zation. Classrooms exist in schools, and in school systems. Departments exist in plants, and in corporations. This multilevel model of a learning system is consistent with the field view in systems theory, in which systems are comprised of systems, supra-systems, and sub-systems (Banathy, 1991; Borich & Jemelka, 1982). It is also consistent with a systemic view of instructional design.

Having outlined the general types and levels of context, we now turn our attention to the contextual factors within each type and level. There are many and varied contextual factors for each type of context (e.g., school climate factors, family factors). We will focus upon a group of factors that are often overlooked in designer literature but have been demonstrably influential upon cognition, motivation, and performance (Table 2).

ELEMENTS OF THE ORIENTING CONTEXT

The orienting context shapes learner motivation and one's cognitive preparation to learn. As such, both learning and transfer are facilitated by the factors that comprise the pre-instructional experiences of students. These factors have been classified in terms of the three key subcontexts—the learner, the immediate environment, and the organizational environment—as previously identified in Table 2.

Learning and transfer are facilitated by the analysis and design of orienting context factors (Marx, 1982; Ostroff & Ford, 1989). These factors influence a prospective student's motivation and cognitive preparation to learn and subsequent transfer.

Learner Factors of the Orienting Context

Learners bring to each education or training event an accumulation of experiences that shapes their perceptions of what will occur during learning. These experiences shape their attitudes toward instruction and expectations of their own success, as well as their ability to undertake various learning tasks. As such, a major portion of the orienting context is controlled by the learners themselves and is, by and large, internal.

Learner Profile and Experiential Background. Those elements of a person's background that are critical to an educational intervention's success include key demographic characteristics and previous educational experiences. In work-related training other factors are also relevant,

Table 2 ☐ Contextual Factors Within Levels of the Orienting, Instructional, and Transfer Contexts

	Orienting Context	*Instructional Context*	*Transfer Context*
Learner Factors	Learner Profile Goal setting Perceived utility Perceived accountability	 Learner role perception Learner task perception	Utility perceptions Perceived resources Transfer coping strategy Experiential background
Immediate Environment Factors	 Social support	Sensory conditions Seating Instructor role perception Learning schedules Content culture	 Transfer opportunities Social support Situational cues
Organizational Factors	Incentives Learning culture	Rewards & values Learning supports Teaching supports	Transfer culture Incentives

including the amount and nature of one's work experience (Richey, 1992).

Two of the most common demographic factors distinguishing learners are age and intellectual capabilities. There is an inconsistency between the adult education literature and studies of cognitive aging. The aging literature points to substantial age differences in not only the speed of mental processing but also in levels of subsequent mastery (Kubeck, Delp, Haslett, & McDaniel, 1996). On the other hand, much of the adult education literature minimizes these differences by citing the dominance of "practical" intelligences (Schaie, 1990) and the substitution of what Knox (1977) has called "wisdom for brilliance" (p. 421) when dealing with intellectual tasks.

In education and training, the typically independent functions of age and intellectual factors do not operate in an isolated fashion, especially with respect to more complex training outcomes such as attitude and behavior changes. Here the effects of one's past experiences as a worker and learner intervene. Attitudes toward past educational experiences, a particular type of instructional delivery, and the job or employer all interact with aging and intellectual effects to shape and orient one's performance as a learner (Richey, 1992). In summary, these factors can be viewed as aspects of one's academic self-confidence which has long been recognized as a key aspect of successful learning environments among adult learners (Cross, 1981), as well as among younger learners in formal educational settings.

Goal Setting. Goal setting has learners determine their own cognitive and affective learning goals for a particular training experience. The act of goal setting, and the types of goals set, impact both learning and transfer by establishing preparatory cognitive and affective states in the learner. The goal-setting process may take place days or weeks before instruction begins.

In their survey of training evaluation, Kraiger, Ford, and Salas (1993) indicate that "Numerous studies have supported the hypothesis that goal setting increases the likelihood that knowledge and skills acquired in training are applied on the job" (p. 321). For example, Farrell and Dweck determined that students who had established a mastery learning goal attempted more and scored better on transfer tasks than students who set a performance goal of only establishing adequacy or avoiding inadequacy (cited in Kraiger et al., 1993). In school learning, Schunk (1996) determined that children who set goals of learning how to solve problems, versus a performance goal of learning to solve them, exhibited higher motivation and achievement.

