

## USER-DESIGN RESEARCH

*Alison Carr-Chellman and Michael Savoy*  
Penn State University

Knowledge and human power are synonymous.  
—Sir Francis Bacon

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### 27.1 INTRODUCTION

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The purpose of this chapter is to describe the state of research and theory in the area of user design in instructional and informational sciences. In recent decades the importance of the learner and user has increased considerably. However, a comprehensive consideration of the underlying theories that contribute to user design as a construct, as well as a careful explication of the research that contributes to our understanding of engaging users, is currently lacking in the literature. This is particularly the case in the educational technology literature.

Traditionally, the quest for and attainment of knowledge have been restricted, for various reasons, to those select few in the upper echelons of society. And this is surely the case within instructional design thoroughly steeped in jargon and special techniques for taking best advantage of the findings of instructional science. Academics conduct research to gain deeper knowledge and understanding of the powerless majority of society to compel that majority to utilize the results of the research through products that are *unveiled* to the users. However, the users of this expert-conducted and designed research have had little say about the products with which they were presented. This has led to many innovations being less than acceptable or usable and rarely effectively implemented. The instructional sciences have not been exempt from this type of one-sided, often-unsuccessful *diffusion* of innovation. The experts' and practitioners' frustrations with the lack of relevant useful results have led to more collaborative efforts to design, develop, implement, and benefit from research, processes, and products.

We begin this chapter with a definition of user design and delineation between user design and other progressive archetypes such as learner-centered, user-centered, and emancipatory design models. This is followed by a discussion of the foundations of user-design research including the Scandinavian design literature and stakeholder participation. Within these related disciplines, we consider what the empirical research tells us and what gaps remain to be filled to build a robust research agenda for the user-design discipline. We then turn our attention to a brief discussion of obstacles to user design and conclude the chapter with a description of a potential research agenda and associated methods for advancing user design. Each section of this chapter begins with an explication of the specifics of the concepts and theories of the various related areas and user design. This is followed by a careful discussion of empirical evidence that helps to frame the relationship to user design and the need for further and specific research as well as a brief discussion of the methods needed to further user-design inquiry.

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### 27.2 DEFINING USER DESIGN AND USER-DESIGN RESEARCH

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The engagement of end users in the creation of new artifacts is not an entirely new concept. For example, the architect works closely within the boundaries of what the end users want, need, and hope for their new home while lending his or her expertise to the project (Hooper, 1986). In contrast, the instructional designer who closely follows instructional science methods for the creation of learning materials has not traditionally consulted

with the end users. In a traditional instructional design model, a needs assessment is conducted in which the instructional designer finds the problem and begins to create a solution to it. This solution is then negotiated with *administrators* and eventually imposed on the end users or learners. Typically, the learners are considered as part of a learner analysis, and usually they engage in the formative evaluation stage. However, in most cases these processes are limited engagements and tend toward something being done *to* rather than *with* the learner.

User design, in contrast, empowers the users to engage authentically in the decision-making process that *is* design. In this case, the end users are empowered to play a central role in the creation of their own systems. Schuler and Namioka (1993) set out the Scandinavian roots of user design as they apply to the creation of information technology interfaces. Scandinavian participatory design research focuses not only on improved product development as a result of user participation, but also on the political structure between management and labor. However, the Scandinavian work force is characterized by high education levels, strong unions, and prolabor policies and legislation regulating management/union relations. This context represents an almost-ideal situation for user participation compared to typical instructional design situations in the United States or most other Western cultures.

User design, when applied to instructional design, represents a dramatic shift in power dynamics from traditional instructional design approaches (Carr, 1997; Reigeluth, 1996). In traditional instructional design the designer analyzes, creates, and negotiates, and the leaders initiate, approve and decide. Unfortunately, the users are left to accept or reject the innovation and much literature has focused on better and better ways to encourage adoption, or compliance from the end users (Evans, 1996; Rogers, 1995; Valente & Davis, 1999). This approach, however, ignores savvy users who realize that they are being, in large part, controlled by the negotiated agenda of the designer and the administrator. Typically, those products or processes that are truly designed by users tend to build ownership among users and create a significantly different adoption process than is typical of more manipulative (Rogers, 1995) models of innovation adoption. Rogers' approach, or the "colonial" approach, to design and diffusion has been critiqued because of the disempowerment of users and the lack of respect afforded indigenous knowledge (Carmen, 1990; Yapa, 1996a, 1996b). This traditional approach is deficient in terms of the robustness necessary given the variability of many current contexts (Larsen & McGuire, 1998). Thus, in user design, actions such as initiation, approval, rejection, design, and decision making are negotiated among the users, designers, and leaders.

Though user design has empowering potential, many users still need a little convincing. Ehn (1993) interprets Ackoff (1974) as concluding that three conditions are necessary for users to be motivated to participate in design efforts. "(1) it makes a difference for the participants, (2) implementation of the results is likely, and (3) it is fun" (p. 74). Ehn (1993) further states that user design not only means users being involved in the design, but also designers participating in its use. Designers must be more than outside researchers, consultants, or even facilitators. They must be users as well, thereby increasing their stake in

the effectiveness of the design process and eventual product. In addition, where designers are users, power differentials are increasingly mitigated.

One important distinction to make with regard to defining user design is what it is *not*. It is not the practice of increasing "user involvement in acquiring, maintaining and manipulating essential institutional data" for the purpose of "incorporating user input into systems design and development (Hurley & Lipp, 1980)." It is also not user-based (Abels, 1997) design in which focus groups and questionnaires are used to gather user perspectives for application to the design of systems. Although these approaches are good strategies for soliciting input and garnering user support, they rarely significantly change what designers do. User-design empirical research on instructional systems is almost nonexistent. The field of instructional design has not yet taken many of the lessons from Scandinavian user-design models and applied them to the creation of learning environments. The notable exception here is the study of home nursing agents (Carr-Chellman, Cuyar, & Breman, 1998) that found that user design, while possible, was very time-consuming and resource hungry. In this case study a group of full-time nurses was engaged in the creation of a computer interface system that they were to use within home settings. A series of meetings was held and observed, participants were interviewed, and one of the authors was within the organization, lending to the complete telling of the story. It was found that the process of user design, truly engaging the nurses in the creation of their own interface, was extremely time-consuming. It led to fundamental considerations about power relations within the organization at a macro level, uncomfortable discussions between nurses and leaders about the future job prospects for home nurses, and careful and, at times, contentious discussion about what nurses do in any particular home visit at a micro level. This was not a surprising finding, and the length of time that was required clearly pointed to resource expenditures that made the leadership, in particular, quite uncomfortable. Resources in terms of time and people were required for this user-design attempt, and the second (M.S.), author who was the Chief Information Officer for the agency conducting the study, insisted that the organization would not attempt this level of user engagement, much less true user design, again soon. This study, however, was both naive in its attempt to apply user-design principles to an organizational setting and unskilled at the actualizing of appropriate research methods. Thus, user design in instructional systems is almost a blank slate. This is not particularly surprising to us. To pursue user-design research is to begin to deny the power and expertise of instructional design as a field (Carr-Chellman, in press). It is to devote precious time and research resources to an issue that is essentially out of alignment with our expert-based capitalistic society. There are, however, a number of empirical studies in related areas such as user-centered design, human-computer interface design, and others, which may help to build an appropriate research agenda by identifying gaps in those literatures.

