to implement. As a result, the reform is an easy and comfortable substitution for many traditional instructors, perhaps one reason why this teaching strategy has so quickly become a fad despite limited research to show its effectiveness or sustainability (Henderson, Dancy, & Niewiadomska-Bugaj, 2012; Strayer, 2012).

By contrast to the flipped classroom, a number of educators have argued that in an information age, instruction needs to be more radically revised from the traditional lecture/transmission model of learning (Pink, 2006; Tucker, 2012), a goal not currently central to the popular conception of the flipped classroom model. Among the recommendations are for more student centered classrooms, authentic assessment, and problem-centered tasks as well as the application of technologies that promote not only content discovery but communications and knowledge creation (Michael, 2006; Tucker, 2012; Zhao, 2012). At the same time, newer research on learning differences between experts and novices argues against a simple transmission from the expert instructor to the passive novice student ready to receive wisdom (Bransford & National Research Council, 2000). Beginners in a topic lack the mental models with which to incorporate advanced concepts and may also have preconceived ideas placing obstacles to new learnings. In discussing the flipped classroom, Manjinder (2012) stated, "Years of research have proved that an individual's ownership of new knowledge comes through constructive, productive, creative activities, not through passive consumption of instructional tutorials or reading textbooks. By the same token, step-by-step instruction and instructional consumption are necessary for some subject matters at some stages of knowledge development" (np).

In the few studies that have emerged of flip teaching, the reports note that the where positive learning differences are seen is when changes occur in the uses of classroom time (Deslauriers, Schelew, & Wieman, 2011; Henderson, et al., 2012; Prober & Heath, 2012; Strayer, 2012). These are changes that go beyond flipping lectures for simple exercises and practice problems typically assigned as homework. The researchers particularly point to applying what is knows from research-based effective practices. This argues for more extensive remodeling of instruction as part of flipping the classroom. As Musallam, a popular spokesperson for the flipped classroom, noted, "It's a thing you do in the context of an overarching pedagogy…not the pedagogy itself" (cited in Ash, 2012).

The simplistic application of the flipped classroom to move from in-class lectures to pre-recorded online videos is in one sense another headliner for how technology can change teaching without sufficient attention to the complexities of classroom dynamics or the diversity of learners (Cuban, 2001; Manjinder, 2012). Gerstain (2012) argues that, "for educators, who are used to and use the didactic model, a framework is needed to assist them with the implementation of the Flipped Classroom." She goes on to say, "The Flipped Classroom offers a great use of technology - *especially if it gets lecture out of the classrooms and into the hands and control of the learners.* As it is being discussed, it is part of a larger picture of teaching and learning" (np). Such concerns suggest that the design of instruction has a greater role to play in developing contexts for learning that move beyond the lecture as the central strategy of pedagogy to more thoughtfully developed learning environments that recognize the intricacies of

learning. Within this context, the remainder of this paper discusses ways systematic instructional design can be applied to improving the learning environment more generally and thus strengthening the picture of the flipped classroom.

INSTRUCTIONAL DESIGN AND COURSE DEVELOPMENT

Systematic instructional design (ID) provides a framework that can help faculty visualize new learning environments empowered through technology (Enkenberg, 2001). Rather than focusing on single teaching strategies such as digitally-rendered lectures or online homework exercises, ID is a holistic approach to envisioning learning environments with foundations in the learning sciences and promoting instruction aimed at accomplishing learning and performance goals (Richey, Klein, & Tracey, 2011).

Formal understanding of instructional design can be helpful for faculty who are more often experts at content than at pedagogy, despite the recognition that knowing how to teach is as critical to supporting student learning as is content knowledge. Shulman (2000) refers to the bases for teaching as pedagogical knowledge (how to structure knowledge for learning) and pedagogical content knowledge (understanding how students learn–or often misunderstand–a particular content area). While many how-to guides exist for improving college classrooms with ideas such as flipped classrooms or other current fads, few have the history and testing over time provided by instructional design, particularly with its roots in adult education rather than the more traditional fields of educational studies associated with children and schools (Ross & Morrison, 2012). Instructional design principles can help put the experiential learning of an individual's good teaching practice in context, allowing for faculty self-reflection and teaching improvement.

Instructional design has a long background in higher education, but more often because of the use of professional instructional designers who work with faculty content experts to redesign courses, at present particularly for online and distance learning. For many educators outside the discipline, ID is associated with older modes of instructional development such as "programmed instruction" from the field's earlier history, but newer models have emerged that offer more contemporary approaches (McArdle, 2011). These models emphasize student-centered learning based on real-world contexts and learning goals while applying insights gained from research-based instructional strategies and learning theories premised on findings from brain research. As part of the larger field of educational technology, instructional design is also premised on applying technologies to enhance the learning process.

