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Paradigms of Knowledge Production in Human-Computer Interaction: Towards a Framing for Learner Experience (LX) Design

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In this chapter, I contextualize the knowledge production of the human-computer interaction (HCI) community within broader epistemological, historical, and disciplinary framings of this scholarship. I describe the historical landscape of HCI as a discipline, including the significant subcommunities that have formed over time as the discipline has become more inclusive of disciplines and forms of knowledge. This description will map across cognitivist, social constructivist, and humanist/design threads of the community, all of which are still active participants in the creation of HCI knowledge. These threads are contextualized for a learning, design, and technology (LDT) audience, including historical and theoretical connections to scientific and humanist modes of instructional design scholarship. I conclude with a preliminary grounding for learner

experience (LX) design and a conceptual roadmap that draws from strengths in the LDT and HCI communities.

1. Introduction

User-centered approaches to design have experienced rapid adoption in industry contexts in the last decade, with the underlying promise of a better connection to user needs and experiences, and ultimately, increased profit (Brown, 2009; R. L. Martin, 2009). This approach, often known by the moniker “design thinking,” has been taken on perhaps most substantially by practitioners known as user experience (UX) designers—a transdisciplinary role that builds upon and beyond elements from psychology, graphic design, and anthropology, among other disciplines. UX design has risen in prominence in conjunction with “design-first” approaches. However, the roots of UX—including a focus on user experience, user needs, and attendance to the socio-cultural and organizational contexts of use—have their origin in numerous disciplinary traditions, including human-computer interaction (HCI), interaction design (IxD), cognitive psychology, and human factors. Even now, the definition, core knowledge, and disciplinary perspective of UX designers is contested and rapidly growing (Kou & Gray, 2018; Lallemand et al., 2015).

While UX design is the most dominant job title umbrella relating to human-centered design, its lack of precise origin means that there is little cohesive intellectual history that might be accessible to an instructional design audience. To account for this, I will focus on the HCI domain due to its importance and longevity in the study of interactions of people with technology, and due to its present role in theoretically informing many UX practices. I will frame this discussion specifically on knowledge production in HCI and the ontological and epistemological dimensions of that production that rest on disciplinary

perspectives, concepts, and historical patterns of inquiry that use this perspective as a means of identifying connections and tensions with LDT scholarship and practice. By LDT, I refer both to communities of scholarship and practice that have relevance to learning theory, instructional theory, and the uptake of this knowledge in the creation of learner experiences in many educational forms and contexts, including informal learning, K-12 education, higher education, workforce development, and corporate training. Formal manifestations of LDT might include graduate programs in instructional design, instructional technology, educational technology, or the learning sciences.

In this chapter, I will set the stage for the emergence of a transdisciplinary learner experience (LX) designer role, attempting to align—or at the very least, raise—disciplinary perspectives from HCI, UX, and LDT. First, I will provide an overview of my positionality as a researcher and scholar in these communities, which may be useful in identifying points of overlap and also potentially lack of awareness to certain literature. Second, I will outline historical and current patterns of knowledge production and disciplinary engagement in HCI. Third, I will situate theories, concepts, and methods from HCI and UX perspectives that may have value from an LDT perspective. Fourth, I will offer a preliminary conceptual roadmap and grounding for the future LX design discipline. Through these sections, I intend to outline a means through which HCI scholarship might be contextualized and interpreted by instructional designers, connecting disparate conceptual and methodological vocabulary, while also providing a means of describing different epistemological orientations that impact the uptake of this knowledge.

2. Researcher Positionality

As part of any critical praxis, it is important to recognize the experiences and disciplinary perspectives to which we relate, which

vocabularies we rely upon, and where in turn these experiences and perspectives might introduce areas of weakness and strength in knowledge building. I currently do scholarship at the intersections of LDT, human-computer interaction (HCI), and design, with particular areas of focus in design education, ethics and social responsibility, translational science, and design practice. I earned a BS and MA in graphic design, with a strong focus on web development and new media, with overlapping interests in art history, art criticism, and semiotics. I was first introduced to the field of instructional design as an art director for a management consultancy, where I served as an art director, and later took on substantial responsibilities for learning strategy and technological implementation. Parallel to this work experience, I earned a MEd in educational technology, where I became familiar with learning theory and theories of instructional design. By the time I began my PhD in instructional systems technology in 2010, I had substantial familiarity with the nature of "real world" instructional design practice, but this experience did not resonate with my understanding of theories and knowledge building practices in the field. Through my work with my doctoral advisor, Elizabeth Boling, I began to explore the broader world of design theory and the role of design in LDT (Boling & Smith, 2018). In parallel, I discovered the world of HCI, which at Indiana University was—and still is—strongly linked to transdisciplinary design theory and practice. During my doctoral work, I had the opportunity to conduct studies and publish work in multiple areas of disciplinary focus, including HCI, design, and education, and it was through this set of experiences that I began to identify opportunities for translational work between academia and practice, and in a transdisciplinary sense across, through, and above established disciplines.