Personal goal setting not only guides students' learning processes, it instills motivation by giving them ownership in the instructional process (Broad & Newstrom, 1992; Knowles, 1987; Michalak, 1981). Attribution and self-efficacy learning theories indicate that realistic goals, when set by learners prior to instruction, can enhance effort, persistence, and skill development (Borich & Tombari, 1995). Designers need to assess the existence or absence of learner goals in the orienting context, and facilitate goal setting where necessary. According to DeShon and Alexander (1996), setting difficult goals may increase performance on simple or complex tasks.

Perceived Utility of Instruction. Perceived utility is achieved when learners believe that the upcoming instruction can be useful. The cultivation of these utility perceptions may be deliberately initiated days or weeks before the learning event. Otherwise, the learners' perceptions will be the product of peer group opinion and previous training experiences.

If learners do not see the relevance of the impending instruction, learning or transfer may be impeded by a lack of motivation (Smith-Jentsch, Jentsch, Payne, & Salas, 1996). Steers and Porter (1975) have previously identified three functions of motivation—to energize, to direct, and to maintain—and they viewed these components as essentially interactions between individuals and their environments. Perceptions of instructional utility impact each view of motivation. For example, Clark, Dobbins, and Ladd (1993) indicated that the perceived career value of a particular training program was directly linked to learning motivation. This learning motivation serves to energize and direct learning attention.

While perceived utility is often associated with learning, it has also been demonstrably associated with learning transfer, especially if the content is performance oriented (Noe,

1986; Smith-Jentsch et al., 1996). A summative evaluation of trainees' failure to apply learning to their jobs indicated that "They did not expect their behavior to contribute to organizational performance or know how it contributed" (Sleezer, Cipicchio, & Pitonyak, 1992, p. 69). A trainer survey by Newstrom (1986) indicated that a major transfer barrier was trainees' perceptions that the training was impractical, that it could not be used. Likewise, the belief that situational constraints (lack of time, equipment, resources) will not permit new skills to be used can affect motivation and transfer (Mathieu, Tannenbaum, & Salas, 1990). The perceived utility of targeted content is also tied to the perceived accountability of learning such content, another learner aspect of the orienting context.

Perceived Accountability. The notion of perceived accountability is a complex variable that addresses elements of both consequences of training and support of the content within an organization. Along with perceived utility, it determines learners' impressions of whether it really matters if they attend to the anticipated education or training program.

In school environments, students respond to the awareness that they will be subsequently evaluated on what they learn (Broad & Newstrom, 1992). The evaluation may be a student-teacher progress review, performance evaluation, or peer review. The parallel in work environments is when employees know that supervisors will require use of the learned material, or when pay increases are dependent upon training success. Baldwin and Magjuka (1991) found that trainees who entered training expecting posttraining assessment showed greater intention to transfer. Perceived accountability is an element of learner perceptions, and thus the learner context. By cultivating perceived utility and accountability perceptions, designers increase the likelihood of learning and transfer.

Immediate Environment Factors of the Orienting Context

The immediate environment varies greatly depending upon the particular context considered. In the instructional context the immediate environment is most often a classroom. However, for the orienting context, the immediate environment also involves other situations. For example, in employee training situations there are many elements of one's everyday job setting that are critical. Such factors are strengthened or inhibited by pertinent aspects of the learner's private life, such as a spousal support of learning. For most educational situations, be they school or non-school situations, the immediate environment is likely to involve the learner's private, home or recreational environments.

Social Support for Learning. To a great extent the orienting factors in one's immediate environment are social in nature. A person's attitude toward education or training frequently is influenced by other people, such as managers and coworkers, who provide "cues" about training (Tannenbaum & Yukl, 1992). In the workplace these social factors help constitute what has been called "environmental favorability" (Noe & Schmitt, 1986). The aspects of a favorable environment that influence employee training success include general conditions of co-worker cooperation, union and management support, and a climate in which most people follow the workplace rules (Richey, 1992).

Environmental favorability in schooling traditionally has included both family and community support of education, as well as support among the learner's peer group. Such suggestions are consistent with Ajzen and Fishbein's Behavioral Intention model (1980) which posits that attitudes are shaped in part by whether a person's social contacts support a given type of behavior. These factors shape preinstructional attitudes toward education and training as well as influence the transfer of training.