ADDIE as a Mental Model for Course Design and Redesign

Instructional design is the term used both for the discipline that studies effective and efficient educational approaches as well as the for the process of designing learning environments (Hodell, 2011; Reiser & Dempsey, 2011). As a process, the most basic model for design is commonly referred to as ADDIE, comprised of analysis, design, development, implementation, and evaluation.

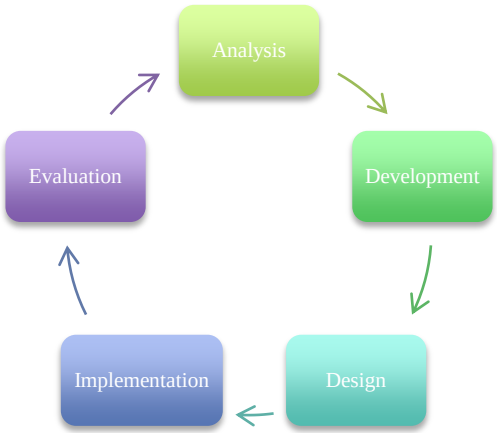

Figure 1: ADDIE Model for Designing Instruction

Like all models, ADDIE is a simplification of a complex process but provides rapid insight to key elements needed in design, with an emphasis on initial analysis of learning goals and then moving through a process that in the end demonstrates those goals are met through student assessment. While the "E" for evaluation occurs at the end of ADDIE, evaluation is a component at every level with continual testing of the instruction for efficacy at each stage of development, and implies an iterative process of using feedback to improve instruction through continual redesign.

While ADDIE provides a big picture of instructional design, the stumbling block has often been the detail needed by a designer to create the actual learning tasks and select appropriate teaching strategies and resources. Recognizing that careful design and development of a course, unit, or learning environment is a required step in ADDIE is not equivalent to knowing what to do or how to put it together. As a way to address this issue, Merrill (2013) has proposed a set of basic principles for design that will lead to what he calls "e^3," or effective, efficient, and engaging learning that can be applied not only by trained instructional designers but practicing instructors as well.

Merrill's work, embodied in his 2013 book *First Principles of Instruction: Identifying and Designing Effective, Efficient, and Engaging Instruction*, is a compendium that re-examines and consolidates the large body of instructional design theories. These principles operationalize design in ways that make sense to those who are practitioners, including those involved in direct instruction. Further, unlike many earlier instructional design models, Merrill's e^3 instruction contains explicit advice for how to work with content, going beyond basic application of pedagogical strategies and technology applications found in many how-to manuals. Merrill argues that the primary problem for educational professionals is "how to recognize [efficient, effective, and engaging] instruction and how to revise existing instruction or design new e^3 instruction" (p. 5).

Foundational Principles for Problem-Centered Learning

Merrill's model is centered on the idea that students learn through doing, with instruction providing increasingly challenging problem-solving events resulting in content learning as well as student independence in applying this in real-world and complex contexts. Five principles are foundational to the e^3 instructional model. As he notes, learning is promoted when learners:

1. Acquire knowledge and skill in the context of real-world problems or tasks;
2. Activate a mental model of their prior knowledge and skill as a foundation for new skills;
3. Observe a demonstration of the knowledge and skill to be learned;
4. Apply their newly acquired knowledge and skill; and
5. Reflect on, discuss, and defend their newly acquired knowledge and skill.

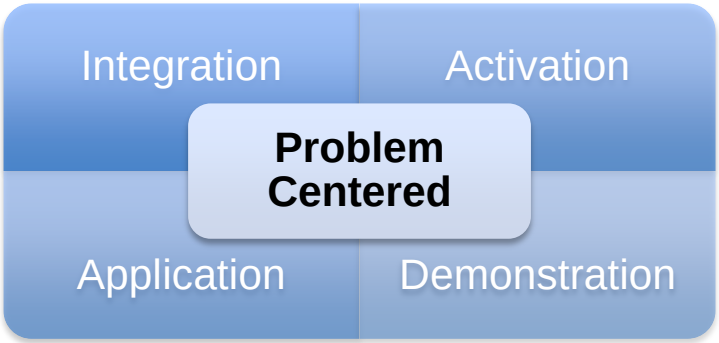

Figure 2: E3 Learning Design, Based on Merrill (2013, p. 22)

Designing Supports for Learning through Pedagogical Strategies

In Merrill's perspective, design centered on problem-solving isn't just about "flipping" classrooms so lectures are out-of-class experiences. It is about reversing the order of instruction so that problems are central and used from the beginning of a course implementation. He argues against the standard approach of presenting theory

and basic facts first and out of context with later application only after initial knowledge is mastered. Unlike many educational reformers, he does not denigrate the use of lectures as a teaching strategy but positions these as one strategy among several essential to framing the problem-solving exercises.

