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A final project presented to the faculty of the Instructional Design Master's Degree Program

University of Massachusetts, Boston

The knowledge worker and upskilling:
Can instructional design frameworks help?

Submitted by:
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in partial fulfillment for the requirement of the degree
MASTER OF EDUCATION

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Abstract

This paper explores how knowledge workers face uncertainties in the job market and how workers sustain a decades-long career in the midst of technology changes and globalization pressures. In particular, this paper asks how knowledge workers self-assess knowledge gaps, discover appropriate learning opportunities, demonstrate mastery, and promote credentials across decades-long careers. Interviews with 8 knowledge workers in educational publishing, an industry undergoing workforce changes due to market disruption, provides real-world context to this research question. Taking into account various theoretical frameworks offered for adult education and also reviewing the realities of the postmodern workplace, the paper outlines the hurdles impairing the knowledge worker's ability to design effective self-directed learning to up-skill.

Keywords: Informal Learning; Knowledge Workers; Postmodern Learning Theory; Qualitative Analysis; Self-Directed Learning; Upskilling

Introduction: The Knowledge Worker and the Postmodern Job Market

We live in an “Information Age,” an era characterized with economies and communications influenced by computerization. This digital revolution has disrupted virtually every aspect of life in the United States. Workers experience job and career disruptions as computer-enabled automations afforded through technologies such as machine learning and robotics become commonplace. This displacement occurs as machines learn routine work tasks, and the machine replaces the human worker to perform those routine tasks. In a provocative study, Frey and Osborne (2013) analyze 702 occupations and estimate 47% of total US employment is at high-risk to computer-automation within the next two decades; machines will perform most tasks done by workers. Computers and computing power are expected to replace humans in jobs as diverse as tour guides, roofers, taxi drivers, technical writers, librarians, and attorneys (Frey & Osborne, 2013). Expedia, TurboTax, Waymo, RFID represent a small sampling of current and developing technologies designed to perform specific tasks once thought to be performable only by people with specialized skills. The American worker watches IBM’s Watson claim a historical Jeopardy championship and realize: the artificial intelligence that displaced two all-time Jeopardy champions is also edging into performing some of her workplace tasks.

Technology, expected to supplant work currently performed by close to 50% of the services workers, manufacturing workers, and knowledge workers over the next two decades, is one threat to job security. Globalization is another. Technology catalyzes globalization; new communications, transportation, and manufacturing technologies open up worldwide trade, consumer, and workforce marketplaces. Globalization stresses the workplace and the worker

while rewarding the investor. Trade agreements protect corporations at the expense of workers, evidenced by wage deflation, especially for the lower-skilled knowledge worker and the manufacturing worker (Bivens, 2013). American investors and employers experience financial gains, while American workers, competing for jobs in a global marketplace, face wage stagnation and job reductions.

Just as technology enables the work to be performed where it is most efficiently performed, technology enables economical transport of the work product. However, even when jobs are not lost to offshoring, or are “reshored” to the United States, machines more and more often perform the routine jobs. The American manufacturing jobs market has long experienced this shift to robotics. Take, for example, General Motors. In the mid-1980s GM employed 349,000 people to manufacture 6.4 million cars. In 2017, fewer global workers (220,000) produce more cars (8.4 million) (*Wikipedia*). Similarly, software and computing power streamlines start-up businesses built on new technologies. For example, in 2016 Facebook generated \$27.6 billion in revenue with a mere 17,000 global employees (*Wikipedia*).

Conditions of postmodernism define the information-era job market: uncertainty, fluidity, relativity, subjectivity, and complexity. Despite the chaotic landscape, the jobs market does and will always need to employ skilled workers. Workers can find career security and success performing in areas machines cannot. At present, humans outperform machines in activities such as performing irregular motor tasks (to do jobs required in healthcare), reading emotional cues (to do jobs required in business negotiation), making judgment calls (to do jobs required in leadership positions). Brynjolfsson (2017) predicts growth in jobs that focus on maximizing human creativity, empathy, teamwork, problem solving, leadership, and planning--all highly cognitive skills difficult to make machine-learnable. In fact, workers who regularly perform non-

routine and highly cognitive work prosper in this information era (Brelade & Harman, 2007).

“For those who possess skills complementary to ... ‘routine’ tasks, computerization is creating new opportunities for productivity and wage gains” (Ernst, 2015, p. 21).

One way for the worker to withstand job reductions brought by technology and globalization is to skill up to perform tasks difficult to automate. Relevant skills change over time. “Skills become obsolete over a couple of years due to the decreasing half-life of knowledge” (Sze-yeng & Hussain, 2010, p. 1913). In particular, the “knowledge worker,” the worker whose tools are information and whose outputs are creative decisions, would be well-served to seek skills-training throughout a career so to remain relevant and succeed in the job market (Brynjolfsson, 2017).

It is all well and good to proclaim, optimistically, that workers will persevere in the jobs marketplace if they up-skill over the course of a decades-long career. *How* can workers efficiently identify what to learn? What skills should workers focus on when they invest in training to upskill and obtain new knowledge? Which skills and knowledge will future employers find valuable? Which skills does the worker lack competency when compared against the marketplace? In addition to identifying training needs for themselves, how can workers know they have achieved adequate mastery of these skills or knowledge? How can workers demonstrate and promote skills and knowledge in the jobs marketplace? In order to answer these questions, workplace characteristics and how workers manage skills and knowledge acquisition over long careers and in environments of uncertainty must be understood. This research was undertaken to answer the question: Do the foundational principles of instructional design inform how knowledge workers self-direct their learning? How do knowledge workers self-assess knowledge gaps, discover appropriate learning opportunities, demonstrate mastery, and promote

credentials across decades-long careers?

This paper reviews various adult learning theories against postmodern workplace conditions to assess how well learning theory describes real-world experiences of knowledge workers and their vocational learning. To better understand the actions knowledge workers take to manage their learning, this paper summarizes current research exploring how adult learners self-assess knowledge or skills gaps, how and why adult learners learn, and promoting credentials within the workplace and the jobs marketplace. Attitudes and experiences of 8 knowledge workers collected using an online survey and in personal interviews refine the picture of the knowledge worker as learner. This data is examined against the research and theoretical literature. Taking the position that adult learners need to take control of their individual learning paths, this paper also explores whether instructional design models such as ADDIE or Dick and Carey's Systems approach are useful to workers to structure self-directed learning plans.