I share this background to temper expectations regarding what perspectives I can account for, as well as to show the deeply subjective and experiential role that all of us occupy as researchers, instructors, and designers. To use Schön's (1990) language of

repertoire, the vocabularies, theories, methods, concepts, and processes of each of these fields have left a unique imprint on my way of seeing the world and impacts my praxis in ways that are not even fully accessible to me (Boling et al., 2017). Thus, I will present one view of how HCI and LDT might productively be connected. You, the reader, will have to confront differing epistemological traditions, the difference in disciplinary patterns of knowledge production, and even the difference in philosophical and critical orientations and choose your own path forward. I will seek to leave behind the "breadcrumbs" of my own experience so you can find your own path through the literatures of these fields, with the goal of defining your own transdisciplinary practice.

3. HCI as a Discipline

In the 1960s and 1970s, the need to engage everyday users in the operation of technological systems birthed the field of human-computer interaction (HCI), concretized through shared interest among cognitive psychologists, computer scientists, and human factors engineers. HCI has existed since this time under many different academic framings, including computer science, information science, human factors, and informatics. While the field has built extensive scholarly knowledge through conferences (most notably the ACM CHI Conference on Human Factors in Computing Systems, or "CHI"), the lack of undergraduate programs in the field have led to a lack of general awareness of this community, particularly within the educational community. Exacerbating this issue of awareness, HCI—like its computer science siblings—has historically prioritized conference publications, which are refereed at an equivalent level to journal articles in education and other fields. Thus, CHI conference publications and those of partner conferences (e.g., DIS, CSCW, Creativity and Cognition, UIST) are considered to contain the most rigorous knowledge in the HCI field. While the HCI community is not

as large as the educational research community, writ large, the field is highly productive, with 647 full papers (roughly equivalent in prestige and rigor to journal papers in education) accepted at the 2020 CHI conference alone.

Given the modern awareness of UX Design, particularly in the rise of design approaches in industry, it is also important to situate UX within or in relation to HCI. First, while many UX designers are trained in graduate HCI or Information Science programs, these paths are not exclusive or predetermined; many UX designers originate in other fields, such as industrial design, graphic design, computer science, or marketing. Thus, many fields consider themselves to have some claim to UX, which is aligned with program offerings and common degree paths—made possible because UX in some ways is more of a philosophy than a concrete and objectively defined set of skills or theoretical perspectives. Second, while UX approaches and methods resonate strongly with trends of human-centered design within HCI, UX is not generally considered to be a subset of HCI, but rather a superset. This means that while HCI knowledge can often be seen as foundational to UX practice, many practitioners do their work quite ably without this full historical backdrop (Gray et al., 2014). Third, a gap in research and practice has resulted in a lack of resonance and awareness between the knowledge produced in academic settings, and the knowledge required to expertly inform expert practice. This gap, like those in many other fields, points towards mismatches in knowledge generation, categorization, and eventual use (Colusso et al., 2019; Gray et al., 2014). For all of these reasons, I cannot present HCI knowledge production as a totalizing force over all of UX practice; instead, I position HCI as one of multiple traditions that might inform a future LX role, and one that I am perhaps uniquely positioned to share and contextualize to an LDT audience due to my educational background and research foci.