User design embraces the conflict inherent in power dynamics present in most organizations and social systems and brings this conflict into clear relief by engaging users in empowered decision making through design. User design is, however, perhaps

not quite as clear as this definition suggests. We have found that there is a variety of levels of user engagement that encompass several levels of user design and empowerment. The next section addresses these levels and sublevels of user design and related user engagement and each level's associated research findings.

### 27.3 LEVELS OF USER PARTICIPATION

Noyes and Baber (1999) define *user* as the “human component” of design. However, this definition gives no detail as to who actually uses and/or benefits from the designed product or process. It also does not define the level of knowledge these users possess. In operational settings, users range from trainees to masters, governance structures range from frontline workers to top executives, HCI/technology users range from novice to expert or laggards to early adopters, and users in society range from the disenfranchised to the empowered.

User participation occurs in various ways depending on the context, participants, resources, and intentionality with which user engagement is proscribed. There is much confusion about the differences among *levels* of user participation, i.e., user centered, learner centered, student centered, and user design. Whereas some researchers make no distinction among sublevels of user-centered design (Sugar, 2001), others distinguish between user centered and user participation (Salvo, 2001), and some clearly define various levels of user design (Schulze, 2001).

Regardless of the sublevel of user design, the designer and/or leader typically determines the extent to which users are engaged in the creation of their own systems. Thus, grassroots movements (T. Jackson, 1993; Merrifield, 1993; Olson, 1990) are infrequently possible. Because the leader typically maintains power in most organizational contexts, and is usually uncomfortable giving it up, true user participation requires a different

perspective on organizational structure and radically different communication systems.

Power is an issue that may not be completely understood by those not familiar with the ways in which power can be employed for and against users. In essence, power can be invested—not given to (which implies a certain patronization of users), but invested in users. This would be understood as empowerment of users. The idea of power is pretty transparent, actually. Persons in power are usually able to get persons with less power to carry out their wishes. Often persons in power, leaders, for example, believe that they have the best intentions for the organization or the users or workers themselves. Persons in power often have a global view of the organization and may employ that advantage to set direction, plan initiatives, and make changes as they see fit. Persons in power are able to manipulate systems and organizations to their own or others' benefits. Typically, though, for persons in power, the power itself may not be recognized. They may feel that they are overwhelmed leaders (Oshry, 1995) rather than powerful participants in the shaping of the organization's future. Power is, for them, a natural consequence and they often do not recognize their own power. In addition, the powerful rarely recognize that the power they wield will tend to benefit some and not others, and they even more rarely will carefully examine the intended and unintended consequences of their powerful actions on a variety of stakeholders at lower levels.

Perhaps the best way to understand the types or sublevels of user design is to array these levels of user participation on a continuum of empowerment (see Fig. 27.1). A few of the associated researchers and theorists are listed under each design model. Further explication of each of these design models (excluding the traditional instructional systems design [ISD] model, which is well discussed elsewhere [Dick, Carey, & Carey, 2001; Reigeluth, 1999; Romiszowski, 1981; Schiffman, 1995]) follows.

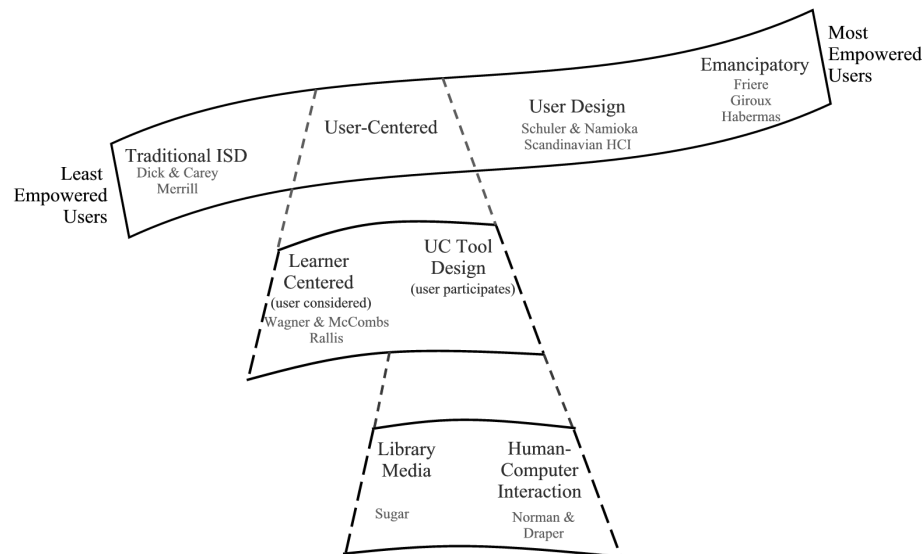


FIGURE 27.1. Continuum of empowerment in user-participation levels. ISD, instructional systems design; UC, user-centered.

### 27.3.1 User-Centered Design

In earlier work, we distinguished broadly between *user-centered* design and user design (Carr, 1997). In that earlier work, user-centered design and learner-centered design are used synonymously. However, for the purposes of clarity, we can divide user-centered design into two broad groups of models and corresponding literature. The first is concerned primarily with learners, whereas the second is more concerned with end users. In general, learners are engaged primarily in structured or semistructured learning experiences, whereas end users are engaged in tool use. We explore learner-centered design first and user-centered tool design second and distinguish between user-centered tool design for human-computer interfaces and library media tools.

**27.3.1.1 Learner-Centered Design.** In traditional instructional situations the teacher defines what the learner will learn based on external mandates from, for example, curriculum and assessment standards. Consideration of the learner is given through pretests, learner analyses, and sensitivity to individual learner differences, however, the learner does not actually have a say in what, when, how, and to what extent he or she learns. Learner-centered design differs from other types of user design in that the focus is on learning and pedagogy rather than tool use as is the case in human-computer interface design. Learner-centered design emanates from learner-centered psychological principles (American Psychological Association [APA], 1993), particularly those associated with metacognition, cognition, and affective, developmental, and social psychology. Perhaps the most well-known theorist to extend learner-centered principles from situated cognition (Brown & Duguid, 1994), constructivism (Duffy, Lowyck, & Jonassen, 1993; Jonassen, 1999) and systems theories (Banathy, 1973, 1996; Senge, 1990) was Barbara McCombs (2001; McCombs & Whistler, 1997), and most of the design models that have passed into the instructional design field come from this foundation (Wagner & McCombs, 1995).

According to Wagner and McCombs the learner-centered model for instructional design (in this case for distance learning) strongly considers the needs of different learners during the design process. Learner-centered design encourages active collaboration and engaging learners “as active participants in the generation of learning plans.” (Wagner & McCombs, 1995, p. 33) However, the principles of learner-centered psychology (APA) and their implications for design practice (Wagner & McCombs) maintain and reify the standard role for designers. The principles are primarily phrased, “The learner. . .,” indicating that the audience for the work is a designer who should know and understand these psychological principles *about* learners to design better learner-centered environments.

There is little discussion of the shifts in power that are necessary to engage learners in substantive ways in the current literature. Future research literature needs to highlight the shift from imposing education *on* learners to designing education

*with* learners (Norman & Spohrer, 1996). One notable exception is Hannafin and Land’s work (1997) in technology-enhanced student learning<sup>1</sup> environments where we encounter “students-as-designers” (p. 168). Thus, although the learners are not precisely *engaged* in the process of designing their own instruction or information systems in the majority of learner-centered design literature, they are considered to be the center of what the designer is doing. All things should focus on successful outcomes for the learner rather than other extraneous concerns such as administrator desires, contextual cues, or resource limitations. This position argues that learners ought to be afforded a serious opportunity to influence their own learning (Wagner & McCombs, 1995) and to allow learners to take a more active role. This represents a significant departure from traditional instructional design models (Wagner & McCombs, 1995).

