Linking User-Design to Traditional ISD Models

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This paper begins to lay out the relationship between user-design and traditional ISD models by explicating the specifics of the practice of both. A discussion of the similarities and differences between the two constructs is followed by a more direct comparison of the processes involved in ISD and user-design. The challenges associated with user-design for the traditional ISD practitioner closes out the paper.

Keywords: ISD, Design, Systems Theory

Problem Statement

Definitions of Instructional Systems Design (ISD) practice and Performance Technology (PT) have varied widely through the last decade. From our roots in B.F. Skinner's behaviorist prescriptions for instruction and Gilbert's Performance Engineering (1978) concepts, we have progressed far to reach the introduction of constructivism (Jonassen, 1991), performance technology (Stolovitch & Keeps, 1992), feminist pedagogy (Maher & Tetreault, 1994) situated cognition (Brown & Duguid, 1994) and the learning sciences (Carr-Chellman & Hoadley, 2004).

Examples of the broadening of the field of ID are many. The seminal *Handbook of Human Performance Technology* (1992) points out that diverse non-instructional interventions should be considered when trying to improve overall human performance in any organization. The recent edition of Dick and Carey and Carey's *Systematic Design of Instruction* (2005) includes consideration of issues such as contextual analysis--a critical concept in systemic change. Over the past decade, there has been a shift from a more narrow focus on training and instruction to a broader consideration of various interventions and cultural contexts (e.g., Land & Hannafin, 1996; Henderson, 1996; Gayeski, 1995; Rowland, 1994, Dick & Johnson, 1993). Despite this expansion, much of the literature in the field continues to focus on efficiency of human learning, instruction, and performance. Our traditional models of ISD maintain a sense of linearity and closed boundaries. While efficiency seemed an appropriate value in the industrial era, it is becoming increasingly obsolete in the information age where dynamic change in organizations continually forces the integration of new and innovative technologies and processes into the workplace. Because of this dynamism, innovation adoption rates cannot be hampered by less-than-enthusiastic users. Moving through stages of adoption such as those suggested by Rogers (1995) or Bhola (1977) in models of innovation is time consuming to the point that a new process or innovation often comes just on the heels of the adoption of the previously "new" process or innovation. This creates frustration on the part of the user and confusion about his or her place in the broader system. The frequency with which these changes are occurring is exacerbating an already less-than-perfect adoption process, causing anxiety and frustration--which can lead to sabotage of the innovation or a loss of human potential because of high turnover rates.

User-design offers an alternative approach to change which allows for continuous processes, lower turnover, increased engagement, and democratic ideals. This paper defines user-design and makes some initial comparisons to traditional approaches to instructional design and change. There are a number of serious issues to consider for any HRD professional embarking on a user-design initiative including the context and culture of the organization, leadership openness, ability to handle conflict productively and so forth. Bela Banathy was among the first to use the term user-design as applied to education. And the empirical evidence while scarce, indicates that while user-design is relatively expensive in terms of the design cycle, it pays off nicely during the adoption cycle (Carr-Chellman, Cuya & Breman, 1998). The basic ideas behind user-design do not naturally "fit" with what most people understand as traditional ISD models. This paper will begin to establish explicit connections between these two constructs so that HRD professionals can put the ideas of user-design into immediate use, whether as a full blown user-design effort, or just a little user-empowerment within more traditional ISD processes.

Theoretical Framework

User-design extends stakeholder involvement beyond mere input to create empowered users who have design and decision-making powers (Banathy, 1991; Carr, 1997). This is perhaps its most critical feature in terms of