HCI has a long and tumultuous history, marked by the rapid rise of technological capability, the equally rapid uptake of technology in

society, and the diversification of knowledge from scholars who have introduced theoretical and conceptual lenses from a range of disciplinary perspectives. These expansions of the field over time have been theorized by multiple scholars using the language of "waves" and/or "paradigms" (Table 1). While each of these mapping approaches is reductionist in at least one dimension, these accounts of HCI scholarship may help to establish the types of perspectives that the field has historically valued, and the epistemological orientation of the knowledge generated through a given perspective. In consolidating these differing perspectives, one might be tempted to see certain perspectives as more "evolved" than others, or to think that—like Kuhnian shifts—certain perspectives are no longer in vogue. In contemporary HCI scholarship, knowledge is still produced in all three paradigms, waves, and sets of typical theoretical approaches. At the annual CHI conference, papers stemming from all three of these traditions are present, and valued for their respective merits by subsets of the overall community. However, the boundaries and field of view of each perspective are still epistemologically and ontologically limited. As Harrison et al. (2007) articulate: "The 1st and 2nd paradigms emphasize the importance of objective knowledge. The 3rd paradigm, in contrast, sees knowledge as arising from situated viewpoints in the world and often sees the dominant focus on objective knowledge as suspect in riding roughshod over the complexities of multiple perspectives at the scene of action" (p. 13). Thus, we can see the continued value of engineering-focused perspectives suggested by the 1st wave, while also identifying new opportunities when engaging in humanistic approaches in a 3rd wave stance (Bardzell & Bardzell, 2015).

Table 1

Historical and Conceptual Alignment of Paradigms, Waves, and Typical Theoretical Approaches in HCI

	One	Two	Three
Paradigms (adapted from Harrison et al., 2011, 2007)	Interaction as "man-machine coupling," with a focus on optimizing fit between person and machine.	Interaction as information communication, with a focus on optimizing accuracy and efficiency of information transfer.	Interaction as phenomenologically situated, with a focus on support for situated action in the world.
Waves (adapted from Bannon, 1995; Bødker, 2006)	Individuals "rationally" operate technological systems to accomplish work tasks.	Groups work together with a collection of applications, primarily in work settings and through interaction in well-established communities of practice	Interaction moves from the workplace to our homes and everyday lives and culture. This interaction is increasingly non-work, non-purposeful, and non-rational.
Typical theoretical approaches (adapted from Rogers, 2012)	• Cognitive modeling • Human factors	• External cognition • Distributed cognition • Ecological psychology • Ethnography and ethnomethodology • Situated action • Activity theory	• Embodiment • Experience • Design • Cultural studies • Critical theory, queer theory, feminist theory, post-colonial theory, post-humanism

The interaction(s) among these perspectives is, in many ways, the greatest potential strength of HCI as a field. New paradigms may illuminate hidden concerns in other paradigms; some paradigms might reframe issues such that approaches taken within other

paradigms are seen to be inappropriate or ill-structured. And ultimately, the reframing of HCI outcomes as being designed has shifted priorities from experimentally verifiable and objective knowledge (e.g., 2nd wave or paradigm) to socially and culturally defined subjective knowledge (e.g., 3rd wave or paradigm). For instance, while design knowledge in the second wave is primarily concerned with guidelines or prescriptions that are repeatable regardless of context or user, design knowledge in the third wave encapsulates multiple types of knowledge (cf. intermediate-level knowledge; Löwgren, 2013) that are under the control of the designer and the decisions that she chooses to make. Thus, Harrison et al. (2007) position this change in perspective as a shift from "verified design and evaluation methods" to "a palette of situated design and evaluation strategies." This view of design activity and the heightened role of the designer is resonant with recent work in the LDT community describing the subjective-yet-professional role of the designer in creating the not-yet-existing (e.g., Boling et al., 2017; Gray et al., 2015).

An example might be helpful in drawing distinctions—and potential connections—across these three waves or paradigms. Consider the design of a tool to encourage communication among individuals. In the first wave or paradigm, this would automatically be assumed to take place within a work setting, since this performance dimension was initially the center of the field. Rather than considering communication as emergent or situated, the focus would be on optimizing fit between person and machine, with the metaphor of human as a machinist "cog" as the primary metaphorical framing. In this context, it is difficult to engage with any philosophical position other than that of efficiency or speed of production. If the human is a cog—and often as a solitary actor working in tandem with a larger machine—then the goal should be to optimize fit and remove any barriers to increased efficiency, and thus any focus of encouraging communication would have to focus on the working of humans as rational actors (Card et al., 1983). This might feel most similar in