In terms of empirical studies in the area of student-centered or learner-centered environments, there are a number of strands of research. The seminal author in this area is McCombs. She has three studies in particular that indicate positive findings for learner-centered classrooms. Weinberger and McCombs (2001) examined students in grades 4 through 8 using the Assessment of Learner Centered Practices (ALCP) survey and found that as students feel or perceive that their teachers are more learner centered in their approach, students’ academic performance, attendance, and motivation increase, whereas disciplinary problems tend to decrease. These findings are of particular interest, in Wienberger and McCombs’ view, to those students who are at risk of failure in more traditional teacher-centered classroom structures. Two additional survey studies by McCombs (2001; McCombs & Quait, 2000) found strong links between a positive predilection toward learner-centeredness and positive motivation, performance, climate for learning, and student-teacher relationships. Daniels, Kalkman, and McCombs (2001) looked at learner-centered and non-learner-centered primary classrooms and surveyed these young learners about what they valued in a teacher. They found that primary students valued similar things in all teachers and that those in learner-centered classrooms tended to be more interested in schoolwork and learning. In McCombs and Quait (2000) the Community for Learning (CFL) program, a K-12 reform effort, was evaluated to determine the extent to which it was meeting its learner-centered goals. Here again, the ALCP was administered to students and teachers of fourth and fifth grades in inner-city schools that were all in various stages of implementation of the CFL program. Naturally, high implementers and those open to learner-centered approaches were more adept at and more willing to implement the CFL approach. Students of these high-implementing teachers tended to show higher test scores and higher motivation levels than students who were in classrooms taught by low implementers. These survey results may not be completely reliable because high-implementer teachers likely have other qualities that inspire excellence and motivation in their learners and that is likely to be separate from the learner-centered approach of the CFL program.

<sup>1</sup>Because sorting out the language associated with various design models (user centered, learner centered, etc.) is the main purpose of this portion of the chapter, it is important to note that we consider *learner centered* and *student centered* to be synonymous.

The remainder of empirical studies on learner-centered approaches can be loosely broken down into two categories: studies that examine teacher philosophies, perceptions, and abilities toward learner-centered classrooms and studies that examine specific learning outcomes as a result of learner-centered classrooms. Paris and Combs (2000) studied teachers from elementary, secondary, and postsecondary contexts who were involved in the Foxfire curriculum innovation. In interviews they found that teachers' understandings of learner-centered classrooms included five specific characteristics; the teacher focuses on learners, guides and facilitates learning, promotes active learner engagement, promotes learning through interactive decision making, and participates as a reflective, ongoing learner. However, simple understanding is not sufficient for effective implementation. As Williams (1996) found in a survey of 435 teachers' philosophies and attitudes about learner-centered instruction, teachers are, in fact, faced with a variety of conflicts. In this study of 10 public high schools in an urban school system, she administered both the Kerlinger's Education Attitude Scale and the McREL School Practices survey and found that whereas teachers prefer to see themselves as progressive, they are ambivalent about both progressive and traditional philosophies. Williams explains this ambivalence as either moderation between two extreme positionalities or, possibly, the realities of classroom life forcing a more moderate stand.

Learner-centered studies, which focus more on learning outcomes, are by and large positive. Smrekar (1997), in her study of learner-centered second-language classrooms, found that students with limited English skills, in learner-centered classrooms, enjoyed more language growth than those in more teacher-centered classrooms. This study utilized the Preschool Teacher Verbal Behavior Index (PTVBI) to determine the extent of learner centeredness in four second-language classrooms. This was combined with observations over a 16-week period. While the group examined is very small, and it may not be surprising to find that one teacher was learner centered, one was not, and two were slightly more learner centered, the final conclusion is that the use of the PTVBI is helpful in understanding classroom communication and studying it further. Jackson, Stratford, Krajcik, and Soloway (1996) utilized computer modeling as a case study of learner-centered software design and found that their modeling tools allowed even novice learners to construct computer models easily. This study was a case study that described the application of the ScienceWare Model-It software to high-school science learning. In this case, novice high-school learners were able to create simulations and test hypotheses using the software. Ruitter (1971) utilized learner-centered techniques at the university level in basic electricity instruction. He found that learner-centered instruction was superior to conventional methods in terms of both achievement of learning goals and efficiency as measured by number of experiments on electricity completed. Nelson (1999) examined learner-centered telecourses, by examining the application of four media—cable TV, face-to-face, print, and Web page—to health education at the undergraduate level. A battery of surveys and questionnaires was administered in this study including a Telecourse Readiness Questionnaire, additional questions on learner style and learner independence, the Canfield Learning Styles Inventory, the

Rotter Internal-External Locus of Control Scale, Kolb's Learning Style Inventory, and an end-of-course evaluation survey. Additional data sources included midterm and final examinations and student projects and portfolios. The treatments all utilized competency-based strategies, and in the end, the study found that this approach (competency-based telecourse) resulted in overall higher retention rates despite higher early withdrawals. In addition, students had increased satisfaction rates with instructor preparedness, quality of interaction, feedback, GPAs and self-regulation. Soloway et al. (1996) offer two case studies implementing computer-based learner-centered environments. The first is based on the earlier work by Jackson et al. (1996) with Model-It high-school science learning. The second case study involves NoRIS, a problem-solving environment designed for nuclear engineering learning. In both cases, based on think-aloud learner interviews, the authors found that these learners used their tools effectively and that their reflection and engagement in learning tasks increased with the use of learner-centered environments. In addition, they found that these tools offered helpful structure to the students and assisted with enculturation into professional fields of study.

Salisbury-Glennon, Gorrell, Sanders, Boyd & Kamen (1999) examined an entire school that was implementing learner-centered philosophies. Their large-scale, multimethod study looked at the effects of learner centeredness on an urban middle-class school among sixth and seventh graders. The study found that certain self-regulation strategies such as seeking, organizing, and transforming information were used more often than memorizing, self-evaluation, and record-keeping for those in the learner-centered school. The students in the study tended to be more oriented toward the development of new skills, self-improvement, and intrinsic rewards of learning itself. This finding is consonant with Brush and Saye's (2000) case study of a single U.S. history class (one teacher and 21 students) in which learner-centered approaches were attempted. Their evaluative case study used classroom observations, interviews, teacher debriefings, and analysis of student products. The study found that learner-centered strategies hinge on specific classroom and learner characteristics. For example, Brush and Saye found that learners, to be successful in learner-centered environments, need high levels of self-monitoring and other metacognitive skills. In addition, Brush and Saye advocate for sufficient structure to support learners in learner-centered environments to avoid high levels of learner disorientation and frustration.

Methodologically, these studies truly run the gamut from surveys, to pre-post test experiments, to interviews and observations. The findings are not completely holistic; they do not always build on one another but, rather, examine bits and pieces of the largest issues associated with learner-centered learning environment design. However, these studies do not approach learner-centered learning from a truly learner-empowered position, nor should we expect that they would. Taken together, the studies on learner-centered learning are hopeful, encouraging, and overall positive with regard to using learner-centered approaches. They tend to use a variety of methods and find that teachers and learners, in the proper mindset and the proper contexts, can make learner-centered approaches work well. Turning

learning entirely or primarily over to the learner is still not a part of this dialogue.