Adult Learning Theory

Malcolm Knowles, in his foundational work on adult learning theory, used the umbrella term "andragogy" to encompass the various principles unique to adult learners and adult learning. Knowles' model emphasizes the autonomous adult learner engaging in self-directed learning as "a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes" (Knowles, 1975, p. 18). In Knowles' framework, self-direction, structure, and control characterize adult learning. Assimilation of past knowledge to construct new meanings, often through reflection activities, defines the adult learning process. Adult learners desire learning to be relevant and to build on experience, which taps into internal

motivations of the learner. Many attributes of the humanist theories are grounded in andragogy, including learner self-actualization and autonomy inherent in self-directed learning.

Learner control, characteristic of humanist learning theories, is also evident in cognitive learning orientations. Cognitive theorists focus on mental processes such as building connections to memory and prior knowledge involved in learning. Theorists such as Bandura (1986) acknowledge the learner's external environment as a key factor in how the brain processes information, defining an interactive triad of learning content, learner, and environment central to social cognition. Social cognitive theorists help to explain motivations adult learners have to engage in learning events, particularly in the areas of on-the-job training where socialization of knowledge is a key component to learning.

Much adult learning theory has a constructivist theoretical underpinning. The constructivists hold that learners construct meaning, or learn, in order to understand experiences, which holds relevance for occupational learning. Frameworks such as communities of practice, apprenticeship, situated learning, and reflective practice describe different dimensions of how, where, and why adult learners learn. Constructivism also informs what is known about self-directed learning: "the constructivist view of learning is particularly compatible with the notion of self-direction, since it emphasizes the combined characteristics of active inquiry, independence, and individuality in a learning task" (Candy, 1991, p. 278).

Pervasive in traditional learning theory is the belief that humans can control their own destinies and optimism for unbound potential for growth and development through learning (Merriam, Caffarella, & Baumgartner, 2007). Various theories in the constructivist cannon, such as Mezirow's (1990) critical reflection framework, which underpins the theory of transformational learning, build off the constructivist tenet that the learner controls meaning

making. In as far as learning objectives can be identified, and learner outcomes against those objectives are measured, constructivists suggest learning goals are defined and bound by the specific situation of the learning event. Constructivists in the traditional schools of thought point to the learner as central to navigating modern-day complexities and uncertainties: “the rapid rate of political, social, and technological change with which we are currently confronted has increased, rather than diminished, the need for self-directed citizens” (Candy, 1991, p. 20).

Adult Learning Theory: The Postmodern View

Traditional learning theories focused on self-direction suggest the adult learner has the ability to identify what needs to be learned and that rational, if highly specific, learning pathways can be developed to guide that learner through the learning. Postmodern learning theories understand the learning context and the learner of the current era quite differently. Kilgore (2004) describes this postmodern view of knowledge: it is tentative, arbitrary, multifaceted, and constantly changing by the meaning-maker (the learner) and context. Postmodernists accept the diversity of knowledge and knowledge making, which is the outcome of learning; there are many ways to learn, and no finite body of knowledge to master. In exploring the various complexities in the learner’s landscape, Nicolaidis and Marsick (2016), summarize the real-world context familiar to many knowledge workers. Factors such as globalization, migration, technology-enabled business transactions, and communications are the complexities catalyzing change in traditional adult education practice. Pointing out that “postmodernism argues for the relativity and subjectivity of knowledge” (Nicolaidis & Marsick, 2016, p. 11), the authors put Knowles’ (1980) theory of andragogy, as appropriate for stable, predictable situations, grounded in expert knowledge, but not for the information age. Rather, the concept of an “intellectual commons” (Kasworm, Rose, & Ross-Gordon, 2010) with its focus on the individual, pressures/affordances

of globalization and technology, evidence-based research and practice to counter ambiguity, innovation, social justice, and collaboration as the building blocks for a postmodern learning theory.

Many postmodern learning theorists recognize constant change as a defining challenge modern adults navigate in both the learning environment and themselves as individuals. Nicolaides (2015) specifically suggests postmodern-era ambiguities make new adult-learning models necessary. “Designing novel opportunities for adults to consciously explore, engage with, and shape a connection to ambiguity provides a doorway to drawing out the potential emerging from within ambiguity that may guide intelligent action” (Nicolaides, 2015, p. 193). Nicolaides (2015) coins “liquid modernity” to describe the challenges of living in a constantly shifting landscape: “the complexity of liquid modernity requires individuals to make sense of their fragmented lives by being flexible, adaptable, and constantly ready and willing to change tactics; to abandon commitments and loyalties without regret; and to act in a moment, as failure to act brings greater insecurity...” (p. 180). Rather than learn job skills, Nicolaides (2015) suggests refining critical thinking skills will support adults to create meaningful work output in complex, or “liquid,” work contexts.

Likewise, the learner exhibits “liquidity” in these postmodern landscapes. Zhao & Biesta (2012) explore continual self-formation as a key component of adult learning, and also put forward the idea of a “dialogical self,” (“one self among other selves”). A “dialogical self,” constructed in intersubjective relationships, is “seen as processes of *questioning, discovering, evaluating, and judging* oneself through reflexivity and dialogue” (Zhao & Biesta, 2012, p. 347, italics original), and not settled to one set of finite, unchanging characteristics. Another study found modern adult learners “actively interpret and construct meaning based not solely on the

structure of the texts to which they are exposed but also on the basis of their preexisting patterns of thought, feeling, and belief” (McLean, 2015, p. 211). More and more of the literature points to how the learner’s preexisting patterns of thought, feeling, and belief (characteristics of self) dynamically change over time and in context. Intersectionality, and the continual construction of self, is at the heart of McLean’s (2015) study, as it is in much postmodernist learning theory (Billet & Van Woerkom, 2008; Kang, 2007; Kilgore, 2004; Lund, 2010; Nicolaidis, 2015; Nicolaidis & Marsick, 2016; Sandlin, Wright, & Clark, 2011; Zhao & Biesta, 2012). Identity, in postmodern thought, resists singular definition.