approach to programmed instruction or cognitivist approaches to learning which value recall or speed of instructional progress. In the second wave or paradigm, improvements in communication would still most likely be presented in a work context, although the role of communication might shift from merely being efficient to perhaps creating a sense of belonging. Building upon theories from sociology and anthropology, the designer might identify opportunities to build team cohesion both in person and across distance (G. Olson & Olson, 2000), while also attending to the accuracy and efficiency of communication capability. In this context, the focus is still on improving work practices, but the social role of human actors is more dominant, and the agency of users to orchestrate their own experiences begins to be foregrounded. This might feel similar to most constructivist or learner-focused efforts in an educational context, where the agency and unique role of the student is valued alongside their ability to attain educational goals. In the third wave or paradigm, communication might be supported in a variety of contexts—from performing one's identity on SnapChat (McRoberts et al., 2017), to the "umbrella movement" that encouraged local democracy in Hong Kong (Kou et al., 2017), to the ability to communicate with one's romantic partner across continents (Sengers et al., 2005), to supporting communication among sex workers in order to identify bad actors (Strohmayer et al., 2019). In each of these contexts, the meaning and importance of communication might differ, resulting in contextually, socially, culturally, and interactionally-bound differences in design, adaptation, and use. This work may require the researcher to take on an activist role by attending to power differences, marginalized communities, or even issues of policy or illegal behaviors. In this context, the subjective qualities of interpretation, experience, and embodiment are foregrounded, with other elements such as technical feasibility, efficiency, or fidelity assumed to be present. This type of work is rising in prominence in educational contexts, primarily in relation to underrepresented groups or social justice, where the lived experience of learners is valued on its own merits and not just in relation to imposed standards.

In summary, HCI as a field can be seen as distinct from, yet related to UX design practice. HCI scholarship includes conceptual and methodological contributions from a range of disciplinary and epistemological perspectives, each of which is limited in scope, generalizability, and resonance with the complexity of everyday life. It is in the cross-section of these approaches—from computation, technological capability, and humanism—that the user and their needs can be identified and acted upon.

4. Building Connections to Relevant Instructional Design Scholarship and Concepts

As the previous section describes, HCI scholarship exists across a range of disciplinary and epistemological perspectives, which have been continuously reinforced and extended over the past three decades. This pattern of disciplinary inclusivity and translation is substantially different from the relatively isolated intellectual position of the LDT community over the same period (see Smith & Boling, 2009, for an example of this isolation in relation to design terminology and theory). Thus, while the LDT community has focused largely on issues relating to design process (see Branch, 2009; Gibbons et al., 1996, for some of these historical roots), the larger design community—and by extension, HCI scholars—have sought to create and disseminate design methods. ADDIE and its many derivatives focus on an overarching theory of praxis (Branch, 2009), while design disciplines more broadly construed (and as adopted in HCI, often) focus on the idea of method (Gray, 2016). This is evident through supporting texts (B. Martin & Hanington, 2012) and through a focus on method development in the HCI literature, although not always with successful adoption in practice (e.g., Roedl & Stolterman, 2013). While traditional views of theory and knowledge still tend to dominate

LDT scholarship and practices, there is increasing engagement with other disciplinary communities such as HCI, particularly in the learning sciences.

I provide a brief comparison of process "stages" commonly used in LDT and methods that are commonly in use in HCI and UX practice in Table 2 as an example of this difference in language. While ADDIE is inherently limiting (see relevant critiques from Boling & Gray, 2014; Smith & Boling, 2009), drawing parallels between disciplinary perspectives is useful in highlighting the methods-focused language of UX across a range of potential design moves. The rich array of methods used opportunistically across multiple design "phases" or "stages" also indicates a particular focus on the lived experience and context of everyday users across the design engagement that is not easily captured in a typical ID phase or method (e.g., learner analysis; Gray, 2015). Much of this richness of method is the result of the stronger modern alignment of HCI and UX practices with methods developed across numerous design disciplines (see B. Martin & Hanington, 2012, for a widely-adopted compendium of these methods), as compared to the relatively weak notions of design that are common in LDT (Smith & Boling, 2009). These views of design and design process have the potential to diverge in unproductive ways—as instructional designers seek to work with UX or HCI practitioners—if they are not recognized and reconciled. Part of this reconciliation is a further engagement in the research-practice divide and the differing definitions and conceptual vocabulary that describes design activity. This dialogue and conversation is still in nascent stages in the HCI community (Brier et al., 2017; Gray et al., 2014; Reeves et al., 2018), and is in its beginning stages in the LDT community (Boling et al., 2017; Gray et al., 2015; Smith & Boling, 2009).