**27.3.1.2 User-Centered Design for Tool Usage.** The application of user-design principles to the creation of artifacts and tools for human productivity (Sugar & Boling, 1995) has been utilized primarily in two areas, human-computer interface design (Norman & Draper, 1986) and library media use (Fidel, 1994; Morris, 1994; Wilson, 1995)

**27.3.1.2.1 User-Centered Design for Human-Computer Interfaces.** User design for the creation of computer-based software tools and online resources has focused more on the “how to” (work with users) than on learner-centered models (Muller & Czerwinski, 1999; Soloway & Pryor, 1996). Although it is most often true that the designer is not the primary user of the tool he or she designs, it still has become very good business practice to be customer centered (Smart & Whiting, 2001). The customer-centered orientation typically takes the same perspective on power dynamics that other forms of user-centered design take. Specifically, the user is considered, not empowered; research has centered on better understanding the user and the context in which the user works so as to manipulate their adoption rates (Karat, 1997; Vredenburg, 1999).

Thus, the fact remains that most user-centered design literature maintains power in the hands of the designers and only touches on user considerations in actual design. For example, engaging frontline users in the process of usability testing or formative evaluation (Corry, Frick, & Hansen, 1997) still puts the designer in the most powerful position of creation followed by approval, suggestion, or implementation by the user. Sugar and Boling (1995) advocate for early user engagement and iterative processes to represent user desires most effectively in final products. In general, Sugar's (1999, 2001) work in user-centered design advocates for stronger roles for users, while recognizing that it rarely occurs. Sugar (2001) would like to see users in a powerful position regardless of what the process is called but recognizes that the novice designer has misconceptions about true user-centered principles and their implementation.

Norman and Draper's (1986) edited text, on *User-Centered System Design*, seems to focus primarily on how best to engage users in the creation of their own systems. For example, the chapter by Riley (1986) focuses on what fundamental understandings users need to have to engage effectively with designers.

The empirical research on user-centered design for human-computer interfaces consists of approximately six studies, primarily cases and observations that tell us that user feedback on the creation of computer interfaces is useful instrumentally. Vredenburg (1999) conducted a case study indicating that user *testing* increases user ease of adoption. In this case, user-centered design was implemented at IBM prior to the release of DB2, a universal database program. Vredenburg concurs with most research that user-centered design is still very labor-intensive and offers a number of possible strategies for minimizing the resources necessary for user-centered design such as groupware. Smart and Whiting (2001) present a 2-year case study of a technical documentation design team. In their study, the

authors utilized contextual inquiry methods where members of design teams worked directly with users in the context of their work environment. Researchers engaged with users in conversation about their work and what that work meant for the future design of technical documents. Smart and Whiting found that working with user feedback is good business, particularly when it concerns technology. This, they assert, is because it is all too common in our society today that the end user is not the same person as the designer. Corry et al. (1997) conducted a case study with World Wide Web design for higher-education administrators and found that user-centered design is particularly useful from an instrumental perspective. In their study of the University Computing Services (UCS) at Indiana University (Bloomington), Corry et al. conducted interviews, tabulated questions asked by patrons of various UCS offices and categorized them, and conducted think-aloud protocols with users. The new system that resulted from the user engagement was adopted in 1995. Sugar and Boling (1995) conducted a case study of the Virtual Textbook project at Indiana University. In their study, five groups of three or four students each were videotaped as they created a time line for the history of rock and roll. The authors do not specify precisely how these 2.5-hr videotaped sessions were analyzed other than “viewing” them. Sugar and Boling found that user-centered design should be considered as part of instructional systems design because it (a) condenses the ISD process, (b) refines the prescriptive methods, (c) encourages cyclical (iterative) processes, and (d) focuses on the human element. Both the Cory et al. and the Sugar and Boling studies would essentially be considered usability testing. On the other hand, sometimes usability testing is not terribly effective, such as in Sugar's (2001) study of hypermedia design teams' use of iterative feedback. Sugar examined 11 part-time graduate students (6 males and 5 females) as they developed a prototype hypermedia system. Data included interviews, student demonstrations, and class materials. These data sources were examined both before and after usability sessions and a control group was utilized. As noted above, Sugar found that user-centered design is sometimes superficial, particularly with novice designers, who made very few changes as a result of user input. Karat, Atwood, Dray, Rantzer, and Wixon (1996) conducted an “informal survey” that certainly highlights the problems of common language associated with this area. They found that there is no agreed-on definition of user centered design (much less user design in instructional systems). They also found that consideration of context and understanding of the user are lacking among user-centered designers. It should be noted, however, that this particular study, as it was an informal survey, is not really a strong source of empirical evidence.

All of these studies illustrate a lack of robust user design and, rather, focus on user-centered design. They illustrate the difficulties with a common language and agreed-on standards for calling an approach true user design or user-centered design. The studies draw conflicting conclusions in terms of whether user-centered design, and usability testing, is instrumentally valuable. None of these studies are interested in loftier issues of empowerment, moral value, or power issues. In addition, all of these studies employ case inquiry methodology, leaving many gaps

in the literature when we consider a variety of other research methods.

*27.3.1.2.2 User-Centered Design for Media Usage.* In the case of library media usage, user-centered design has primarily meant conducting user surveys to design better the library resources and systems for patrons' use (DeCandido, 1997; Rockman, 1980; Wilson, 1995). Starting in the mid 1980s information retrieval methods were increasingly influenced by advancements in technology (McCandless et al., 1985). These advancements coincided with library/media center users wanting information systems that were characterized by easy, adaptive, user-friendly interfaces and navigation tools (Payette & Rieger, 1998). These systems needed to be suitable for novice technology users and handicapped individuals as well as the typical library patron.

The design and creation of the user-centered library/media facility sparked a number of empirical research reports. Most of this research describes results of surveys of library patron usage patterns and preferences. The expectation here is that other library/media center staff or designers will learn valuable lessons from the results of surveys of particular library patron populations. This generalization assumption may not be altogether valid, however, the studies are of interest here in terms of what they generally say about the evolution of library/media centers and the place of user design in that evolution. In Dowlin's (1980) study of library user preferences between the card catalog and the computer terminal, he found that users actually preferred the terminals (as long as they were readily available) to the card catalog. Reasons for this included speed, efficiency, and increased availability of additional information such as location, number, and availability of resources. Miller (1980), in her case study of the use of automated library systems at Ohio State University, employed a number of inquiry methods but relied most heavily on staff interviews and surveys and found that library patrons were quite willingly accepting new technologies, particularly when they increased information access. She also found that more men than women utilized the electronic terminals rather than the card catalogs. Kaske and Sanders' (1980) report on more than 200 group and individual interviews focused on user methods of accessing library information. They found that users have strong preferences for design of subject databases to include a "knowledge tree, transparent translation from term entered to index term, more access points, summary of author credentials, book status, and various delimiters." (P. 58). However, Kaske and Sanders also called for more research to determine which of these user requests is really feasible and cost-effective. It seems in their report as if they discount user preferences as "pie in the sky" requests that are too expensive to implement.