differentiating user-design from other forms of user-input—that is the power dynamics change much more substantially in user-design than in any other form of user engagement with the possible exception of Frierian emancipatory models. User-design honors the front-line users as the most powerful designers in the system, rather than considering all stakeholders at approximately equivalent levels of influence (Carr-Chellman, Cuyar & Breman, 1998). It is naïve to assume that merely putting all stakeholders into a room together will somehow eliminate or equalize the power dynamics that are already at play in our culture. Thus, the school board member holds more power than the teacher, and the teacher more power than the parent and so forth within a public school arena. And to even complicate matters more, we cannot simply understand power as attached to simple titles or positions within a system. Indeed, opinion leaders may hold significant power in ways that initially allude the casual observer. We may be surprised to discover a wealth of power residing in the support staff, janitor or lunch lady when we expect to find it in the manager's office. Thus, we need something more, something that actually addresses the underlying natural power dynamics present in all groups of designers and stakeholders and proactively tackles some form of power redistribution. The approach in which stakeholders are more than just "involved" in change and design is often referred to as *User-Design* by systemic change theorists (Banathy, 1991; Reigeluth, 1993; Jenlink, 1995; Carr, 1997).

And so, user design for ISD can be concisely defined as an authentic empowerment of a particular set of stakeholders, the users of any innovation, such that they are creating their own systems of human learning. Stemming from Scandinavian approaches to software interface design, user design is an approach that has been applied to the design of computer systems in which "the people destined to *use* the system play a critical role in *designing* it" (Schuler & Namioka, 1993, p. xi).

Design

Both ISD and user-design are, by their very nature, design disciplines. They are firmly planted in the world of creation. Harold Nelson said in a recent (2005) interview that "Design is the means by which humans continue to participate in the ongoing genesis of the real world." That qualifies a whole lot of disciplines as design—from architecture to zoological program development. There is creation and genesis happening all around us, but design is a particular *kind* of handiwork. Nelson's interview (2005) clearly puts design into a category that is in alignment with user-design by identifying the role that service plays in the design activity. Here we have a clear indication that designers are not the owners of specialized knowledge to be utilized for the purposes of building their own personal power, but rather as service professionals who are focused more on others' interests.

Differences in Design

Other than their roots within the design discipline, there are a number of similarities and differences across user-design and instructional design (See Table 1). First, in addition to being interested in the creation of human learning environments, both are being applied to education and instruction. In the case of ISD, the application is, admittedly, a bit more narrow than the hopes of the user-design movement. ISD is, by definition most interested in instruction. Some have asserted that those who are interested in broader issues such as educational systems design (ESD, e.g., Banathy, Reigeluth, Jenlink) should not call themselves instructional designers and should not be a part of the field because their assertions are less rooted in hard science (Merill,et.al. 1996). The user-design process has definitely been interested in broader issues of design having sprung from the ESD movement.

ISD and UD are almost diametrically opposed as far as their primary orientation is concerned. ISD is highly goal-oriented. In the HRD and Performance Technology (PT) world, ISD is expected to produce very specific, behavioral outcomes that translate into performance improvement for the organization (Rossett, 1987). Training organizations have become adept at showing their behavioral gains and making sure that their analyses identify the real problem so that their goals align with the needs of the organization. User-design, on the other hand is highly process oriented. This is not to say that those practicing user-design are not concerned with showing specific gains. However, the primary orientation within the user-design field is focused on the process of engaging and empowering users in the creation of their own learning. It is, in fact, *through* this engagement that user-designers find the benefits are most substantial.

The UD approach is more concerned with systemic than systematic approaches (Carr, 1996). ISD remains a systematic enterprise. While many understand ISD to be a *systems approach* (Dick & Carey & Carey, 2005) this is primarily aimed at aligning the components of the system such as goals, strategies, materials, and assessment into a system that maintains internal consistency across stages. In addition, the ISD process is rooted in more hard systems constructs such as input, process, and output and iterative processes as metaphors for the systems approach. User-design, on the other hand, is more interested in the systemic approach and the goals are more oriented toward the use of systems thinking for the purpose of engaging users in the creation of their own learning systems. The primary shared construct here is the iterative nature of both processes.