Sandlin, Wright, and Clark (2011) explore contexts of adult learning and point out that much of it takes place outside formal educational institutions, while also considering how fragmented, digital environments affect adult learning. “Public pedagogy,” defined as “forms, processes, and sites of education and learning that occur beyond the realm of formal education institutions” (Sandlin, Wright, & Clark, 2011, p. 4), offers a framework to understand the adult learner who is “always becoming” in a chaotic world. Kang (2007), offering a useful system for understanding adult and lifelong learning, proposes the postmodern era requires new conceptual models and coins “rhizoactivity.” In botany, “rhizome” refers to a root-like stem system that propagates new growth from irregular nodules. Kang’s (2007) model “capture[s] the multiplicity of learning that always makes connections to anything else and pursues heterogeneity” (p. 207). With the erosion of universal meaning and knowledge, and the recognition that experience is used “differently in different practices” (Kang, 2007, p. 213), rhizoactivity offers a model for organic connection building (or meaning making/learning) in a chaotic world. In this conceptual framework, learning happens by building connections and purposefully seeking diversity of thought. The learner has no fixed pathways, or beginnings and endings to the learning process,

and, indeed, a coherent whole of the learning experience does not exist.

The literature further describes this view of how learning happens in these postmodern landscapes of perpetual shift: self-directed learning events are motivated by near-horizon knowledge mastery, particularly in the work context. Hunter (2010) characterizes this type of fast-paced and agile learning as essential for workers in “knowledge-intense and rapidly changing industries” (p. 461). Surveying 20 pharmaceutical sales representatives, Hunter (2010) identifies 64 different ways the respondents report learning for work (including corporate-organized activities, externally organized activities, peer-based learning, web-based initiatives, learning on the job, and self-initiated and independent ways of learning). The author confirms most of the reported learning is a mix of formal and informal attributes, with learner motivation centered on increasing on-the-job credibility, but not necessarily knowledge mastery. This study illustrates that knowledge workers (in this case, sales representatives) want to continuously learn, that they learn from their peers as well as their customers, that much of their learning is applied directly to the job, and that they are intentionally alert to “incidental learning.” Bonk, Lee, Kou, Xu, & Sheu (2015) confirm this perspective that adults seek learning to manage their on-the-job credibility: these researchers find that more than 50% of learner-respondents in MIT’s OpenCourseWare programs are motivated to learn for professional growth, and over 80% indicate they want to develop a new skill or competency. “Over the past few years, informal learning in the workplace has been gaining increasing attention and interest due to the need for prompt updates on skills and information in most jobs” (Bonk, Lee, Kou, Xu, & Sheu, 2015, p. 351).

Research indicates adult workers see themselves as responsible for navigating the uncertainties of the jobs marketplace. Rappel (2015) interviews 6 adult educators to explore the

question “how do the backgrounds of adult educators interact with organizational cultures to inform teacher practice” (p. 316). (In other words, how workers demonstrate knowledge in the work context.) On evidence from these personal interviews, Rappel (2015) describes a work context in which organizations are focused on the tasks to be accomplished, not on defining the abilities of the worker. The knowledge professional needs to build credentials, networks, and set the expectations her/himself, because the organization will not/cannot do so (Rappel, 2015). Theoretical-based research also alerts the importance of adults, particularly older working adults, to self-determine training that will enhance abilities. Companies, in addition to focusing on task-based training rather than skills-based or knowledge-based training, tend to invest in the job competence of younger workers, leaving older workers to self-manage and self-regulate their training (Billet & Van Woerkom, 2008).

Especially for mid-career workers, the literature suggests self-direction in continuous learning as one pathway to skilling up. Helpful for this exploration of self-directed learning and the adult knowledge worker is the concept of “informal learning.” Le Clus (2011) defines informal learning as “learning that is not highly structured or classroom-based, not formally assessed, and does not lead to formal qualifications” (p. 363). Postmodern learning theory calls for building agile, continuous, networked, and self-directed learning frameworks because the learning environment and the learner characteristics are in continual flux. A growing body of research and theoretical discussion on the learning environment and learner characteristics of the postmodern era confirms the need for this agile approach to informal, or “just-in-time” learning for knowledge workers (Billett, 2008; Candy, 1991; Hunter, 2010; Kang, 2007; Le Clus, 2011; Manning, 2007; Nicolaides, 2015; Nicolaides & Marsick, 2016; Rappel, 2015; Sandlin, Wright, & Clark, 2011; Song & Lee, 2014; Zhao & Biesta, 2012). The literature also outlines difficulties

self-directed learners experience confirming their learning contributes to skills mastery rather than simply developing the ability to perform context-specific tasks.

Workplace Learning in the Postmodern Era

Theorists speculate machines will be performing more and more of workers' tasks in the next 20 years, and that humans would do well to upskill in ability-based activities to withstand these marketplace challenges (Brynjolfsson, 2017; Frey, 2013). To sustain long careers despite these pressures, knowledge workers should commit to lifelong learning and be self-directed learners. Participating in informal learning offers one way knowledge workers can maintain skills across a career. Do informal, self-directed learning events, taken in a "just-in-time" manner, contribute to up-skilling in the same way as instructor-led learning events? This is an important question for knowledge workers, for whom information is capital within the jobs marketplace. Investment (learning) in that capital (knowledge or skills mastery), is one important component to career success (Francis-Smythe, Haase, Thomas, and Steele, 2012). The unique output of the knowledge worker relies more on mastering non-technical skills (such as interpersonal communication) than mastering technical skills (such as computer software) (Brynjolfsson, 2017). Some argue that up-skilling non-technical capabilities will differentiate knowledge workers from one another, and also offer protection from being replaced by the artificial intelligence of machines (Brynjolfsson, 2017; Frey & Osborne, 2013). With the knowledge worker in mind, Francis-Smythe, Haase, Thomas, and Steele (2012) identify 7 career competency dimensions: goal-setting and career planning, self-knowledge, job performance, career-related skills, knowledge of office politics, career guidance and networking, and feedback-seeking and self-presentation. These competencies are "learned capabilities that result in successful performance in individual career management" (Francis-Smythe, Haase, Thomas,

& Steele, 2012, p. 230). For the knowledge worker, developing these competencies, rather than developing specific skills, could be an important factor in up-skilling.