In a more recent survey of library patrons, Wilson (1995) looked at preferences among library users at the University of Washington. She reported on a number of changes they made as a result of user feedback on their systems. One of the more interesting shifts evident was the importance of responsiveness, in direct opposition to Kaske and Sanders' views of a decade earlier. "When we work to connect with users, and tell them we care about their input, we are obliged to do something with

what they tell us, unlike the suggestion box in Hell" (p. 300). The remainder of the study described specific changes made as a result of user input including a number of policy changes. Payette and Rieger (1998) continued this strand of inquiry by examining scholarly library usage through surveys, focus groups, and semistructured interviewing at the Mann library at Cornell University. They found that "scholars will benefit from adaptive, flexible user interfaces that enable easy navigation of a complex information landscape" (p. 121). Specific changes included different application of metaphors, more user-centric opening screens, easier access, shortcuts, and multi-navigational pathways.

Taken as a group, these studies are of interest in terms of opening of practitioners' minds to the importance and validity of the indigenous knowledge present in library patrons' minds. Although the research is, in our view, overly reliant on survey techniques, the basic idea of implementing user designs for library systems does seem to have progressed substantially in the past two decades. This stream of research is, however, only tangentially related to what user-centered design for instructional purposes has meant. User-centered design for instructional systems has been more closely aligned with Donald Norman's (1983, 1989) understanding of design for human-computer interfaces.

### 27.3.2 Emancipatory Design

Emancipatory design models take the mission of empowerment beyond user design. The emancipatory design team hopes to inspire transformation, to alter some significant, and often historically intractable, aspect of society. The goal of emancipatory design is more to create change and to vest the users and frontline workers in organizational outcomes than it is actually to create a working instructional system.

Emancipation as it is applied to action in the form of research, education, or design emanates from Paolo Freire's (1970) work with Chilean illiteracy. It was Freire's contention that knowledge collaboratively constructed is the key to changes in practice. He asserted that research itself is a project of social change and his understandings were extended to the popular education movement (Morrow & Torres, 2002) in South America during the 1960s and 1970s (Carr, 1990; Gerhardt, 1986; Melo and Benavente, 1978). Emancipatory ideas, then, have been used in education and research but more rarely in design activities. Designers have been more interested in the creation of appropriate, implementable, cost-effective artifacts than in how those artifacts may serve to free oppressed populations.

In the case of both user design and emancipatory design, the payoffs for the corporation or educational institution are tertiary rather than primary or even secondary. That is, the rewards are usually more to the users than to the management. There exists little in the way of literature on what we are calling emancipatory design. This is quite possibly because it brings into sharp focus the conflict between users and designers or between labor and management, as the case may be (Bjerknes & Bratteteig, 1995). It may be seen as completely impractical or impossible to implement, particularly in capitalistic societies

where return on investment is primary. In the case of emancipatory design, users are in charge; their power, their indigenous knowledge are *more* powerful and respected than those of the expert designer. Even more than fully empowered users, emancipatory design asks users to find ways to create systems for themselves that serve themselves primarily. Thus, the extent to which the organization flourishes and succeeds is the extent to which *users* flourish and succeed. Because of this positionality, emancipatory design draws heavily on critical theories, which have as their central focus who benefits and who is disempowered by any innovation, policy, or product (Horkheimer & Adorno, 2002).

There is a good series of Scandinavian case studies from corporate applications of user design. Included among these is a series of trade union projects from three Scandinavian countries. The first involved the introduction of new technology through the Norwegian Iron and Metal Workers' Union (Nygaard & Bergo, 1974). The second looked at the introduction of technology among Swedish skilled workers with the basic assumption that the technology was meant to deskill work (Ehn & Sandberg, 1979). The third was an examination of the unions' influence on the introduction of computer systems among Danish workers (Kyng & Mathiassen, 1979). All of these projects took the position of emancipation of workers. They diametrically opposed labor and management and considered the researcher's moral obligations to reside with the disempowered population being studied (typically labor). Generally, these studies found that "working life democracy can be reached through trade unions as institutions representing a workers' collective." (Bjerknes & Bratteteig, 1995). These studies are considered case studies, though they generally do not follow recent trends in qualitative research or the typical case study research methods.

Perhaps one of the most underresearched areas we report on in this chapter, other than strict definitions of user-design inquiry, is emancipatory design. Rossman and Rallis (1998) described emancipatory research thus: "The research—process and results—becomes a source of empowerment both to the individual's immediate daily life and to change structures that dominate and oppress. The participants are not generating knowledge simply to inform or enlighten an academic or social science community. They are collaboratively producing knowledge to improve their work and their lives" (p. 15).

Carmen (1990) approached emancipatory diffusion of change and innovation with particular attention to the differentiation between Rogers and Friere. In this text, three case studies are presented: Kenyan educational development, West African and Zimbabwean rural progress through indigenous nongovernmental organizations, and Kenyan democratic participation in theater and cultural space/event design. Carmen examined these cases from an emancipatory perspective. Generally, Carmen found these cases to be empowering and presents several criteria, that these cases by and large meet, including horizontal participatory communication, investigation-education praxis, and impact/effectiveness as measured largely by popularity. These cases are very helpful in illuminating emancipatory design, however, all of the research that we currently have on the topic is case based and there is a clear need for further

definitional and (primarily) qualitative research to further this vein of inquiry.

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## 27.4 FOUNDATIONS OF USER-DESIGN MODELS

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The foundations of user-design research and theory are drawn from a wide variety of philosophical stances, research traditions, and theoretical perspectives. Considerable work has already been done to explicate many of these foundations, though their relationship and contribution to the aims of user design have not been drawn. The purpose of this section is to describe briefly the foundations of user-design models and to indicate their relationships and contributions to the discipline of user design broadly defined.

### 27.4.1 Scandinavian User Design

Scandinavian researchers have a long history of user-centered, user-design, and emancipatory design literatures. Their active involvement of users in systems development traces back two decades or more (Bansler, 1989; Bødker, 1996). Certainly Schuler and Namioka's (1993) text *Participatory Design: Principles and Practices* is one of the seminal texts in the field. While their primary emphasis is on HCI tool use, many of the ideas are useful for instructional design (Carr, 1997). Perhaps one of the best reviews of research in Scandinavian user design was offered by Bjerknes and Bratteteig (1995), who focused primarily on the relationship between users and administrators and the inherent contextual issues that are defined by user design. They traced the roots of user design back to a series of research projects involving trade unions and defined two strategic perspectives—conflict or harmony. In this case, Bjerknes and Bratteteig suggested that the conflict perspective recognizes the inherent contextual conflict between users/labor and administration/employers and called on the researcher to work on behalf of the less powerful (that is the users, labor, or employees) to empower them. The harmony perspective suggests that all are working for the betterment of the organization and so all interests are aligned rather than being oppositional. Growing out of this review is a careful explication of the relationship of critical theory, democracy, and social change.

The vast majority of Scandinavian empirical user-design research has focused on human-computer interface and tool design. There has been some theoretical work looking specifically at work contexts and the design of jobs for democracy (Elden, 1979). In fact, the Scandinavian cultures take the user-design process so seriously that in some cases, such as Denmark employment law and the Norwegian Worker Protection and Working Environment Act, it has been legislated (AML, 1977; Norrbom, 2001; Otten, 1991). The relationship between Scandinavian user-design research and the application of user design to instructional design is still quite limited. Very few instructional design and technology scholars are utilizing (we suspect they may be unaware of) the Scandinavian human-computer

interface research on engaging users. Thus user design, as a relatively new model for the instructional design community, embraces the somewhat unknown Scandinavian models for user design of interface tools. Conceptually, the Scandinavian research on user design typically creates more diametrically opposed forces between users and administrators than the application of user-design principles for instructional design. Although Carr (1997; Carr-Chellman, in press) recognizes the inherent power shifts necessary for effective user design, Scandinavian researchers tend more toward a deconstruction of the social context of work in an effort to uncover the inherent conflicts as obstacles to user engagement.