What particularly differentiates Merrill's model from others advocating problem based learning is an explicit process of providing scaffolds to learners to ensure they are learning foundational content within the problem-solving process. In e3 instructional design, he responds to critics of open, exploratory learning (i.e., Kirschner, Sweller, & Clark, 2006) in recognizing scaffolding is needed by beginners. He calls this teacher directed instruction because of intentional design, not because teacher lecture is the center of delivery.

He describes instructional strategies in terms that are easy to understand: tell, ask, show, and do. Tell is information presentation, whether this is lecture or other forms of transmission; ask is practice to help students remember information; show is demonstration to portray action; and do is apply information to the portrayal of the application. These strategies are then linked to content which he describes within categories to deconstruct topical knowledge into meaningful chunks, including information about, part-of, kind-of, how-to, and what happens.

Similar to the ADDIE model, Merrill suggests the design process as a "pebble in the pond," occurring in ripples of interrelated steps and increasing complexity for learners. After problem identification, he recommends designing a progression of problem portrayals from simple to complex, then identifying the component skills at each level. Teacher directed strategies are enhanced though student discussion, peer sharing, collaboration and critique. The design is finalized by identifying supplemental resources, including applying technologies and multimedia, with assessment and evaluation at each stage in the portrayals. Through the use in a course of increasingly complex problem portrayals, he suggests a trajectory of intentionally decreasing supports that increases student independence in problem-solving. In his book, he outlines these steps in greater detail, providing checklists and examples to help practitioners apply these concepts.

Flipping the Classroom through Intentional Design

Merrill (personal communication) has provided brief examples of his version of a "flipped" classroom in his lectures on e^3 learning, including one in which he proposes revising a two-sequence business course aimed at helping students develop business plans. In the original course design, the first semester was spent learning about business plans and what makes them effective. Students examined existing plans and learned from lectures and readings, then developed their own plan in the second course in the sequence. Merrill suggested a redesign in which the students engage in business planning from the beginning, with increasingly complex portrayals of the process from a plan for a simple family operation to a major business enterprise including production and distribution operations. The planning begins with teams approaching the same problem and sharing results, culminating in individual plans and peer critiques in the second semester course. Further e^3 examples in Merrill's book cross multiple disciplines and range from redesigning a single unit to considering a whole curriculum (Merrill, 2013).

The remainder of this paper explores an actual instantiation of e^3 design applied in the context of a graduate course on qualitative research methods developed by the author. This is a brief case study focused on the reversal of assignments to increase student action.

EXAMPLE FROM A QUALITATIVE RESEARCH METHODS COURSE

Research methods courses provide a particular challenge to instructors, with multiple studies indicating students enter with approbation or "fear of research" (Coleman & Conrad, 2007). This is further problematic when such courses are required as is typical in many social science disciplines, particularly at the graduate level. Multiple studies show that this combination typically results in low student end-of-course evaluations for the instructor, and may not provide deep enough learning for the students to implement what is taught when the course ends (Sizemore, 2009).

This brief case study looks at the redesign of a required qualitative research methods course for graduate students in education at the University of Hawai'i at Mānoa. The e^3 process is used as a way to illustrate some of the

central issues in development as well as show the positive responses from students the change elicited. This redesign was part of an iterative process in which multiple approaches had been tried in earlier semesters based on reported research, none of which were fully satisfactory in terms of learning achieved or student evaluations of the course. By applying the concepts Merrill (2013) proposes, the resulting course received the highest student ratings of any research course taught over the previous seven years of teaching research methods by the author.

Issues in Designing the Qualitative Research Methods Course

The overall goal of a methods course is to develop student expertise in qualitative research so that each is able to carry out a study independently by the end (Schutt, Blalock, & Wagenaa, 1984). Debates exist about the best approaches (Wagner, 2011; Wiggins & Burns, 2009), with many courses primarily sequenced through the steps of research design, data collection, and data analysis, often ending with an assignment to write a research proposal (Goussinsky, Arie Reshef, Yanay-Ventura, & Yassour-Borochowitz, 2011; Onwuegbuzie, 2012). Many standard qualitative textbooks are structured for this normative sequencing, starting with the big concepts that are foundational such the ontology and epistemology, then moving through the steps of defining research questions, choosing one among many qualitative methodologies, understanding primary qualitative data collection strategies, and knowing in general data analysis, often focused on constant comparative data coding (Roth, 2006).