How, though, can a self-directed learner design learning pathways to develop these non-technical skills? Are there any supports within instructional design frameworks that offer a roadmap for the self-directed learner? Can formal instructional design contribute to defining a new model of adult learning in postmodern times? In many ways, the science of instructional design is in conflict with the characteristics of the postmodern workplace. Instructional design takes a systemic approach to identify learning goals and develop instruction to satisfy those learning goals. The widely used models of instructional design (e.g., ADDIE, Dick and Carey, rapid prototyping) have in common a focus on instruction, a process for assessing instructional needs, defined learner characteristics and learning environment, formal learning objectives, measurable learner achievement against those objectives, and processes for evaluating and revising instruction. Minimizing ambiguities in the learning event is the primary goal of instructional design frameworks. However, knowing how to learn and work within that state of ambiguity is an important aspect to successfully navigating the postmodern workplace (Nicolaidis, 2015). Instructional design frameworks also emphasize building instruction to be delivered to learners. However, adult learning in general, and learning needs of the knowledge worker specifically, require self-reliance and a commitment to lifelong learning (Nicolaidis, 2015). Does instructional design offer self-directed learners a system to manage learning within ambiguity, or are the systems of instructional design irrelevant to learning in ambiguous contexts?

This paper turns to exploring whether design processes of the instructional design models are useful framers in the “just-in-time” self-directed learning framework the postmodernists

suggest are appropriate in today's workplace environments. Specifically, in the absence of formal instruction, how can the self-directed knowledge worker understand their own knowledge (through self-assessment), evaluate their knowledge acquisition (demonstrate competency or mastery), and develop their own instructional strategies (discover learning opportunities) given the realities of a workplace characterized with hyper-change.

Self-Assessment

When learners self-assess against learning objectives defined by instructors, they are able to describe and evaluate how they meet their learning goals, and, equally important, demonstrate their learning (Beusaert, Seger, Fourage, & Gijsselaers, 2013; Robertson, 2011). This model presumes an authority of the learning objective, which grounds the instruction and the learning. Instructional design models place great emphasis on identifying meaningful, measurable, and demonstrable learning objectives for formal learning events. How well does this model work for knowledge workers self-directing the learning that will help them sustain long careers? Are self-directed learners able to self-assess their knowledge and, from understanding their knowledge gaps, develop meaningful learning objectives to direct learning for upskilling? The research suggests no.

Given the mutability of learner and context, the literature describes the process and output of skills or knowledge self-assessment as unreliable. For example, some argue that humans are "hardwired" to make optimistic assessments about abilities or to appropriately ground these optimistic assessments (Eva & Regehr, 2008). For example, workers' attitudes about their employability tend to be based on how they perceive their position within their employer and also personal factors such as willingness to seek out training opportunities rather than in actual analysis of their capabilities (Dymock, 2012).

Research shows that learning tools designed to extend a learner's contextual frame of reference often do not support learners to make reliable skills and knowledge self-assessments. For example, Beausaert, Seger, Fourage, and Gijsselaers (2013) learn that adult learners who used personal development plans (PDPs) participated in more learning activities than did non-PDP users, but did not self-evaluate their skills any higher than did non-PDP users. Beausaert, Seger, Fourage, and Gijsselaers (2013) propose "this lack of differences might be explained by the fact that by using a PDP, the [knowledge workers] are more aware of the competencies that are needed to fulfill their jobs because the PDP stimulates them to think about [those competencies]" (p. 154). This proposal supports the postmodern tenet that knowledge landscapes shift based on personal points of reference.

Theorists point to other ways adult learners might effectively self-assess knowledge. Billett and Van Woerkom (2008) describe the need to develop a "personal epistemology" as an approach to "the practice of learning comprising an individual's view about what knowledge is, how knowledge is gained, and the degree of certainty with which knowledge can be held and/or expanded" (p. 334). Especially for mid-career knowledge workers, developing learning goals that align to a personal epistemology is a critical aspect of creating identity in the workplace and ensuring learner motivation. Equally important to knowledge workers looking to develop skills that will ensure long careers, however, is confirming that personal epistemology aligns to the knowledge the jobs marketplace needs. This personal epistemology needs to be reflected against the work context in order to offer useful information about workplace knowledge gaps. Otherwise, the learner is developing a view into personal growth rather than professional growth.

Understanding self-assessment as inadequate to the task of identifying skills gaps, other theorists and researchers suggest self-reflection "may well prove to be an effective pedagogical

strategy that can lead to better understanding of both the world and the adequacy of one's own personal constructions of it" (Eva & Regehr, 2008, p. 15). Reflection affords the learner a way to ground self-assessments about knowledge. Research shows that grounding self-assessments for a reflective process can also expose learners to shifting learning landscapes; as the learner acquires knowledge, the learner knows there is more to learn (Beusaert, Seger, Fourage, & Gijsselaers, 2013). Billett and Van Woerkom (2008) determine "critical reflection is...an epistemological device that can assist older workers' capacity to understand and respond to the changing requirements of work life and work transitions" (p. 345), which in turn "stand as a means to make sense of their circumstances and reflect upon a changed work situation, including the transition to new forms of work" (p. 346).

Knowledge workers make assessments from limited frames of reference about the workplace environment, rather than actual knowledge of a universal jobs market. This limited understanding of the workplace context can lead to inaccurate assessments and misperceptions about the knowledge needed to perform a job (Dymock, 2012; Yelich Biniecki, 2015). The individual may know what skills are needed to perform the work for one specific context. However, "[e]ach workplace, even those enacting the same occupational practices, represents a unique instance of a vocational practice" (Billett, 2008, p. 45), which circumscribes the learner's ability to make valid assessments about what knowledge she/he needs to perform a job in the marketplace outside a specific work context. "Adults are members of intersecting and separate communities of practice" (Yelich Biniecki, 2015, p. 128), which also constrain knowledge construction to a known (or familiar) body of knowledge rather than a universal body of knowledge.

If intersectionality and the "dialogical self" characterize the individual (Billet & Van

Woerkom, 2008; Kang, 2007; Kilgore, 2004; Lund, 2010; McLean, 2015; Nicolaidis, 2015; Nicolaidis & Marsick, 2016; Sandlin, Wright, & Clark, 2011; Zhao & Biesta, 2012), the knowledge worker cannot self-assess what she/he knows easily. If workplace environments, and by extension, learning contexts, are fragmented and indefinable (Hunter, 2010; Kang, 2007; Kilgore, 2004; Nicolaidis, 2015; Nicolaidis & Marsick, 2016; Rappel, 2015), it is not possible for knowledge workers to judge what needs to be known to succeed in that environment. In these ways, knowledge assessment for the self-directed learner is problematic.