The empirical work in Scandinavian user participation and systems development was well reviewed by Bjerknes and Bratteteig (1987). Some of this work has already been reviewed in this chapter (the union projects discussed in the emancipatory design section above), but there are several additional strands of research worthy of review. There have been three studies of design for the skilled worker in several Scandinavian countries including the UTOPIA Project, which involved several Scandinavian research organizations and the Nordic Graphical Union (UTOPIA Project Group, 1981). In this case, the workers were deeply involved in the creation of a pilot-computer interface for a text and image processing system. The various tools for this system were indeed developed in cooperative ways. And although there was a strong sense that trade unions and labor's voice were strengthened through the project overall, it was not found that it ultimately contributed to universal stakeholder involvements in particular, women and unskilled men were largely removed from the process. The Florence project focused on the creation of a computer system for nurses in their daily work. It was interested not only in individuals, but also in organizational change (Bjerknes & Bratteteig, 1987). The case report of the Florence project found that working at the organizational level requires certain compromises between and among the interests of a variety of stakeholder groups. The FIRE project also examined the design of computer systems for whole organizations and found that there is a problem with attempting to meet all the needs of many workers within an organization. This stakeholder-based process can lead to serious and practical compromises that may be acceptable to all but end up being manipulative (Ehn & Kyng, 1987). However, value was found in the *redesign* process, as it can serve to facilitate user participation if properly organized. Bjerknes and Bratteteig (1995) make the final synopsis of all of these studies clear in one of their concluding comments: "The challenge for future research is to contribute to democracy in a changing working life and workplaces. To achieve this, it is not obvious that user participation in system development activities is a means or the only means." Thus, the final analysis of the Scandinavian empirical literature is, as has been the case with most of our review, mixed in terms of the impacts of user participation.

Ultimately, these reviews of the findings of Scandinavian user research expose certain gaps in the literature including the over-reliance on the case study method and the somewhat narrow definitions associated with user participation in the Scandinavian tradition. Although this foundational area has much to offer those involved in user-design research, there are also important

changes that could be made to create a more robust research product to speak to the critics of user design.

#### 27.4.2 Stakeholder Participation

User design extends stakeholder involvement beyond mere input to create empowered users who have design and decision-making powers. However, linkage to stakeholder participation literature and research is an important foundation for user design. Stakeholder approaches from the performance technology arena include organizational design (Jewell & Jewell, 1992) and cultural change (Lineberry & Carleton, 1992). As both of these enterprises attest, enacting substantive change requires more than a simple open invitation to stakeholders to participate. Each unique situation determines who the users are, and each user has a different experience and knowledge level.

Understanding the ways in which leaders can enable stakeholders to take a decision-making role in the design of their own systems of human learning is the next step toward effective implementation of technology and educational practices. In the most effective cases of both user design and stakeholder participation, control percolates from the bottom up. Grassroots movements, although rare, are perhaps our strongest cases of true user design built on the foundation of effective stakeholder participation. Kevin Kelly (1994) describes the problem of control over distributed systems (such as most social systems) by equating this problem to the example of bees in a hive. He asserts that within social systems where everything is connected to everything else (a lesson we are rapidly learning firsthand in the global economy of today), things happen quickly and "simply route around any central authority" (p. 469). Stakeholder researchers have, for some time, realized that stakeholder participation is one way to stem ineffective implementation of innovations due to this "routing around" authority.

User participation, as with stakeholder participation, becomes more complex as the size of the system involved increases. For example, stakeholder research informs us that successful participation requires multilevel and multistake participation (Daresh, 1992; Stevenson & Pellicer, 1992). This means that for something as complex as a school system, for example, stakeholders from teachers to administrators, from community members to parents, must engage in the design or participation processes at many levels including policymaking at the classroom, school building, district, and even state levels. Stakeholder participation theory and research offer the user-designer a number of similar lessons about effective implementation of empowering methods (Berube, 1970; Cooper, 1992; Davies, 1981; Epstein, 1997; Fantini, Gittel, & Magat, 1970; Sarason, 1995).

The empirical research in stakeholder participation represents a large and well-defined body of literature. For our purposes we have divided the literature into two broad areas, public-school participation and social systems participation. Within public-school participation, there are studies focused on site-based management and a series of studies that consider a number of other stakeholder participation or involvement approaches from planning to evaluation.

Although there are a number of articles on site-based management, very few of them seriously consider the question from an empirical standpoint. Two exceptions are worthy of note here as exemplars of what the literature says generally. Holcomb's (1993) study of school-based instructional leadership essentially described the progress of a large site-based instructional leadership (SBIL) program. One of the larger efforts, this study described the sessions in which 909 educators and stakeholders were involved in SBIL and data sources included anecdotal reports, evaluation forms and surveys, and a follow-up study. Holcomb found that stakeholders felt positively about their participation and were highly satisfied with the outcomes as well as their training for their changed roles. Carr's (1996) examination of stakeholder site-based management in four public middle schools found that leadership philosophies are critical to stakeholder satisfaction—that more transformative leaders tend to encourage stakeholder participation and sustain stakeholder satisfaction. In that study, data sources included leader interviews, staff and parental interviews, observations, and analysis of school-based documents when available. Based on the same study, Carr (1994) found that for stakeholder participation to be truly effective, it must be apparent to the stakeholders that the effort involved is worth their while. Specifically, phone interviews, personal interviews, observations, and document analysis led to a clear indication that community member participation is logistically difficult, and therefore, stakeholders will participate only if they feel strongly that their voice will not only be heard, but be heeded. In addition to these two studies, there are a number of cases that are detailed in an edited book focused on site-based management (Lane & Epps, 1992). Daresh's (1992) case study of Cincinnati's schools and Stevenson & Pellicer's (1992) case study of South Carolina's schools were both loosely empirical. Although they were based on real cases, the work tends to be reflective and theoretical, but both chapters found that site-based management was a useful tool and an important aspect of larger reform efforts.

In terms of the more general set of empirical studies associated with stakeholder participation in the public schools, there are six studies of note, which look at a variety of approaches. Wang, Haertel, and Walberg (1995) examined six urban school sites selected for their diversity of certain variables. Fully two-thirds of the programs in these schools specifically identified stakeholder participation as a key to successful planning. Likewise, Hafner (1992), in her review of promising practices in public-school district information systems design, found that obtaining stakeholder participation was one of the keys to success. Hafner examined three schools in California and Maryland and created profiles of each school to describe their information systems. Whereas she found that most administrators do not utilize available sources of information, such as student information, for the purposes of decision making, she did find that these districts shared "obtaining stakeholder participation" as one of the most promising practices. Henry, Dickey, and Areson (1991) reported on a case study of Virginia's creation of an educational-performance monitoring system. In this case, a stakeholder approach to development was utilized and stakeholders felt that their impact and input were significant to the final product. The study found that teachers, in particular, were

positive about their efficacy. In contrast to that study is one that considered *student* participation in the creation of program attributes (Brandon, Lindberg, & Wang, 1993). In this case study, students were involved by offering input, and although faculty retained the final decision-making power, the end product was seen by all as better than it would have been without student involvement. Similarly, Brandon (1999) found that although males participated more than females in stakeholder participation opportunities, the resulting product was stronger because of everyone's input. However, there are certainly studies that are more cautious in their advocacy of stakeholder participation. Keith, Abrams, and McLaughlin (1993), for example, balanced their enthusiastic use of stakeholders in the creation of special-education services with realistic understandings of the costs and resource demands of truly effective participation. In their study, part of a larger 18-month research project aimed at evaluating the influences of class size and inclusion of disabled learners, stakeholders were surveyed about their expectations, perspectives, and opinions. Among other findings, Keith et al. advocated for researchers to serve as teachers of research to the participating stakeholder groups.