Table 2

Brief Comparison of Process Language from Instructional Design With HCI or UX Methods/Concepts

ID Process Stages	Examples of HCI or UX Methods or Concept[a]
Analysis	User research (as an umbrella term) • Personas (Marsden & Pröbster, 2019) • Scenarios • Contextual inquiry (Beyer & Holtzblatt, 1998) • Ethnographic engagement • Interviews
Design Development Implementation	• Prototyping (Lim et al., 2008) - Sketching - Wireframing - Medium to high fidelity • Problem framing (Dorst, 2015) • Probes (Wallace et al., 2013) • Deployment studies (Chilana et al., 2011)
Evaluation	User testing (as an umbrella term) • Usability testing (Dumas & Redish, 1999; Reeves, 2019) • Cognitive walkthrough (Wharton et al., 1994) • Experience sampling (Hektner et al., 2007) • Wizard of Oz (Dahlbäck et al., 1993) • Experience prototyping (Buchenau & Suri, 2000)

[a] Any methods not directly referenced can be found in compendia of methods such as the work of B. Martin & Hanington (2012).

Following on from this contrast between process and method, there are also larger vocabulary misalignments that make movement across and within HCI and LDT disciplines problematic. While this is a known issue relating to transdisciplinary research and practice (Blevis &

Stolterman, 2009; Gray & Fernandez, 2018), recognizing areas of overlap and disconnect is an important starting place to building knowledge at the inter- and trans-disciplinary levels. As noted in Table 3, there are some areas of conceptual alignment among HCI/UX and LDT. For instance, both fields have used Dewey's notion of pragmatist aesthetics (e.g., Dewey, 1934/2005) to guide user/learner experiences, and both have a range of scholarship types with differing standards of rigor, differing outcomes, and different potential use cases. There are also areas with potential for alignment which, if undertaken without epistemological investigation, could result in false equivalency. For instance, while principles and best practices from LDT can easily be found in Löwgren's (2013) notion of intermediate-level knowledge, drawing an equivalency without attending to overarching notions of design knowledge and the relationship of these knowledge types to theory or precedent knowledge could result in improper conclusions. Finally, there are areas where each field has gaps that are well-covered by other fields. For instance, the use of participatory design and co-design approaches in HCI/UX has facilitated new modes of engagement with end users that is not present in traditional LDT scholarship. Similarly, the focus on learning and instructional theory in the LDT community does not have a strong equivalent in the HCI/UX community. In this latter case, we might probe historical examples to see where current opportunities might lie. For example, in the early days of desktop computing, Carroll and colleagues generated the "training wheels" model of instruction to encourage active exploration and early failure (Carroll & Carrithers, 1984), leading to the theory of minimalist instruction. Although this theory was introduced in an HCI context, it only had a lasting impact in the LDT context, aside from a brief reintroduction by a recent student of mine in relation to mobile onboarding experiences (Strahm et al., 2018). Thus, we can see the barriers between these concepts—and their potential for uptake in the alternate disciplinary context—as permeable, but requiring translational effort and awareness of the knowledge production norms of all relevant communities.

There is also a potential for alignment in a discussion of research methods more broadly. While multiple forms of research design are common, both in education and in HCI contexts, there are notable differences as well (see J. S. Olson & Kellogg, 2014, for an overview of research methods for an HCI audience). While LDT conceptions of research are primarily attached to formative and summative evaluation or related to patterns of implementation or adoption, HCI and UX researchers view research approaches more broadly in ways that may seem diffuse or unrecognizable as research to the LDT community. Drawing from Table 2, HCI researchers commonly use intermediate or final prototypes to elicit user feedback, but the temporal positioning of these engagements can vary broadly. For instance, a probe might be used as a means of identifying situational or contextual characteristics of user groups—a material artifact that can then engage users in sensemaking that is valuable for further work. One example of this is Chatting and colleagues' (2017) use of mobile phone sensors to create customized probes to interrogate family socializing and interaction practices and inform further research and technological development. While the probes themselves look complete, they are merely props through which to gain user involvement and feedback. In contrast, deployment studies can be used to gain summative feedback on the creation of a designed system by end users. But this need not be in the service of a "shippable" product. As an example of the indeterminacy of even a final product, Odom and colleagues (2019) created a highly polished sound system called Olly that was deployed into users' homes for an extended period of time. This system was intended to engage users in considering concepts of "slowness" and data, with the goal not of finalizing a system for production, but rather as a means of creating an interactive vocabulary to engage with in future design work. These two examples of probes and deployment materials have much in common and serve as two examples of research through design (RtD)—whereby the researcher/designer studies their own practices of both creation and engagement with users to enrich foundational concepts and vocabulary for future work. While there are some