Demonstrating Competency

The literature suggests many ways knowledge workers demonstrate their competencies within the workplace and across the jobs market. Several studies point to specific ways LinkedIn profiles can be managed to highlight skills and knowledge. For example, projects completed on the job or in project-based learning events, or badging credentials earned by participating in micro-courses, attending conferences, or paying for an online course can be highlighted on LinkedIn profiles (Benetos & Peraya, 2015; Blumenstyk, 2015; Capiluppi, Serebrenik, & Singer, 2013). Despite the compelling arguments for certifying learning, two studies taken together suggest that formal credentialing, as a means of demonstrating competency, is only somewhat useful to the knowledge worker who participates in informal learning (Bonk, Lee, Kou, Xu, & Sheu, 2015; Hunter, 2010).

More and more, adult learners use online open courseware to skill-up with the goal of career advancement or avoiding redundancy. One study examines the affordances of online learning to the self-directed learner and finds that open courseware aligns to workplace training needs: “[o]ver the past few years, informal learning in the workplace has been gaining increasing attention and interest due to the need for prompt updates on skills and information in most jobs.

New forms of learning and literacy are forming at the intersection of academic needs and informal learning sources including unique spaces like the Khan Academy and other YouTube Channels” (Bonk, Lee, Kou, Xu, & Sheu, 2015, p. 351). This same study finds that roughly 20% of those surveyed reported receiving a formal credential to certify learning in an open courseware course, and also that about the same percentage of those surveyed reported finding a new job or position as a result of their learning experiences (Bonk, Lee, Kou, Xu, & Sheu, 2015). While open courseware seems to offer a clear-cut way for learners to demonstrate knowledge attainment, only 1 in 5 participants were motivated to earn the certification offered by the learning platform.

Studying how pharmaceutical sales representatives learn for their jobs, Hunter (2010) also asks *why* the sales professionals do on-the-job learning. The sales representatives “used learning to develop themselves as resources for their customers in order to earn their trust and respect and gain access to customers” (Hunter, 2010, p. 455). Knowledge, and the ability to demonstrate that knowledge in a specific workplace setting, becomes a workplace differentiator for these knowledge workers. The purpose of learning is to gain knowledge; in the workplace context, the knowledge worker is motivated to demonstrate this new knowledge on the job. The more a knowledge worker can display her/his knowledge, the more competent she/he is perceived to be within that specific situation. The most competent workers are more likely to withstand pressures of the postmodern workplace. Just-in-time learning events are well suited to provide the knowledge required for this specific instance.

However, just-in-time learning with the primary motivation of maintaining a reputation within a professional network is not upskilling. Just as the self-directed learner has limited perspective to assess her/his knowledge, demonstrating competency within professional

networks bounds and perhaps skews the evaluation of learning. The learning is evaluated within a community of practice rather than a larger jobs marketplace (Billett, 2008; Yelich Biniecki, 2015), and that evaluation is made unreliable because the situational context is circumscribed to what the learner already knows.

Discovering Learning Opportunities

Self-directed learning opportunities are plentiful: “Thanks to the openness of the Web, the learning world is open and we all learn all the time in whatever situations we face” (Song, & Lee, 2014, p. 524). Informal learning in the workplace tends to be a dynamic, nonlinear process, and so it would seem the Internet would be a good match for just-in-time learning. The knowledge worker can perform a Google search to learn how to pivot an Excel table, can watch YouTube to learn best practices for designing an executive presentation, can dip into a Lynda.com course to learn tips for time management. These just-in-time learning events support the knowledge worker to use technology to perform specific tasks. In fact, this informal learning support likely assists knowledge workers from needing to invest a lot of training time to learn details of technologies used on the job. Just-in-time or informal learning may support knowledge workers performing specific tasks, but it does not, in isolation, equate with up-skilling. For the knowledge worker interested in upskilling, opportunities abound. Management, financial skills, software, engineering, healthcare, communications, and language seminars, courses, certificate programs, micromasters, masters, and doctoral programs are available online and in-person, at price-points beginning at free. However, the availability of learning opportunities presents issues for the self-directed learner: learners report the vastness of the resources available online and the lack of curation to ensure the quality and/or appropriateness of those resources to be barriers to successful self-directed learning using online resources (Bonk, Lee, Kou, Xu, & Sheu, 2015). It

easy for the self-directed learner to become overwhelmed with finding relevant content, or settle for learning with less-than-ideal or bad content.

Instructional designers understand learner characteristics and perform needs assessments in order to identify learning objectives and, from those learning objectives, develop learning content. Can best practices from the systematic approach to instruction design be applied to support the self-directed learner to curate learning content? The research reports factors such as mutability of learner characteristics and workplace context, as well as intersectionality and development of a “dialogical self,” make self-assessment unreliable (Yelich Biniecki, 2015). Because learning objectives derive from a needs assessment of the jobs market’s requirements, making accurate self-assessments of skills and knowledge, and evaluating any gap between the two, it also stands to reason that the knowledge worker’s ability to develop this critical foundation to learning would be compromised. Where to go for learning, or even knowing when learning is needed, is difficult for the self-directed learner to assess (Yelich Biniecki, 2015).

The knowledge worker has a difficult task in assessing the needs of the jobs marketplace context as the individual’s point of view is circumscribed by his/her own experience and context (Yelich Biniecki, 2015). So rather than knowing what the jobs market requires of knowledge workers and designing learning plans based on those requirements, self-directed learners are left to design their learning pathways and “self-identify future use for the content as an influencer in knowledge construction” (Yelich Biniecki, 2015, p. 126). Doing so tends to limit a self-directed learner’s (informal) learning objectives to knowledge horizons the learner can identify, rather than to knowledge the marketplace may require of knowledge workers. As Sze-yeng and Hussain (2010) emphasize, self-directed learners experience difficulty with motivation when they become disoriented (e.g., in the initial stages of learning new material). It becomes a challenge for the

self-directed learner to maintain motivation through the challenges of learning, especially if the content for learning is not aligned to the learner needs, interests, and abilities, or if the quality or scope of the content is not relevant to the learner (Sze-yeng & Hussain, 2010).