ISD has been historically applied in certain contexts with great success. For example, ISD has been well-established within the military- industrial complex and as part of the larger PT and training movement, ISD has enjoyed strong subsequent success in corporations as well. ISD has had slightly less success in public schools, where the impact has been debated (Carr & Reigeluth, 2001). Higher education has recently become particularly interested in ISD and is increasingly employing instructional designers as they learn that this approach can help when moving courses from residential (face-to-face) instruction to online learning environments. UD is still very much in its infancy and has been primarily used in large, systemic design projects in public school systems. There are several cases being reported of user-design within schools that are facing dramatic changes, but fewer universities and only one or two cases of corporations implementing a user-design approach have been reported to date.

There have been many studies which have examined the identity of ISD as a field (IDT Futures Group, 2002; Jones, 1999; Reiber, 1998; Seels & Richey, 1994; Heinich, 1984; Silber, 1970) and task forces have been set up to help determine the field's core identities more definitively. Leaders in the field have tried to help ISD make sense of the field, who is "in" who is "out",(Merrill 1996) what counts as appropriate scholarship in the field, and what standards might be used to assess practitioners and novices in the field. A number of studies have looked at citations or publication outlets as ways to further understand our identity, (e.g., Klein, 1997; Ross & Morrison, 1993).

User-design is much more in its infancy as a field, and therefore is more focused on the very early stages of field definition (Banathy, 1991, 1992; Carr, 1997). So, for user-design, we are most interested in what it is as a construct and process, where it comes from, what sort of initial attempts should be made in application of the user-design approach and sources of new ideas. The user-design field is less concerned with membership, standards, and boundaries and more concerned with inputs, new ideas, and initial applications.

The process of ISD is organized around clearly discernable discrete steps. The traditional ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model represents the most frequently cited and often utilized process that ISD professionals employ in their own work (Hannum, 2005). The process of user-design, on the other hand, is much more fluid and is generally organized in loose phases as in Table 2.

Table 1. *ISD/UD Comparison*

ISD Discipline	UD Discipline
Application to Instruction	Application to instruction and broader issues of educational systems design or even HCI, organizational design, and culture change
Affected by current learning theory advances	Affected by current learning theory advances as well as emerging dynamic systems theories such as chaos and complexity
Highly goal oriented most often based on behavioral objectives	Highly process oriented most often aimed at user empowerment
Systematic approach to align goals, strategies, materials, and assessment	Systemic approach to engage users in creation activities
Founded as a way to advance the application of technologies	Founded as a way to serve others, to empower users through design
Carried out in military, corporate, public school, higher education, and non-profit organizations	Carried out in schools, higher education, corporations (not yet in military)
Struggles with issues of identity and effectiveness as a field	Struggles with initial stages of field definition
Organized by specific, usually discrete and linear steps	Organized in looser phases

Process Comparison

The processes involved in ISD and UD follow basic stages, though to indicate any kind of linear progression might be a bit ambitious as far as the user-design process. Both processes are iterative, but the ISD process tends to have a more linear progression. The UD process is a continually unfolding set of stages which are expected to be highly iterative. Table 2 compares the steps/stages in the two processes as they are ideally lived out. It is certainly the case, as critics have suggested, that the ISD process does not proceed so neatly as is expressed in almost all of its models (Hannum, 2005). It is generally accepted that the ISD process is far more messy in the real world than it is in the idealized models of any theorist, however, the existence of these models equip novice ISD practitioners with early tools for learning the ISD process as well as a language to use to describe the process.

In both ISD and UD there are some preparatory tasks which precede any serious design work. In the case of the ISD process, full needs analyses, problem analyses, task analyses etc. are usually the first step. This helps to ensure that the problem is really a learning or training problem and that the need is best answered with an ISD approach. In a very similar way, the UD process begins with readiness assessments. While this includes an examination of the needs of the organization, the focus is also on the ability of the organization to be open to the power shifts and serious design work necessary in the UD approach.

In addition to readiness assessments, it can be argued that the team selection process is also part of the preparation for UD activities. This process certainly does take some time and is part of the reason that timelines are more protracted in this approach. Team selection in UD requires careful examination of size of team(s), number of team(s) if multiple work teams are desirable, and diversity within and across teams. Membership commitment and capacity/readiness of the individuals (as opposed to the organization which was determined in the first stage) is part of the team selection process as is leadership involvement/membership issues. The ISD process begins in earnest by setting goals based on the needs of the organization discovered in the first step. These are typically learning or instructional goals at fairly broad levels and can run from very broad performance improvement goals to specific behavioral objectives related to the training itself. These two phases are really not equivalent or closely linked between the two processes.