parallels with RtD and design-based research (DBR) common within educational research, the epistemological traditions that allowed these approaches to emerge in HCI and LDT, respectively, are quite different. While DBR is intended primarily as a set of design activities with scientific outputs (i.e., theory generation) as a goal, RtD originates in the practice of art and design, and does not generally result in the generation of theory. Instead, RtD results in a more situated and phenomenologically-aware set of practices and vocabulary, which may also then point to opportunities for the generation of theory (Bardzell et al., 2015).

Table 3

Brief Comparison of Terminology With ID/Educational Origins and HCI/UX Origins

ID or Educational Research Concept	HCI or UX Concept
Learning as aesthetic experience (Parrish, 2009, 2013)	Technology engagement as aesthetic experience (Wright & McCarthy, 2004)
Design-based research (Wang & Hannafin, 2005) + Design cases (Boling, 2010)	Research through Design (RtD) [a] (Zimmerman et al., 2007)
Study of design practices (Boling et al., 2017; Boling & Gray, 2014; Gray et al., 2015)	Practice-led research (Kuutti & Bannon, 2014)
Principles, best practices, and formative research (Reigeluth & Frick, 1999)	Intermediate-level knowledge (Löwgren, 2013)
N/A [b]	Participatory design (McCarthy & Wright, 2015) and Co-design (Sanders & Stappers, 2008)
N/A [b]	Critical design (Bardzell & Bardzell, 2013), speculative design (Dunne & Raby, 2013; Elsden et al., 2017), and design fictions (Blythe, 2014; Lindley & Coulton, 2016)
Learning and instructional theory (Reigeluth, 2013)	N/A [b]

[a] While RtD is aligned with DBR, the aims and design knowledge gained through RtD varies substantially from common DBR implementation due to underlying understandings of design theory and design knowledge.

[b] This implies that there is no strong intellectual tradition, although isolated examples may exist.

Table 3 also provides potential insight into substantial research gaps in the LDT space, and narrower or different conceptual gaps in the HCI or UX literature. I wish to call attention to two specific areas where there is almost no research presence: (a) participatory and co-design approaches, and (b) critical and speculative work. Participatory design (PD) and co-design are philosophically aligned methodologies that aim to enable everyday people to engage in design processes in ways that value their lived experience and flatten traditional structures of power or hierarchy. PD in particular has activist and social justice roots in 1970s Scandinavia; as a result, PD seeks to not only identify stakeholders that may have a "stake" in the system being designed but also to identify those individuals who may not yet have a seat at the table (Simonsen & Robertson, 2012). In HCI contexts, participatory approaches have been used to engage marginalized populations such as rural LGBTQ+ youth (Hardy & Vargas, 2019), more fully involve a range of individuals in citizen science work (Qaurooni et al., 2016), and include women's voices in the design of breast pumps (D'Ignazio et al., 2016). The vocabulary of participation and inclusivity is present in the broader educational literature, but is discussed infrequently in an LDT context, and is almost completely lacking in explicit support through design processes and methods. In an extension of this critically-oriented approach to design activity, critical and speculative work has also risen in prominence in HCI scholarship as a way of identifying potential future social impact, calling attention to inequity, and

encouraging dialogue and social activism. In HCI contexts, this research approach has been used to interrogate gender and design through an analysis of the Menstruation Machine (Bardzell et al., 2015), foreground worker rights and the limits of the quantified self (Toombs, 2014), or even to investigate how lawn-mowing robots could be caring members of a community in the year 2040 (Toombs et al., 2020). While some critical and speculative fiction research might appear trivial or even silly, its goal is to uncover, displace, or bring into language structures that designers need to attend to now and in the future. This space is largely unexplored in an LDT context, even while privacy threats are rising in areas such as learning analytics, which could be productively explored through creative and defamiliarizing methods such as critical design and speculative design fictions (Gray & Boling, 2016).