Considering again the question framing this research: How do knowledge workers self-assess knowledge gaps, discover appropriate learning opportunities, demonstrate mastery, and promote credentials across decades-long careers? The research gives little hope that the knowledge worker, focused on self-directed learning, has adequate perspective to design upskilling learning pathways. To understand how the literature aligns to attitudes and experiences of knowledge workers, a survey and interviews with 8 workers were performed.

Research Question, Context, and Methods

How mid-career professionals maintain currency in a constantly changing jobs market pressurized by globalization is a question that touches on personal experience. From the time I had graduated college until about three years ago, I had felt confident I could specialize on a single skillset (operational team management within an educational publisher) and maintain career growth. I did not seek or participate in training that would expand my vocational knowledge or my technical skills. I focused almost all my career energy on excelling at my work within that specific domain, rationalizing that job success would translate to sustaining a long career. However, 25 years into my successful career in educational publishing, a significant company restructuring catalyzed a shift in how I thought about my long-term career prospects. As details of the restructuring became clear, I assessed that, because my professional experience was very much tied to a specific domain (educational publishing), and because many jobs in that domain within and outside my company were being lost to restructuring, I was in danger of

“skilling out” of the occupation market. I spent several months in an existential-like self-assessment of skills and knowledge: I talked with many people in the industry; I evaluated my experience and knowledge against job requirements in fields inside and outside of educational publishing, and I prognosticated on professional options likely to be available over the next 20-25 working years. I decided to seek out skills training to augment my occupational experience and educational publishing knowledge and, also, I hoped, support a transition to jobs outside educational publishing. With little more than the intuition that instructional design skills would round out my professional experience and help my long-term career prospects, I enrolled in the University of Massachusetts Boston’s Instructional Technology Design program. My original intent was to end participation in the program with a certification (an 18 month and approximately \$7,500 commitment). As I completed the certificate requirements, with little more than a desire for more knowledge, I enrolled in the master’s program and committed to 2 more years and approximately \$12,500 more in tuition and fees. With this project, I complete the formal education work to earn an M.Ed., and realize, if I could go back 3 years, I would like to have brought more objectivity to making the commitment to this program of study. How could I have more effectively self-assessed my knowledge gaps, discovered appropriate learning opportunities, and demonstrated mastery in updated skills? Are there methods more objective than intuition available that would help me assess whether this program was a worthwhile learning opportunity in terms of positioning me to skill-up and develop new skills relevant for a future job market?

Beginning the research for this paper, I approached 8 co-workers who I assumed (and verified) had worked in operational divisions of educational publishers for 15 or more years, self-identified as mid-career, and experienced uncertainties in job security. (This research sample

intentionally shares these characteristics.) In a brief conversation with each co-worker, I shared with each of these co-workers information about my academic work and about my positionality to the topic. I asked each person if she/he would be willing to contribute to this research by answering a survey designed to take 20 - 30 minutes to answer, and a follow-up, one-on-one interview expected to take 45-60 minutes. Of the 8 people I approached, 100% agreed to participate and 100% completed the survey and interview sessions.

The participants work for the same educational publishing company within a large operational team. The company is a mid-sized higher educational publisher headquartered in New York, New York. Pressures to transform from a print-products company to digital-services company, which requires deep investment in technology and personnel to enable that technology, have profoundly changed how all educational publishers, including this company, operate. Like almost all other educational publishers, this company is also challenged with shrinking markets, falling sales, and declining revenues. Since 2012, 4 separate significant layoff events (reduction of 30 or more staff employees) and several more smaller layoff events have occurred. Over the same timeframe, new teams were established (in areas of learning science and learning technologies), which required hiring new staff (with relevant experience) to do new types of jobs.

The participants experienced organizational changes first-hand: their team name was changed from “Production and Operations” to “Content Management”; their work once focused on production of print products and now focuses on production of both print and digital products; the team size was reduced by 25% over 5 years (a result of restructuring and attrition). Overall, the respondents reported doing more work with fewer resources as compared to 5 years prior to this research. In addition, the business challenges of the publisher (digital transformation and

reductions in operational expenses, to name two) put pressure on the staff to skill up in specific ways (e.g., learn Google for Work and new content management systems) and also to adapt to constant shifts in organizational structures and team priorities.

The 8 survey participants self-report working in higher educational publishing for 16 - 40 years (18 years lowest, 36 years highest). Two participants are hands-on designers, 4 manage teams of 7 or more content management specialists, 1 is an individual contributor managing internal systems technology. All participants are college-educated (a requirement to work at the publisher), mid-career, and white; 5 are women and 3 are men. Most of the respondents (75%) reported being relatively new to their current positions (fewer than 5 years in the role). All respondents answered yes to the question “at any time in the past 3 years, have any changes in the workplace prompted you to think about your job security.” In the follow-up interviews, one respondent revealed she would be leaving the company within 3 months of the interview as part of an in-process company restructuring; 4 other respondents reported being laid off from a publishing company at least once in their careers.

Looking to foster trust with this survey group, a personal note (in email) with a link to the online, non-anonymous, private, survey was sent to each participant:

You may know my story: In 2013, after 24 years of career growth in educational publishing, my job responsibilities, and, I thought, my job prospects, changed course in a restructuring event. Not for the first time in my career I was made aware that I couldn't count on working in publishing for another 24 years (when I hope to retire) doing the same kind of work I had been doing. However, for the first time in my career, I took action: upskill. I knew that educational publishers were hiring instructional designers; I guessed that my production skill set could be

augmented with instructional design credentials, and I knew UMass Boston offered both a certificate and master's program in the field. Without much more to go on, I signed up for some classes, and eventually enrolled in the master's program. The program has been useful to me on a personal level and has made me much more confident in my abilities and capacities to keep learning while working. But I'm not entirely sure the time and financial investments I've made will pay off in terms of landing a job in instructional design.

The survey asked respondents to share their professional histories and aspirations for future work, attitudes about our employer, as well as experiences with self-directing their learning (self-assessment, vocational training, and demonstrating competency). The survey responses were first blind-reviewed to understand the group's attitudinal similarities and differences and then individual responses were coded. A 45- 60-minute personal interview with each respondent was conducted over the phone. These interviews were structured as informal follow-ups to the individual's responses on the survey; a space of trust and confidentiality was maintained. The interview took on the characteristics of a back-and-forth conversation designed to clarify survey responses and record overall impressions of career- and knowledge-management in the professional context.