This seems like a logical approach, following the standard model of scientific research design, but as those who have taught a similar course have learned, without the big picture of how these elements fit together, beginning researchers have a hard time putting the separate steps together to develop their own coherent research design. Further, to get all the material covered in a single semester course, the steps of and options for data analysis, perhaps the most critical piece for making sense of qualitative data, is often barely covered because it comes last. This scheduling often means analysis is given short shrift by the time other topics are covered, yet understanding analysis is obviously critical to a finished research plan. In general, interpreting results and linking these to research questions is then barely included in course design at all, often with the idea that any student who will use qualitative methods should take an advanced course to learn analysis later. This is in contrast to the typical quantitative course where statistical analysis forms the central component of instructional content.

The proposed solution by some instructors is to implement a more action or experiential assignment in which students not only learn about research but actually carry out a qualitative research project, often in groups and of their own design (Hockett, Mardis, & Hoffman, 2006; Hurworth, 2004). Of course, the challenge is that to complete such a study requires time that is often too limited for a meaningful project to be outlined and carried out, particularly by novices who are unfamiliar with all the elements needed to do such a project when they are starting. Many instructors who have tried this find the research is shallow and lacks evidence of deep learning of qualitative methods, often consisting of a few interviews and descriptive, common sense codes that could have been found even without the research being done. This is further complicated by student preconceptions, insufficient knowledge of how to connect results with conclusions, and lack of understanding that models of research design are more complicated when put into practice in the unsystematic social world, so that students need to learn connections within the elements of research design as much as specific skills and knowledge (Cooper, Fleischer, & Cotton, 2012).

Setting Up and Scaffolding the Problem

A first challenge in the redesign of the qualitative course was carefully rethinking what the students should achieve given the time constraints of a single semester, as well as a heterogeneous group of students whose previous experience with research courses ranged from none to a couple. Given previous disappointments in trying to have students design and carry out a real-world study, putting this as an initial problem-centered activity that would require all semester to complete was clearly too big, made more complex and drawn out when adding ethical constraints including institutional IRB approval of human studies. While Merrill argues for looking at what an instructor wants students to do, he also notes that the problem portrayals have to be carefully sequenced to increase complexity as students gain skills and knowledge while gradually releasing control from teacher directed to independent action. Starting with a task that is too difficult for novices to achieve is not the objective in this flipped scenario.

Rather than using a complete research design as the end-point, the redesign focuses on a thorough qualitative analysis and write-up, in some ways paralleling the way students learn statistics. The course was set up to begin with analysis rather than ending with it. This requires recognizing that the starting exercise will cause some level of challenge and frustration with no expectation that it will be at an expert level initially. Supports not only required building content knowledge across the course about qualitative methods, but also acknowledging the potentially negative affective component when novices approach an unfamiliar task.

The problem-centered portrayals designed for the course thus revolved around the analysis of real-world data, focusing on a large dataset of open ended responses from a large-scale survey collected for the University's strategic planning process. The data content allowed students to apply knowledge of a setting familiar to graduate students, the university.

Class Projects in Practice

After an overview of the class structure and timelines, students were immediately introduced to a task of data coding. Their first analysis began with a single demonstration by the instructor as well as out-of class readings to provide foundational knowledge, explicitly not following the order found in the course textbook. The course required careful instructor input to reduce frustration when asking students to stretch by coding so early in the semester. Lecture was not excluded but only one strategy and provided more as a just-in-time informational session rather than long explanations of methods and theory prior to any hands-on research. These short lectures were recorded but more for the potential of review after class than as a substitute for reading and online discussion before in-class work. Ask strategies were also used to get students to think more deeply about the resources they had explored.

The scaffolding also included "show me" real examples from research, linking to resources both required and optional to ensure students are getting basics from textbooks and primary research sources as well as web sites with how-to hints that could be explored as needed. The instructor shared materials generated from her previous research studies and described how these were developed. As the semester progressed, students added to the resource pool with helpful articles and web-based sources shared with classmates, as well as suggesting tools that could be used in qualitative analysis.

Portrayals began with group analyses of small sets of the survey data, with coding compared and reviewed by the class through group and whole-class discussions. Each problem iteration used larger chunks of data, more class discussion examining issues of inter-rater reliability, and finally independent coding. Students learned not only methods but processes important for collaborative research. They also experienced the challenges faced by all qualitative researchers in interpreting and simplifying complex real-world social communications into patterns of meaning. Through discussions and revisions, the class developed a codebook for use with the large dataset from the University survey. The results of their analysis were incorporated into a written report summarizing survey open-ended responses by major themes. Their work was used in the development of the final University Strategic Plan, for which the class received an acknowledgement in the official institutional document (University of Hawai‘i at Mānoa, 2011).