Organizational Factors of the Orienting Context

The organizational environment also serves as an important function in shaping learners' orientation toward learning. The "organization" may be a formal association such as a corpora-

tion. On the other hand, it may be an informally defined culture established over time, such as with an ethnic group or people living in certain geographical regions sharing similar concerns. The organizational factors are less likely to be social in nature and more likely to be factors that define the general organizational culture or climate. Like many orienting context variables they are factors that contribute to learner motivation.

Learning Culture. A culture is established by a system of shared beliefs among a group of people, such as a shared belief that the organization encourages instructional innovation. A key determinant of education and training success may be the degree to which the organizational culture is a learning culture. In such a culture, continuous learning is recognized at the organizational level (Tracey, Tannenbaum, & Kavanagh, 1995). Broad and Newstrom (1992), reviewing trainers' perceptions of transfer barriers, state that "The trainers polled believed that the typical organization simply doesn't provide strong philosophical support for the goals of training and development programs" (p. 20).

A strong learning culture provides cognitive as well as motivational orientation to learning. It often expects that its trainees will acquire higher order skills instead of verbal information outcomes. This cultural commitment to learning often takes more specific forms—as an incentive to apply new skills, time or resource allowances to apply them, the cultivation of a supervisor or peer support network, and clear policies on the importance of continuous learning. Work environment behaviors that send a message that learning is important also send cues that suggest the organization is innovative and encourages change (Tracey et al., 1995).

Likewise, a general learning culture influences educational success of children; for example, the great respect for education and learning in the Asian culture has been well documented (Chang, 1983). Wong (1992) notes the educational attainments of many Asian American children result from the efforts to being honor to their ancestors and race, and to establish themselves in an American society. Such learners come from a cultural orienting context that is strongly motivational and requires less learning preparation and support.

INSTRUCTIONAL CONTEXT FACTORS

Introduction

The instructional context is composed of both physical and psychosocial factors. These factors indirectly affect learning by directly affecting learner processing, learner motivation, and instructor behavior. As specific contextual elements, they are identifiable by the instructional designer via contextual analysis. They are also manipulable by altering contextual elements or instructional components to accommodate these factors.

We will not discuss the many acknowledged factors that are part of the instructional context. Instructional strategies, learner characteristics, objectives, practice, and feedback are all part of the instructional context but are covered in extant design texts (e.g., Dick & Carey, 1996). In this section we focus upon contextual factors that may be overlooked in designing the instructional context. For example, according to White (1972) "General estimates indicate that while about 75 percent of learning is accounted for by motivation, meaningfulness, and memory the remaining 25 percent . . . is dependent upon the effects of the physical environment" (p. 1). On the other hand, physical dimensions of color, acoustics, temperature and facilities are frequently overlooked (Hiemstra & Sisco, 1990).

Learner Factors of the Instructional Context

Learner context factors directly affect learners' cognitive, affective and physical states. For example, learning motivation is fostered by developing self-motivating capabilities and providing a motivational context (Rueda & Moll, 1994). Physical comfort, as determined by sensory conditions, influences concentration and problem solving (Tessmer & Harris, 1992). Contextually, learning is affected by sensory conditions, seating arrangement,

instructor/learner roles and task perception. These contextual factors also affect each other, similar to how seating patterns may determine learner role perceptions.

Learner Role Perception. Learner motivation is in part determined by the match between desired roles (how learners want to learn) and expected roles (how they think they will learn). That is, learners may be more motivated by perceptions that their actual learning role matches their desired one, and less so with a mismatch. Teachers who are less control-oriented may elicit more curiosity and challenge in students (McCombs, 1994). Teachers who adopt more autonomous roles may be responding to the organizational context: policies that pressure teachers toward externally imposed standards, which result in more controlling teaching behaviors (Ryan & Stiller, 1991). A learning context that allows multiple learner roles may be desirable (Tessmer & Harris, 1992), or one that allows learner autonomy (McCombs, 1994).

The roles that learners play determine what they learn, how they learn, and what role they expect the instructor to play (Harris & Bell, 1990). If students are to learn declarative knowledge they should see themselves more as receivers (Harris & Bell, 1990). If they are to engage in generative learning they must see themselves as generators (Harris & Bell, 1990; Tessmer & Harris, 1992). For multimedia knowledge exploration, students must see themselves as more nonlinear, exploratory learners (Anderson-Inman & Horney, 1993; Tessmer, in press). For successful instruction, students' perception of their learning role should match that of their teacher or software. Designers must identify the match or mismatch between these roles, and develop congruence between them.