Research Findings

Themes emerging from this research confirm ambiguity and constant change, two conditions of postmodernity, persist in the respondents' workplace. All respondents described continual up-skilling as an important component to maintaining relevance over a long career, and share that they do refine existing skills and seek to expand on existing knowledge. All respondents point to specific ways they learn job-related skills; this learning is often self-

directed, on the job, and undertaken to master specific knowledge required to refine a skill and perform a specific task in their current job rather than an up-skilling endeavor. With one exception, the respondents report adopting an ad hoc approach to identifying knowledge or skills gaps and formal learning opportunities to certify learning to resolve that knowledge gap; only one respondent participated in activities that contribute to developing new skills. The respondents point to on-the-job experience and the body of knowledge learned through that experience as crucial to developing their critical thinking skills, which, in their assessment, differentiate them in the jobs marketplace.

Identifying and Self-Assessing Technical and Non-Technical Skills

All respondents reported high confidence (4 or 5 rating on a Likert scale of 1 to 5) to identify the non-technical skills required to do their current job, whereas only 62.5% reported that same level of confidence in identifying technical skills required to do their current jobs. The non-managers (designers) reported the highest confidence identifying the technical skills needed to do their jobs; they list the specific design software used to create design layouts. Some respondents communicated that non-technical job skills were more important to their job and career success than their technical job skills. In a follow-up interview, one respondent clarified that he could rely on the technologists he collaborates with to be expert in the various technologies he oversees while he honed expertise in negotiating contracts. Another respondent, when asked what gave him confidence in his assessment that his non-technical skills were more valuable than his technical skills, he described specific feedback from former colleagues and also his current manager; this respondent sought out external feedback to assess his skills.

The survey asked whether and how the respondents self-assess their competencies in the technical and non-technical skills they identified as necessary to be successful at their current

jobs. Seventy-five percent of the respondents reported self-assessing their technical skills, and all of those respondents reported doing so on the job. One respondent described realizing she needed to learn more about a new ebook file format while sitting in a meeting and not being able to follow the conversation. (“Oooh, I thought to myself, I need to learn this. And then I just figured it out.”) In a follow-up interview, one of the designers told a story about a stakeholder asking for a specific design effect for a book cover. This designer searched YouTube and watched videos to self-teach using Adobe Illustrator to create the effect. A slightly smaller percentage (71%) of the respondents reported self-assessing their non-technical competencies. One respondent described how she self-assessed her ability to transfer her schedule management knowledge from the print domain to the digital domain by reviewing her work against that of her colleagues and confirmed for herself that her skill in that area was “just fine.” Another respondent, a manager who reported increased people-management responsibilities in recent years, and who didn’t feel confident in her people management skills, pointed to a lack of constructive feedback she could trust from her leadership team, as the motivation to take an online course on management techniques.

Demonstrating Competency in Technical and Non-Technical Skills

The survey asked the respondents to rate (on a Likert scale of 1 to 5) their attitudes about demonstrating skills competency within their current workplace. The respondents confirmed, for the most part, that appearing competent is an important motivational factor to learning. All respondents report high (4 or 5) the importance to display competence in non-technical skills, whereas 75% of respondents report that same level of importance in demonstrating technical skills in the workplace. Interestingly, in the post-survey interview all respondents focused their conversation on demonstrating technical competence. One respondent said that more and more

of her job is based on knowing how to perform tasks using specific systems, so knowing the technology becomes important to demonstrating overall job competence. The managers were more likely to report insecurity in working with technology, and some felt pressure to be “on top of it,” while other managers were secure in their non-technical skills to leave technical mastery to other team members. The designers surveyed, who work with complex software every day, report a different motivation to ensure they are able to demonstrate their mastery of technology: the need to constantly learn techniques using the software to “stave off complacency” (innovate with design) and also be “more efficient” in their work (be successful with increased workloads).

While the respondents report the importance to demonstrate skills mastery in their day-to-day work, 85% report they do not work to promote these skills or projects outside of the workplace on LinkedIn profiles. In follow-up interviews, several respondents made clear they did not know LinkedIn provides affordances for promoting skills through credentialing badges or posting projects. One respondent said he thought it more important to manage a professional contacts network on LinkedIn than to post projects or certifications on his LinkedIn profile. This respondent, telling the story of job searching during a recent layoff, learned through his job-search experience that transferring skills from one job market domain to another (e.g., publishing to nonprofit) is difficult. Reputation within his professional network, rather than certified skills, opened the connection to his current position within educational publishing, though his goal had been to leave the industry.

Seeking Self-Directed Learning

All survey respondents were asked the same question in the follow-up interview: “Do you think it’s important to learn new skills throughout a career?” All respondents answered yes. Asked if they were capable of training, 100% of respondents answered yes; asked if they had

thought about upskilling as a result of changes in the organization, 100% answered strongly agreed. Almost all respondents (87.5%) reported learning a new technology to do their job in the prior 3 years. Yet only 50% of survey respondents answered that they had participated in self-directed training in the prior 3 years. The designers make up the largest proportion of the respondents who sought out training to learn about software updates (dipping in and out of the Lynda.com online library provided by the company) and watching YouTube videos for tutorials on very specific techniques using that software.

The manager respondents reported not participating in training to learn technical skills. How, then, did the manager respondents accomplish the technical learning they need to do their jobs? In the follow-up interviews, the respondents described a number of just-in-time techniques, including: bookmarking websites and company intranet sites for future reading or reference, reading emails and attending meetings, self-improvement (e.g., adopting better organizational skills to accommodate more work), and developing a mindset that new things can “just be figured out through brute force.” The designers also described this type of just-in-time learning in how they keep current on visual design trends by “living in and observing the arts world” (e.g., reading magazines, going to galleries). Most respondents described task-oriented learning performed for the specific purpose of doing work at the company; the respondents, overall, did not report seeking out a learning program or a work project that would broaden, develop, or challenge their skillsets. Only one respondent reported seeking out and participating in non-technical training for the specific purpose of skilling-up in the prior 3 years. In an interview, this person described seeking out management skills training based on a gut feeling that she needed to hone her management skills. She described how as she took the course she could recognize

learning was happening because she actively practiced what she learned, while slowing working through the self-paced online course.