With the "flipped" sequencing of putting analysis, verification, and conclusions as the starting point for learning, students were well prepared to return to the issues of design and data collection, having a richer understanding of the how and why of setting purpose, asking questions appropriate for qualitative study, and determining what methods of data collection support different designs. In the last part of the semester, the students carried out their own data collection strategies on small samples then used these for analysis and discussion, exploring how different questions and different ways of gathering data might impact conclusions. The reverse sequencing focusing on the end point rather than teaching design in the order in which it might normally be performed by an expert allowed students to come to a more holistic understanding of research design in which they could see relationships among the steps and really understand where all the effort was leading. They not only understood the normative process of qualitative research described in methodology textbooks, but had a taste of the real-world complexities that face researchers when collecting data in the emergent social world and interpreting the results.

Positive Outcomes and Lasting Impacts

From an instructor viewpoint, observations comparing this and previous classes indicated that the "flipped" instruction using e^3 strategies led to an increased understanding over student learning in other semesters. Students were excited by the work and consistently completed assignments going beyond minimal requirements. They came to class with meaningful questions about the intent of qualitative research and the kinds of issues that are normally the domain of experts around purpose, quality and generalizability of qualitative research. Discussions moved beyond facts to debates about best approaches and alternative solutions. Lasting impact was seen in increased comfort in carrying out qualitative research with many developing small pilot projects after completing the class, more rapid ability to master concepts for those who continued with an optional advanced qualitative class, and ultimately in improved dissertation research designs.

Student comments in evaluations indicated excitement in contributing to a real-world research project at the University while acknowledging that there was more to learn. They noted increased incentive to excel because they were not judged solely by a teacher but through the real-world contribution they were making to the institution's very public strategic planning process. Many indicated they planned to take an optional advanced course to continue to learn more ways to use qualitative research and a wider range of approaches. With 17 of 19 students completing end-of-course evaluations, the averages for questions relating to objectives understood, course organization, quality of assignments and instructional materials, effectiveness of class discussions, and self-assessment of student accomplishment of objectives was 4.9 on a five-point scale for each item, with all students indicating they would recommend the course to others. As one student noted, "I like the professor's teaching strategies. They look light but very deep." All indications were that the course achieved the goal of effective, efficient and engaging instruction.

CONCLUSIONS

Improving university teaching is not a simple process, and quality will not be achieved merely by time-shifting lectures and exercises which by themselves have been shown as relatively weak strategies to promote deep learning (Rohrer & Pashler, 2010). A flipped classroom becomes more effective when it involves rethinking assignments and what students should be able to do (Tucker, 2012). Course redesign can incorporate more active learning and real-world assignments, as suggested by the example of the qualitative course described above. Rather than accumulating knowledge as is often done in traditional qualitative courses, the exemplar showed that by "flipping" the assignments with a focus on outcomes and skill application, student learning and satisfaction increased.

While many faculty are able to improve their teaching over time through self-reflection, attending professional development workshops, and dialogue with colleagues, Ball and Forzani (2009) have noted that the teaching role is a complex dynamic that goes beyond informal telling and showing. As they indicate, "Although learning can occur without teaching, such serendipitous learning is chancy. The practice of teaching comprises the intentionally designed activity of reducing that chanciness, that is, of increasing the probability that students will attain specific intended goals" (p. 459). They go on to stress the intentionality of teaching, stating "teaching involves identifying ways in which a learner is thinking about the topic or problem at hand, to structure the next steps in the learner's development, and to oversee and assess the learner's progress" (p. 499). More than imparting content, excellent teachers establish a learning environment in which outcomes are planned, scaffolded, achieved, and measured. They propose that to improve teaching in this intentional way, there is a need not only for professional development and research on teaching, but a common language to describe instructional events and strategies and share successes.

Given such a "lack of shared taxonomy and language for the core practices of teaching" (Ball, Sleep, Boerst, & Bass, 2009, p. 459), Merrill's e^3 instructional design with it careful delineation of both strategies and general principles can provide a common framework to begin discussions of teaching events and processes (Merrill, 2013). Research which will support the efficacy of Merrill's work is in its infancy, with positive case studies such as the one included here as well as a sampling of others in the book. However, given such positive early results, e^3 instruction provides potential for helping instructors re-examine course design and provide the kind of teaching that will empower students to act on the world with their knowledge and skills. The highly specific recommendations,

checklists, and examples provided in Merrill's book are the tools instructors have needed to change the teaching paradigm.

AUTHOR INFORMATION

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