The third step in the ISD process is to align instructional strategies with the needs and goals for the training. Strategy selection is a broad category of many substeps and considerations such as motivational techniques, media selection, scope and sequence decisions, and instructional strategy choices. This is one of the more comprehensive steps and would be considered by most the "heart" of the design activity within the ISD process. By the same token, the UD process engages in the creation of their own processes. As mentioned earlier, the UD approach is far more process oriented than the ISD approach. So it is not a surprise, then, to see that the primary design activity in the early phases of the UD process is focused on deciding *how* design will proceed. Here the users determine what they want to adopt in terms of how they will engage in design, what values will guide them, and what tools they will use. Here again, because the UD group might be working on process design while the ISD team is working on product or instructional design, there is a sense in which the UD process is more time consuming or lagging behind. The ISD process will have some early designs that can be shared with leadership, while the UD process will have processes that can be shared which may be far less impressive to leadership.

The fourth step/stage in these two approaches really illustrates the divergent paths that the two processes are taking at this point. About midway through the processes of UD and ISD, we see very little overlap between the two. ISD is concerning itself with the development of materials. During this step, graphic designers and producers are making powerpoint slides, videos are being produced, texts are being created. This is the nitty gritty product development stage—the "just do it" step. The UD process, at this point, is focusing on the capacity building that is essential to user-design. Design is not an easy task, but it can be learned and participants in the user-design process are building a wide variety of design capabilities such as value setting, communication, conflict maximization, leadership, idea generation, and familiarity with discrete and continuous design events such as those outlined in Jenlink, Reigeluth, Carr & Nelson (1998) is all part of this fourth stage.

The fifth step in the generic ISD process is the disciplined development of tests and assessment tools. Tests must measure the objectives that were set back in step two and reflect that content learned from the strategies in step three and the materials utilized in instruction itself from step four. Item analyses can help to ensure this alignment. Alternative assessment models, such as portfolios, written products, on-the-job performance, and so forth would also be considered as possible assessment techniques in this stage. The UD process is now ready to really dig in to the design process itself. Meetings will take place and extensive discussions about various potential solutions will start percolating from among the users. Whatever particular tool was selected in step three will be used now to collect data and analyze its usefulness to the team and the broader user group.

The ISD process, in this sixth step, is now ready to diffuse or implement the new program. Here is where the training actually takes place, new ideas are shared with the users for perhaps the first time. Users are now informed of the expected new behaviors and they are able to accept or reject the innovations/ learnings either overtly or covertly. This is where many ISD solutions fall down and fail to reach their intended goals. The UD process is now prepared to begin trials of the innovations that they've been discussing. Primarily because of the user-design based approach, the team will feel far more comfortable moving into rapid prototypes or trials of new ideas more seamlessly. Ideas are accepted or rejected based on how they really work on the front lines and the feedback from within the user group. Here again is an opportunity for conflict among team members—conflict which should be maximized rather than avoided.

The seventh step for the basic ISD process is to assess student learning. This is primarily accomplished through implementing the tests that were designed in the fifth step, but may also include on-the-job assessments and any

alternative assessment techniques specified in the fifth step. Similarly, the UD process is engaged in the iterative assessment of both their processes and the resulting products or designs that they have been trying out during step six. There is really no beginning or end to this part of the process within the UD approach and it is far less discrete than the corresponding assessments happening in the ISD process.