Because I work closely with all of the survey respondents, I knew about certain company training initiatives and technology roll-outs that had affected the team in the prior year, but were not mentioned in the survey responses. For example, the company transitioned to Google for Work in 2016. In the interview, I asked each respondent why she/he did not mention this technology training. Each respondent paused to reflect and, to a person, answered that they didn't consider Google for Work a new technology because they were familiar with Google in their personal lives. In another instance of respondents not reporting active training, 100% of the manager respondents were actively participating in professional coaching sessions meant to teach new teamwork and personal growth techniques. When asked why these respondents did not mention this training, to a person, each respondent paused to reflect and answered they found the coaching more personally relevant than professionally relevant. Finally, one respondent turned down an opportunity to participate in a yearlong intensive training in a specialized form of project management. Had the respondent participated in this training, he would have had two work projects completed and a certification to add to his LinkedIn profile. However, this participant had no interest in learning this project management technique that "does nothing more than complicate common sense." This respondent said, in the follow-up interview, that there is a time in a person's career lifespan (in the second quarter) during which this type of intensive training makes sense, but at the midpoint in a career this type of training is not as useful as is experience.

Attitudes about the Future

The respondents reported high levels of uncertainty about the future. Half of the respondents have low confidence (1 or 2 on a Likert scale of 1 to 5) that their jobs will be performed in 5 years. All but one respondent wants to be working in 5 years, but only 62.5% of respondents are willing to invest time to up-skill for jobs of the future. Most respondents reported low confidence (1 or 2 on a Likert scale of 1 to 5) that an individual could assess which skills need to be mastered in order to be relevant for the jobs that need to be filled in 5 years. On average, the respondents reported higher confidence in predicting the skills needed for jobs outside the company than within the company. In follow-up interviews, one respondent pointed to job descriptions as indicating what skills would be required for future jobs; another respondent described how he didn't think the company knew what skills it needed people to perform in 5 years; another respondent noted the futility in upskilling as she looked back to the past 5 years to note the pattern that the company lays off people rather than re-trains people.

Discussion of Research Findings

The attitudes expressed by this research sample support the postmodern theorists' view of networked, self-directed, fragmented learning environments nested within tightly circumscribed workplace networks. The knowledge workers surveyed and interviewed for this research confirm a desire for learning, with the primary motivation to develop or maintain workplace competence. Evaluated against the literature concerning learning in postmodern work contexts, this research confirms how self-directed learning occurs in the workplace and also suggests that this learning contributes to just-in-time task mastery, but does not amount to upskilling.

The workplace described by the research participants (all knowledge workers) exhibits the postmodern characteristics of ambiguity, constant change, and uncertainty. Almost all

participants report being in relatively new job roles, and yet expect their current roles to be obsolete in 5 years. Participant attitudes about the future at their company, in particular, highlight a cynicism about the company's ability to identify the skills workers will need in 5 years, and also the belief that the company will hire new employees rather than train current employees to be upskilled to perform those jobs of the future.

All respondents report being concerned about their knowledge and skills (so to be employable), yet most do not actively pursue self-directed learning programs to develop knowledge and skills that would be considered upskilling. Rather, the respondents report directing their learning to mastering specific tasks in order to be able to demonstrate competence in the workplace. This attitude of seeking self-directed learning to be able to perform tasks specific to this workplace may have implications for long-term employability. The research reports workplaces to be circumscribed learning communities, where meaning making is not necessarily transferrable to different domains (Yelich Biniecki, 2015).

Even if these knowledge workers were to seek out training to upskill, the literature suggests, and this research confirms, the frameworks these adult learners have to assess knowledge gaps in order to identify appropriate training opportunities on their own are likely inadequate. Each respondent reported self-assessing technical and non-technical skills against the circumscribed frame of reference of their workplace; no one reached out to the job market at large to assess skills. The respondents reported learning content and activities (reading company documents, attending meetings, participating on company-specific technology training) within this same circumscribed setting. No respondents reported assessing knowledge gaps or the quality or extent of their new knowledge in an out-of-workplace context; no respondents reported demonstrating the outputs of their learning (e.g., by posting projects completed on

LinkedIn, by keeping their LinkedIn profiles up-to-date, or by networking outside the company). Most respondents revealed in the follow-up interviews that they understood this activity to be, in general, important to career management, but they did not see how they could connect their day-to-day learning for task mastery to be skills or work outputs worthy of self-promotion outside the company. The respondents also described a lack of motivation to self-promote, likely due to the ambiguities of connecting their skills learned on the job to how marketable those skills are in the jobs marketplace.

These knowledge workers suggest their non-technical skills are more valuable, and more worthy of cultivating and demonstrating competency, than their technical skills. This attitude aligns with what Brynjolfsson (2017) says about upskilling in areas that are less likely to be automated in the future. In particular, the respondents identify critical thinking skills, honed by on-the-job experience, as their most important skills or knowledge asset. Interestingly, though 62.5% of the respondents were actively participating in intensive team training with a skills coach to refine those critical thinking skills, none of the respondents identified that training in their surveys. The participants reported not connecting this learning to building their nontechnical skills, illustrating how the act of learning itself can be ambiguous. While organic “rhizoactivity” in learning, in which there are no beginning or endings to learning events, rather continual connections that are difficult to categorize, certify, and demonstrate competency, describes the real-world context for knowledge workers, it is inherently problematic because this learning is difficult to identify, describe, and measure.

Conclusions

Americans face job insecurities brought by the rapid pace of technology, innovation, and globalism. It is in the best interest of workers to participate in learning events throughout their

careers to ensure knowledge and skills relevance. Self-directed learning offers the knowledge worker one way to develop skills to perform job-specific tasks. However, self-directed learning on its own is likely inadequate to deliver on the upskilling a knowledge worker needs to outpace technology or other stresses on the postmodern workplace.

Knowledge workers engage in self-directed learning within their work contexts to master new job skills specific to completing tasks within the workplace. Mastering these skills is an important factor to demonstrating competence within the workplace. However, when it comes to demonstrating those skills outside the workplace, knowledge workers exhibit difficulty identifying how to roll-up specific task training to overall skills or knowledge competence.

Designing self-directed learning events that could be combined to amount to upskilling education is also problematic for knowledge workers. Instructional design systems prove useful to course designers are inadequate to the self-directed learner because conditions of postmodernism (particularly as mutability of learner characteristics, ambiguity in workplace context, and intersectionality) the frameworks for self-assessment, defining learning objectives, and identifying appropriate learning opportunities require a big-picture perspective difficult for the individual to achieve.

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