5. Toward a Definition of Learner Experience (LX) Design

Building on the disciplinary perspectives—including both gaps and opportunities—of LDT and HCI/UX, there are noticeable areas of overlap in perspective and approach which may indicate conceptual boundaries for a future Learner Experience (LX) design role. As is already the case with UX design, job roles and titles have quickly outpaced the academic community and means of formal preparation (Kilgore, 2016). Thus, while I cannot propose to define the field in relation to its present or future form, I do wish to offer a set of guiding principles which may be worthwhile to consider as practitioners and academics alike shape the field and offer formal educational preparation in the future.

As a starting point, I come from a combination of design, education, and HCI traditions, and view design activity as inherently always already about learning. Whenever we engage with what Nelson and

Stolterman (2012) term the “not-yet-existing,” we must rely on our prior experience and our ability to learn something new in order to make sense of and use that new designed artifact. Thus, the drive in UX design to make experiences feel “intuitive” could merely be seen as a restatement of learning outcomes and objectives. In this spirit, I propose some existing areas of alignment that could be exploited as a conceptual pathway towards LX:

1. Designing for aesthetic experience, not just recall or performance in traditional framings. Rather than focusing primarily—or only—on learner performance through measures which are presumed to be objective, build upon notions of learner agency and lived experience from critical pedagogy and aesthetic experience to encourage the creation of meaningful, situated, and memorable learning experiences. Rather than assuming the only philosophy of instructional design to be the creation of “efficient, effective, and appealing” experiences (Merrill et al., 1996), consider other alternative philosophies that may resonate more with the lived experience—socially, culturally, and experientially—of particular groups of humans that wish to learn.
2. Considering the acquisition and performance of knowledge in real life/authentic contexts (cf. plans and situated actions; Suchman, 1987). Rather than assuming that education or learning must occur in certain settings or through predictable learner and instructor roles, identify opportunities for learners to engage in processes of self discovery, co-construction, and empowerment. This requires investigation into the lived experiences, mental models, systems of structural oppression which learners might exist within, and the identification of learning systems that address relevant gaps or opportunities in ways that resonate with this subjective experience.
3. Queering, reformulating, and empowering the user/learner while attending to the impact on the larger social, cultural, and

environmental context(s). Rather than assuming that learners have similar characteristics and experiences, which often advantages certain types of students in powerful structural ways, identify mechanisms whereby learning experiences can value unique and subjective learner qualities. By recognizing alternate modes of learning—and their potential for broader social outcomes—new classes of learners that have been traditionally disenfranchised may find the space to thrive and become empowered.

4. Framing design as inherently situated, conducted through a designer's character and knowledge, and viewed as a "third way" or specific epistemological perspective that allows for inquiry and action. Rather than positioning design activity as monolithic and defined primarily as "modifications to the model," identify ways in which the designer assumes responsibility for the near- and long-term social impact of their work (Gray & Boling, 2016) in ways that are reflexive, situated, and guided by multiple forms of design knowledge that may arise from multiple disciplinary traditions and epistemologies.

If design is really already about learning, how can LX designers help, and what should the boundaries of their practice be? Should LX designers deal primarily with situations where the learning is unintentional, unstructured, or informal and leave traditional instructional designers to deal with formal learning design challenges? Should LX become an umbrella that is a superset of traditional ID practice, offering new space to play and explore at the intersections with UX and HCI? Wherever the field and the future role of LX lands, this chapter should facilitate an interrogation of knowledge types, disciplinary perspectives, and epistemological perspectives across HCI and LDT communities that will be useful in reading the other chapters in this book.

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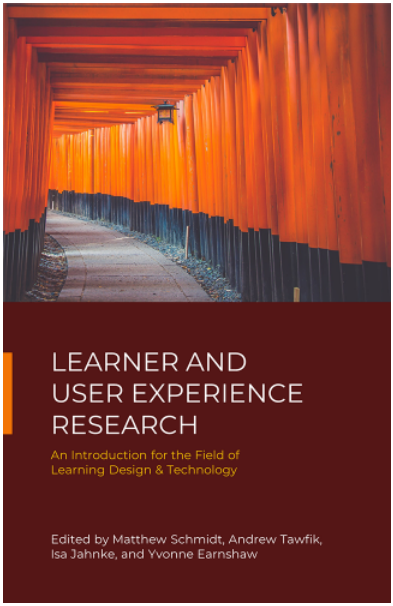

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