The final step in the ISD process is to evaluate the entire instructional program. This evaluation may serve formative goals of improvement or summative goals of decision-making. A number of different measures may be employed to evaluate the instructional system including data collection and analysis and student feedback on the program. Too often this step is made up primarily of "smile sheets" in which the learners are invited to give their opinions of their instructors or the program materials, readings, activities and so on. More complete program evaluations include a variety of data collected and analyzed for performance indicators that align with the original organizational needs and goals set back in steps one and two. Thus the whole system feeds back upon itself and is both iterative and integrated. The final UD step is very similar to the ISD evaluation step in that the users examine the impact of their solutions on the organization. However, because the UD initiative is embedded within the systemic change context, the evaluation examines a wide variety of data sources and takes a very broad look at the impact of user-design. Of particular attention in this step will be the adoption rates and the implementation of the new ideas resulting from UD efforts as well as their impacts on the organization as a whole including the sub and supra systems and both anticipated and unanticipated ripple effects.

Table 2. *Comparison of ISD and UD Processes*

ISD Process Basic Steps	UD Process Basic Stages
Analysis	Readiness
Goal Setting	Team selection
Selection of strategies	Process design/tool selection
Development of materials	Capacity building
Test development/assessment	Process engagement
Diffuse/adopt new instructional program	Trials of innovations
Assess student learning	Iterative assessment of process and product innovations
Evaluate instructional effectiveness	Evaluate user-design systemic impacts

These two processes have some similarities and many differences in their specific process steps or stages. While the underlying values and approaches are vastly different, it is still very helpful to consider how the two compare since it can help to illuminate ways to integrate ISD and UD. Some of the early stages are similar to one another, but during the middle part of the process, there are marked differences. Nearer to the completion of the process, the two come back together in their assessment and evaluation tasks. Ultimately the two are very different approaches and their differences are not necessarily highlighted by considering their corresponding steps or stages. Rather it is through building the understandings of empowerment, conflict, leadership, and tools, that will give you the most insights into the differences between these two approaches to the creation of human learning systems.

Conclusions and Implications for HRD

Traditional instructional design professionals must provide a good deal more detailed work and in some cases more accountable results than the UD practitioner. However, the traditional training department is having it's moments with adoption and implementation, and the UD approach may help with increasing the return on investment throughout the adoption and implementation phases.

The experience of user-design is one of ups and downs, and has it's own share of problems. UD practitioners may tend to believe that UD is the solution where it fact it is out of synch with the context. Frustration with the process and the time for development are common in UD scenarios. Another problem with UD is that while the UD practitioner may be *responsible* to someone within the organization for the results of the UD process, it is not all under their control. Thus responsibility and control should all be shared among the user-designers which may be difficult for traditional organizational structures to accept.

There is a great deal of research that is essential to the advancement and application of user-design in human resource organizations and traditional training departments. First, we need many case studies and ethnographic studies which examine the application of UD principles and the culture of UD. Eventually a clear set of studies addressing the return on investment from design through adoption of a new innovation will be necessary to justify the additional up-front expenses associated with UD.

Exploring the differences between ISD and UD, the way the lived experience differs or is the same, the way the process stages or steps differ or are the same, and integrating these ideas into more user-design oriented instructional systems design models is probably the next logical step. The opportunities that user design offers to improve and dramatically alter the daily practice of ISD are significant and not to be dismissed as idealistic or naïve.

References

Bhola, H. S. (1977). *Diffusion of educational innovation.* Morristown, NJ: General Learning Press.

Banathy, B. H. (1991). *Educational systems design: A journey to create the future.* Englewood Cliffs, NJ: Educational Technology Publications.

Banathy, B. H. (1992). Comprehensive systems design in education: building a design culture in education. *Educational Technology, 22*(3) 33-35.

Brown, J. S., & Duguid, P. (1994). Practice at the periphery: A reply to Steven Tripp. *Educational Technology, 34* (8), 9-11.

Carr, A. A.(1996). Distinguishing systemic and systematic! *Tech Trends, 4*(1), 16-20.

Carr, A. A. (1997). User-design in the creation of human learning systems. *Educational Technology Research and Development, 45*(3), 5-22.