Empirical research on social systems' stakeholder participation ranges in context from homeless children and youth programs through agricultural development. Here, again, in general, stakeholder participation is seen as a positive force for improved planning, evaluation, and social change, however, some studies are more mixed. Brandon, Newton, and Harmon (1993) conducted a study that would be considered similar to needs assessment to look at homeless children's problem issues and found that the scope of problems identified by stakeholder groups was significantly broader than that found in previous similar efforts that did not involve collaboration among stakeholder groups. Saegert (1996) also found positive effects of stakeholder participation in her case study of New York City urban housing. She found that a cooperative neighborhood program called Homebuilders was more successful than other similar tenant programs with less stakeholder participation. Jennifer Greene conducted a series of four empirical studies on stakeholder participation, which also found positive associations. Greene's (1988b) examination of troubled youth programs (such as Big Brother and Big Sister) found support for the positive effects of stakeholder involvement in terms of the utilization of evaluation findings for positive programmatic change. In her 1987 case study of two social service agencies, Greene found that stakeholder participation is worth the time and resources needed to do it well, however, only in certain circumstances—that stakeholders are truly interested, motivated, and knowledgeable and hold legitimacy as stakeholders (Greene, 1987). She also found that participation's success is contextually bound. Finally, conditional to the success of stakeholder involvement is that the process (and, we feel, the leaders) must take participant decision making seriously. In two related papers based on these same two cases, Greene found that "key elements of a participatory evaluation process can be linked to meaningful and multiple forms of results utilization through cognitive and political uses of the evaluation process" (1988a, p. 341) and that, when social action is the desired final goal, less diversity among stakeholders may be more desirable than more diversity (Mathie & Greene, 1997).

Similarly, some concerns were raised by Grudens-Schuck (2001) in her study of Canadian agricultural education programs. This qualitative single-case study focused on the Ontario Environmental Farm Plan program. The method involved 36 2-hr interviews, observations of farm workshop sessions, document analysis, and observation of other events such as farm shows. Although Grudens-Schuck found that stakeholder participation is useful, she tempered this finding with specific challenges such as conflicts among stakeholders. In addition, she asserted that there are actually few data that show the specific positive effects of stakeholder involvement.

In general, the findings of these studies point to positive, effective uses of stakeholders as sources of information, but this is more in the user-input vein than the user-design vein of change. That is, few cases of real decision-making power accorded to stakeholders are present in this set of studies. In addition, it is difficult to know whether or not this body of research represents reliable, objective data for positive effects of stakeholder participation. Although we generally reject the positivistic notion of truth, these studies are putting forward attempts at generalized findings; however, there is no deep engagement with researcher identity, and so it is impossible to be sure whether these findings are colored by researcher bias or researcher role in the context studied.

Methodologically, the studies of stakeholder participation in all of these contexts (site based, public schools, and social systems) represent a number of approaches, techniques, and strategies. Most of these studies, however, lack significant methodological attention and rigor. Only one study, that by Hafner (1992), based out of the Far West Lab, truly seems to consider qualitative research from within a carefully and appropriately triangulated framework of observations, document analysis, and interviews. Most of the above studies use strategies and techniques that mix and match in somewhat less intentional ways and rarely display the rigor associated with excellent qualitative or quantitative inquiry.

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## 27.5 OBSTACLES TO USER DESIGN

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Engaging users in the creation of their own systems does indeed carry with it certain inalienable obstacles. The primary obstacle is the problem of power and the reticence of the powerful to truly engage users (less powerful factions) in decision making (Carr, 1997). In other cases, a design team may decide to plunge into user design too late in the process, potentially at the prototype stage rather than at the analysis stage. In this case, a product is already completed and the user is left with adoption or rejection as the only option. Instead, user design optimally engages users from analysis through evaluation.

Another very important obstacle is the tendency to categorize most or all users into a single monolithic group possessing a single set of characteristics, desires, and stakes in the design. In fact, users are typically such a diverse group that there is almost no way to suggest that what one user wants is *necessarily* what others will want as well. This makes the user-design enterprise significantly more complex than one might initially imagine. For example, as a society Americans have not managed to

negotiate effectively among community members locally or nationally what the purpose of schooling is. This lack of consensus has wide-ranging impacts on our ability to reform or improve education. Other obstacles to user design are dealt with primarily in the human-computer interface literature and include user motivation and apathy, user identification, communication, value conflicts, user access, acquisition of user feedback, and effective implementation user feedback (Grudin, 1993). One final obstacle is the tendency to ignore context in expert-driven design efforts. For example, software designers often engage users in ensuring software usability, but these tasks are often accomplished outside the context in which the software is to be *used*, making effective adoption in context particularly elusive.

In any the situation, user design may be affected by the knowledge level of the users. In addition, the benefit enjoyed by users varies. Doing the work of design is difficult, requiring extensive conversation (Bohm, 1996; Jenlink & Carr, 1996). No part of this process is easy. However, in the traditional constructivist notion of learning by doing (Dewey, 1916, 1938), it is clear that the process of design offers great hope not only for increased adoption rates and ethical design practice, but *also* for human learning (Wiggins, 1998). Just as students who have been enculturated into the learning processes of traditional classrooms complain about the work of active learning of any sort, users who are asked to engage in the design of their own systems can be expected to react similarly.

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## 27.6 RESEARCH METHODS AND AGENDA

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### 27.6.1 Agenda for Further Research on User Design

This review has revealed several important issues associated with research in user design. First, there is almost no research that is specific to the field of user design within instructional systems. Second, there are significant gaps and problems with the majority of the related research literature on user design, such as user-centered, learner-centered, tool use, human-computer interface, media, and emancipatory design. This leads us to propose a specific research agenda for the further development of user design as a discipline. Most of this research agenda will be useful for user design in many contexts and not solely purposed for instructional systems.