Learner Task perception. Task perception is the learner's understanding of the instructional objectives, content, and learning process. Task perception can determine the role that learners adopt and the learning strategies they employ. The manner in which the task is perceived (and portrayed) is integral to learning.

Learners are motivated by the task perceptions of relevance and mastery. McCombs (1994) indicates that task motivation may develop from learners who see the learning task as high on personal relevance and low on threats to self-beliefs. Bandura (1977) indicates that learners are motivated by tasks that are perceived as challenging but doable. Similarly, Keller's ARCs model (1987) emphasizes the importance of helping learners perceive the task as relevant while instilling feelings of confidence that the task may be personally accomplished.

Learners' cognition is also affected by their judgments of the type and ease of the learning task. Ceci & Roazzi (1994, p. 77) indicate "if a task is perceived as related to a domain of knowledge that is well structured, it will result in more efficient processing then if it is seen as belonging to a less elaborated domain." Similarly, Salomon (1986) demonstrated that the media in which a topic is embedded determines the perception of the ease or difficulty of the learning task and affects the amount of mental effort invested.

Task perception determines the amount and type of cognition expended by a learner. However, more experienced learners are apparently able to predict their ability to learn from a particular medium (Cennamo, Savenye, and Smith, 1991). These conclusions are compatible with Richey's (1992) finding that learners' attitudes toward the delivery system not only are indicative of their satisfaction with instruction but are also predictive of the amount learned. In contextual analysis, instructional designers anticipate task perceptions of relevance, difficulty, content structure, and opportunity to perform.

Immediate Environment Factors of the Instructional Context

The immediate environment is the physical space where learning takes place: a classroom, auto, lab, or home computer room. The physical condition of the immediate environment is a potent force in learning. The physical environment does not so much increase learning when it is excellent as inhibit it when it is poor. That is, a certain level of adequacy must be

attained in seating, acoustics, temperature and lighting for the proper learning to take place (Knirk, 1979; Poulton, 1972; Tessmer & Harris, 1992).

In particular, this physical adequacy may be vital for learning tasks or activities that require high levels of cognitive processing, sustained attention to detail or concentration. It may also be critical for learners who have low levels of attention, interest or motivation. Properly designed, the immediate environment can support collaboration, authentic learning, and team instruction (Stuebing, Giddings, & Cousineau, 1992). Improperly designed, it can lead to environmental stress, which in turn leads to cognitive fatigue (Bonnes & Secchiarolli, 1995).

Sensory conditions. The sensory conditions are the thermal, acoustic, olfactory and tactile features of the context that affect learner comfort. The level of comfort (or discomfort) influences students' affect, cognition, and conation. Students are demotivated and distracted by hot, cold, stuffy, or loud learning environments, affecting basic learning tasks such as reading and calculation (Bailey, 1975; Knirk, 1979; Tessmer & Harris, 1992). Uncomfortable seating may irritate learners who must sit in it for extended time periods (Tessmer & Harris, 1992). For complex mental tasks, loud or distracting noises may interfere with performance and lead to fatigue (Glass, 1985), but white noise or periodic sound changes may maintain arousal (Bailey, 1985; Poulton, 1972). Maintaining adequate sensory conditions allows learners to focus their resources to the task at hand.

Seating. Classroom seating is one of the most researched contextual elements (Fulton, 1988). Seating comfort affects the learner's (and instructor's) ability to sustain attention (Tessmer & Harris, 1992) and can facilitate task performance (Bailey, 1985; Gay, 1986). Left in uncomfortable seats for extended periods of time, learners become distracted from the learning or performance task. As Liebbe (1980, p. 22) indicates, "the mind can only absorb what the seat can endure."

Seating arrangements color students' attitude toward the learning experience (Weinstein, 1979). The arrangement communicates learner and teacher roles: if the learner is to be more recipient or participant in the learning experience (David, 1975; Sommers, 1969) or if the instructor is to be more authority than guide (Getzels, 1975). Steele (1973) explains, "The structure of a classroom in which the teacher's desk faces the students speaks clearly about how the system expects the student to see (himself or herself)—one of the herd, non-special, and having no identity when compared with the teacher, who has a unique place at the front of the room." (p. 51).