Carr, A. A., & Reigeluth, C.M. (2001). Whistling in the dark? ID in the schools. In Reiser, R.A. & Dempsy, J. (Eds.), *Trends and Issues in Instructional Design and Technology.* Englewood Cliffs, NJ: Merrill/Prentice-Hall. (Responsibility: primary author/writing/editing; shared original idea and design).

Carr-Chellman, A. A., Cuyar, C., & Breman, J. (1998). User-design: A case application in health care training. *Educational Technology Research and Development, 46(*4), 97-114.

Carr-Chellman, A. A., & Hoadley, C. M. (2004). Special issue of ed tech.

Dick, W., & Carey, L. , & Carey, (2005). *The systematic design of instruction* (5th ed.). New York: Harper Collins.

Dick, W., & Johnson, F. C. (1993). Quality systems in performance improvement (Special issue). *Performance Improvement Quarterly, 6*(3).

Gayeski, D. (1995). The changing role of human performance technology (Special issue). *Performance Improvement Quarterly, 8*(2).

Gilbert, T. F. (1978). *Human competence: Engineering worthy performance.* New York: McGraw Hill.

Hannum, W. (2005). Instructional systems development: A 30 year retrospective. *Educational Technology,* July/ August 2005, 5-20.

Heinich, R. (1984). The proper study of instructional technology. *Educational Communications and Technology Journal, 33*(1), 9-15.

Henderson, L. (1996). Instructional design of interactive multimedia: A cultural critique. *Educational Technology Research and Development, 44*(4), 85-104.

IDT Futures Group (2002). Assessing the field of educational technology: What is the state of the field? Presentation to the Annual Convention of the Association of Educational Communications and Technology (AECT), October.

Jenlink, P. M. (1995). *Systemic change: Touchstones for the future school.* Palatine, IL: Skylight.

Jenlink, P. M., Reigeluth, C. M., Carr, A. A. & Miller, L. M. (1998). Guidelines for Facilitating Systemic Change in School Districts. *Systems Research and Behavioral Science, 15,* 217-233.

Jonassen, D. H. (1991). Objecitivism versus constructivism: Do we need a new philosophical paradigm? *Educational Technology Research and Development, 39*(3), 5-14.

Klein, J. D. (1997). ETR&D-Development: An analysis of content and survey of future directions. *Educational Technology Research and Development, 45*(3), 57-62.

Land, S. M. & Hannafin, M. J., (1996). A conceptual framework for the development of theories-in-action with open-ended learning environments. *Educational Technology Research and Development, 44*(3), 37-53.

Maher, F. and Tetreault. (1994). *The feminist classroom.* New York: Basic Books.

Merrill, D. et.al. (1996). Reclaiming instructional design. *Educational Technology, 36*(5), 5-7.

Nelson, H. (2005) Interview. Retrieved from: http://www.distance-educator.com/dnews/modules.php?op=modload&name=News&file=article&sid=13424.

Rieber, L (1998). The proper way to become an instructional technologist. 1998 Peter Dean Lecture for the Division of Learning and Performance Environments. Presented at the Annual Conference of the Association for Educational Communications and Technology, St. Louis, February.

Reigeluth, C. M. (1993). Principles of educational systems design. *International Journal of Educational Research, 19*(2), 117-131.

Rogers, E., M. (1995). *Diffusion of innovations.* New York: Free Press.

Ross, S. M., & Morrison, G. R. (1993).   How to get research articles published in professional journals. *TechTrends, 38*(2), 29-33.

Rossett, A. (1987). *Training needs assessment.* Englewood, NJ: Educational Technology Publications.

Rowland, G. (1994) Designing for human performance (Special issue). *Performance Improvement Quarterly, 7*(3).

Schuler, D., & Namioka, A. (1993). *Participatory design: Principles and practices*. Hillsdale, NJ: Erlbaum.

Seels, B. B., & Richey, R.C. (1994). *Instructional technology: The definition and domains of the field.* Washington, D.C: AECT.

Stolovitch, H. D., & Keeps, E. (1992). *Handbook of human performance technology: A comprehensive guide for analyzing and solving performance problems in organizations.* San Francisco: Jossey-Bass.