The first step in establishing user-design research is to create a clear, shared language around user-design concepts. We hope that this chapter has, in fact, helped take that step by distinguishing among many similar (though not precisely the same) concepts such as learner centered, user centered, and other terms that may cause confusion between user design and other, potentially less robust forms of participant engagement. However, this first step needs substantially more theoretical thought and articulation. Defining user design clearly and ensuring a common language, which is also *used* in a common fashion, are imperative for a truly significant research agenda. One of the important projects associated with these definitional studies is a litmus test for what constitutes user design and what should be relegated to other categories. As has been the case with many similar movements (e.g., total quality management, alternative

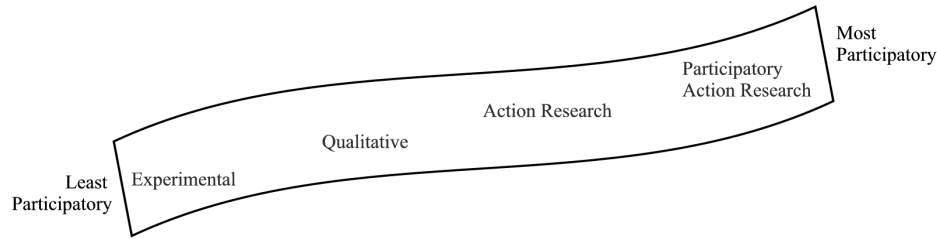


FIGURE 27.2. Continuum of empowerment in research approaches.

assessment, and site-based management) where power is usurped, there is a tendency to compromise the fundamentals of the theory to make it potentially more palatable to management, leaders, and those in power. This would completely undermine the goals of user design, and therefore, it is imperative that some level of oversight and standards be available for those who wish to call their efforts true user design.

The second step for the research agenda, in our view, is a series of studies examining user-design implementation by a number of specific variables such as individual differences (including individual motivation, metacognitive abilities, race, class, gender, and learning style), subject area (including levels of cognitive process), and mode and/or medium of delivery. For example, one might consider how user design at a micro level, in the classroom, works for rote learning, compared to higher-order thinking skills; in what ways user design works—or does not work—with learners of high or low motivation levels; and whether there are any differences among various classes, races, or genders in terms of users' abilities to engage in user design and overcome some of the theoretical obstacles that have already been discussed in the literature. Although this series of empirical studies may appear, on the face of it, to require traditional quantitative controlled experiments, nothing could be further from the truth. In fact, these studies should be primarily exploratory at this point and should engage a variety of research methods, primarily qualitative and participatory action research. Methods of research are detailed below.

The third step in this agenda building process is a series of studies examining what might be considered more traditional measures of effectiveness. Whereas we do feel that these goals may be out of alignment with the fundamental values of user design, we also see their value in terms of policymakers and the traditional inquiry community. There is value in gaining credibility through research and using it further to empower users and alternative modes of inquiry. That said, the fairly reasonable third step would be a series of studies examining user design's return on investment, efficiency in terms of time and money spent to actualize user-design goals, implementation sustainability, cost and feasibility, effects on student learning, and, finally, user empowerment from a moral standpoint.

### 27.6.2 Methods for User-Design Inquiry

To examine and build this research agenda effectively, the user-design inquirer should seriously consider the extent to which the research model chosen is in alliance with the basic values

and philosophies associated with user design. Based on this review, we feel that it would be extremely difficult to attain, particularly, the moral level of inquiry that user design demands utilizing traditional experimental research models. However, we do recognize the need for a variety of research modalities to bring the above research agenda to full fruition. Based on this need, in Fig. 27.2 we have constructed a continuum matched with Fig. 27.1. Perhaps the clearest statement of research methods that the user-designer might engage includes ethnographic field methods, cooperative design, and action research-based user design, which are more fully discussed by Carr (1997) and Schuler and Namioka (1993).

Traditional research models have attempted to remain value neutral (Denzin & Lincoln, 1994). The ethics of research and researcher were not in question and research was not linked to some sort of social action in these more traditional conceptions of inquiry. The user-designer is not necessarily informed by all types of research; rather the user-designer is best informed by certain types of inquiry that tend to engage participants in more powerful ways. Participatory action research (PAR) is one such model. PAR is research with a purpose, in context, to improve an organization with practical applications (Whyte, 1991). It is collaborative research where the "community" is in control (Stoecker, 1999). PAR makes research more accessible to those being studied and distributes knowledge to the academic researcher as well as the participants. Knowledge becomes a tool for fighting oppression. PAR empowers those who have traditionally had research done *to* them instead of actually participating in the design, implementation, and subsequent application of the results of research. The oppressed transform their own environment, with the traditional researcher playing a supporting role (Rahman, 1993).

PAR is full of surprise problems and outcomes. Unlike traditional research, participatory action researchers do not define problems ahead of time but determine, in collaboration with the participants, the problems throughout the research process. It therefore engages all of the potential problems also associated with user design such as apathy, lack of knowledge, communication, and value conflicts. Validity and practicality of research are of paramount importance in PAR. The results of the research must be clear to all involved and delivered in a timely manner for the action objective to be met. All users should have access to this information for them to be an integral part of the design process. Thus, communication and dissemination of information are an ongoing process.

PAR is the research model that is most closely aligned with user design, although user design, to this point, has had very

little specific research conducted on either process or product (Carr-Chellman, Cuyar, & Breman, 1998). Therefore, we cannot say with any certainty that PAR is the best *match* to measure the results or processes of user design but, rather, that ideologically PAR is the most closely *aligned* research model. It seems to us, on the face of it, wrong-headed to attempt to measure the results of user design with those of more traditional, particularly quantitative or experimental, research methods. This is primarily because it seems difficult, if not impossible, to measure the true worth of user design using models that are strikingly oppositional in their value systems. PAR offers the user-design community a number of important lessons regarding engaging participants in the social action of research. For example, the North Bonneville, USA, Experience (Comstock & Fox, 1993) gives the user-designer insights into the purposes of engaging users, the positionality of knowledge, empowered knowledge creation, power issues, the democratic method, and the validity of results.

A number of other examples are illuminating to those engaged in user design, including Hansen, Ramstead, Richer, Smith, and Stratton's (2001) work with school community research, Davies and Johnson's (1996) family/school relationship research, Walker's (1993) rehabilitation research, Kaplan and Alsup's (1995) AIDS prevention research, Petras and Porpora's (1993) PAR models, and McTaggart's (1997) collection of PAR around the world. Taken together, these examples form a strong corollary for user-designers to draw on in their continued practice of user-design inquiry.

We recognize the realities of empirical research as it is tied to policymaking. This leads us to suggest that whereas the methods that are most appropriate for user-design inquiry are qualitative, particularly PAR, more traditional empirical studies such as controlled experiments may be useful for public meetings and policy decisionmaking. However, in general, we feel that

these studies, for example, comparing pre- and posttest scores are not really getting at the critical issues associated with user-design implementation.

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## 27.7 CONCLUSION

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This chapter has reviewed the basic definition of user design and distinguished it from a number of related user-oriented progressive design models such as learner-centered, user-centered, and emancipatory design. The primary distinction, as laid out here, is the elevation of user to true partnership in the design process. Empirical research in related areas of user design such as user-centered, learner-centered, and emancipatory design for the most part showed positive findings for involvement of users in the creation of their own systems part. However, these studies were overly reliant on certain forms of research methods, such as case studies and surveys, and were not holistic in terms of understanding complete disciplines. Foundations of user design were drawn from Scandinavian user design and the large research base in stakeholder participation. The brief review of obstacles to user design recognized the inherent difficulties that rest in the actual practice of user design. We concluded the chapter with a brief review of a research agenda and corresponding recommendations for appropriate research approaches. True user design, as messy, inefficient, overwhelming, difficult, contentious, and perturbing as it may be to the system, goes beyond mere consultation to elevate the user to the role of a designer. It is our belief that user design offers us the clearest, most hopeful way to approach design with faithful inclusion and, consequently, more consistent and facile adoption and implementation. This elevation is a difficult, but entirely worthwhile enterprise, which we hope future instructional designers will integrate into their practices.

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