The seating pattern may also affect cognition by encouraging or discouraging different types of learner-learner or learner-teacher interaction. Seating may have a *sociopetal* aspect (encouraging interaction) or *sociofugal* one (discouraging interaction). For example, a circular seating pattern is more sociopetal and encourages interaction (Hiemstra & Sisso, 1990). Crowded seating can discourage collaborative learning or coaching strategies (Stuebing et al., 1992).

Instructor role perception. Instructor role perception may be as critical to learning as learner role perception. There must be a match between the instructor and students' perception of their respective roles (Harris & Bell, 1990; Tessmer & Harris, 1992). Stuebing et al.'s (1992) work with teachers indicates that interactive computer technologies necessitate a teacher role shift from lecturer to mentor or coach for the instruction to be successful. Similarly, Hooper and Reiber (1994) indicate that teachers who foster a "student as bucket" learning role will fail to fully implement or exploit knowledge construction educational technologies.

Learning schedules. The amount and regularity of learning times can affect students' recall of prior knowledge and their processing of new information. The amount of time actually available for learning may be substantially less than the time allocated for it. For example, students may have regular "1-hour" computer laboratory sessions that actually allow 20 minutes of learning time when lab travel, classroom management and software startup have been accomplished. Abbreviated learning

schedules can mean a student does not have time to process, practice and review lengthier lessons, limiting their cognitive processing and sense of task completion. Students who learn topics in short "bursts" may then require more lesson bridges (recall of prior knowledge) or modular lesson construction (Tessmer & Harris, 1992; Tessmer, Jonassen, & Caverly, 1989).

Whatever their length, learning sessions may be contiguous or sporadic (e.g., two sessions one week then another two weeks later). Learners who have sporadic learning patterns may require more recall of prior knowledge activities. Such activities help learners assimilate the new learning into the proper long-term memory structures by recalling them into working memory. Through contextual analysis and design, designers specify the length of learning sessions, their regularity, and the time of day in which they are offered.

Content culture. One of the emerging contextual considerations is the culture of the learning context, typified by instructor and student beliefs, roles, and practices. A context in itself, we refer to this as a "content culture" because it may be characterized by the subject domain in which the instructor and students function. For example, accounting, literature, and science are distinct content cultures wherever instructors specialize in these topics. The cultural norms tend to be more similar in the same content domain at different schools than different content domains in the same school (Blumenfeld, Marx, Soloway, & Krajcik, 1996; Grossman & Stodolsky, 1995; Siskin, 1994). These domains hold for secondary and university school levels (Becher, 1989; Grossman & Stodolsky, 1995). In training, these content cultures are construed as intra-institutional "professional domains" such as mechanical engineering, chemistry, and electrical engineering (Bucciarelli, 1988).

The content culture is a particularly important consideration to instructional design projects involving innovative instructor activities or materials. This is because the culture reflects teachers' instructional beliefs and behaviors, which should congrue with those implied by the innovation. As teachers model their beliefs and behaviors, they may be passed onto the students of that context (Rovegno 1993). In their study of content as context in high school teachers, Grossman and Stodolsky (1995) note that instructor's content area reflects beliefs about teaching perspectives (i.e., transmission versus interpretation perspectives), the inherent sequentiality of the subject matter, and power. Tobin and Dawson (1992) and Hooper and Reiber (1994) indicate that instructional developers must consider this culture, identified through teaching metaphors, myths, and images, in their instructional materials development.

Other immediate context factors may affect learning, such as lighting, content lifespan, equipment ease of use, and learning materials adaptability. For further information on these factors the reader is referred to Tessmer and Harris (1992).

Organizational Factors of the Instructional Context

The degree to which an organization endorses or supports instruction has a direct bearing on its feasibility and impact.

Rewards and values. The organizational culture is a system of shared meaning, beliefs and values that characterizes the organization (Chelte, Hess, Fanelli, & Ferris, 1989). It is expressed in terms of organizational ritual, reward systems, policies, stories, and language (Siehl, 1995). The organization approves and rewards certain practices and disapproves and punishes others.

The congruence among organizational values and learning practices can determine the success of learning. For example, an organizational culture that promoted individualism and competition hindered students' learning of cooperative strategies and technologies (Orlikowski, 1992). A school system that had suffered through several imposed organizational changes was resistant to educational innovations (Tessmer & Harris, 1992). Since every instructional design is an innovation, designers are change agents, so they must work to identify the organizational attitude toward their efforts.

Learning and teaching supports. Organizational supports consist of such elements as time