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The Kiosk Culture: Reconciling The Performance Support Paradox In The Postmodern Age Of Machines

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THE KIOSK CULTURE:
RECONCILING THE PERFORMANCE SUPPORT PARADOX
IN THE POSTMODERN AGE OF MACHINES

by

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ABSTRACT

Do you remember the first time you used an Automatic Teller Machine (ATM)? Or a pay-at-the-pump gas station? Or an airline e-ticket kiosk? How did you know what to do? Although you never received any formal instruction in how to interact with the self-service technology, you were likely able to accomplish your task (e.g., withdrawing or depositing money) as successfully as an experienced user. However, not so long ago, to accomplish that same task, you needed the direct mediation of a service professional who had been trained how to use the required complex technology. What has changed? In short, the technology is now able to compensate for the average consumer's lack of experience with the transactional system.

The technology itself bridges the performance gap, allowing a novice to accomplish the same task as an experienced professional. This shift to a self-service paradigm is completely changing the dynamics of the consumer relationship with the capitalist enterprise, resulting in what is rapidly becoming the default consumer interface of the postmodern era. The recognition that the entire performance support apparatus now revolves around the end user/consumer rather than the employee represents a tectonic shift in the workforce training industry.

What emerges is a homogenized consumer culture enabled by self-service technologies—a *kiosk culture*. No longer is the ability to interact with complex technology confined to a privileged workforce minority who has access to expensive and time-consuming training. The growth of the kiosk culture is being driven equally by business financial pressures, consumer demand for more efficient transactions, and the

improved sophistication of compensatory technology that allows a novice to perform a task with the same competence as an expert.

"The Kiosk Culture" examines all aspects of self-service technology and its ascendancy. Beyond the milieu of business, the kiosk culture is also infiltrating all corners of society, including medicine, athletics, and the arts, forcing us to re-examine our definitions of knowledge, skills, performance, and even humanity. The current ubiquity of self-service technology has already impacted our society and will continue to do so as we ride the rising tide of the kiosk culture.

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LIST OF ACRONYMS/ABBREVIATIONS

AI	Artificial Intelligence
ANT	Actor-Network Theory
AR	Augmented Reality
ASTD	American Society of Training and Development
ATM	Automatic Teller Machine
DOET	Design of Everyday Things
DVR	Digital Video Recorder
EPS	Electronic Performance Support
EPSS	Electronic Performance Support System
GUI	Graphical User Interface
HPT	Human Performance Technology
ISO	International Standards Organization
ISPI	International Society for Performance Improvement
NACS	National Association of Convenience Stores
NCR	National Cash Register
OJT	On the Job Training
PCD	Performance Centered Design
POS	Point of Sale
PST	Performance Support Technology
PVR	Personal Video Recorder
RFI	Radio Frequency Identification

RKCP	Ray Kurzweil Cybernetic Poet
SSNS	Sales Service Negotiation System
SST	Self Service Technology
VCR	Video Cassette Recorder

CHAPTER ONE:
INTRODUCTION

> It's no exaggeration to say that someone is using a form of self-service technology every minute of every day, virtually everywhere. In countries around the globe, individuals are getting cash from ATMs; using information kiosks to view gift registries and learn which wine will complement their meal; ordering a pastrami on rye (light mustard); printing out a boarding pass at the airport; checking into their hotel via interactive touch screens; and using self-checkout terminals to complete their shopping trips at supermarkets, mass merchants and specialty stores.
>
> - NCR Marketing Literature, *Retailers Rely on the Self-Service Leader*

Do you remember the first time you used an Automatic Teller Machine (ATM)? Or a pay-at-the-pump gas station? Or an airline e-ticket kiosk? How did you know what to do? Although you never received any formal instruction in how to interact with the self-service technology, you were likely able to accomplish your task (e.g., withdrawing or depositing money) as successfully as an experienced user. However, not so long ago, to accomplish that same task, you needed the direct mediation of a professional bank teller or gas station cashier or airline ticket representative who had been trained how to use the required complex technology. What has changed?

The answer to this question is the subject of this dissertation. In short, the technology is now able to compensate for the average consumer's lack of experience with the transactional system. The technology itself bridges the performance gap, allowing a novice to accomplish the same task as an experienced professional. This shift to a self-service paradigm is completely changing the dynamics of the consumer relationship with the capitalist enterprise, resulting in what is rapidly becoming the default consumer interface of the postmodern era.

During the course of the next five chapters, we will take a 360 degree look at a phenomenon that I have labeled the "kiosk culture," including its historical, theoretical, practical, and cultural perspectives. We will define what it is, how it works, and what its larger societal implications are.

At the core of this dissertation is the central argument that the increasing transparency of performance support technology is the catalyst for a new self-service consumer interface, with cultural consequences that impact all of society. We are in the midst of cultural transformation, where technology is enabling all of society to perform tasks for themselves that previously required the assistance of trained experts. The kiosk culture is an exploding self-service paradigm. The details of this concept, as well as the associated terminology, will be made clear in due course.

The dissertation is divided into five chapters. Chapter One provides an introduction to the central premise, as well as this overview of the structure of the entire dissertation. Original theories and terminology will be established, including "performance support technology," "performance support paradox," "post-training," and "kiosk culture." Furthermore, an argument will be made that the kiosk culture represents a new—and soon-to-be dominant—consumer interface for the capitalistic apparatus.

Chapter Two details an original classification system for performance support technology based upon its transparency—or its ability to hide the support it provides—and examines the usability strategies of successful self-service systems in relation to this classification system. The increasing transparency of performance support technology is the catalyst for today's explosion in self-service consumerism, akin to Hegel's "vanishing mediator."

Chapter Three offers observations on the consequences of applying performance support technology to non-business areas such as the arts, athletics, and medicine. Performance in each of these areas means something different, yet the same question of responsibility permeates them all. Where does the organic human end and where does the machine begin? Who is responsible for the "performance," the man or the machine, even if that means running a four-minute mile, composing a symphony, or regulating a heartbeat?

Chapter Four provides some historical context for the societal pressures that drive increased worker productivity and how they enabled the development of performance support technology. This obsession with efficiency has now bled into all aspects of society, resulting in technical skills being situated in the technology instead of the human. This devaluation of technical skills will lead to an increased value in knowledge, causing us to re-examine the suitability of terms such as "training," "education," "knowledge," and "skills."

As the final chapter, Chapter Five ties up the threads of the dissertation, tempering the concept of a "post-training" era with the acknowledgment that training will not disappear entirely, nor should it. Technical skills training, especially in the form of simulations, will still be necessary for proficiency improvement. Technology never stands still and any thorough analysis of a technological development must consider the future. As humans delegate more skills to technology, the chapter will briefly touch upon the Heideggerian posthuman threat of performance support technology, ultimately reconciling it and the performance support paradox by emphasizing the difference

between performance support—which, by definition, must include a human to support—and automation—which, by definition, must eliminate a human from the activity.

Elements of this dissertation are based upon developing research that was previously published, notably an April 2004 article in the journal *Performance Improvement* entitled "The New Spectrum of Support: Reclassifying Human Performance Technology," portions of which are included with permission from the International Society for Performance Improvement (ISPI). Developing research was also presented at several industry conferences, including a December 2004 paper presented at the Interservice/ Industry Training Simulation and Education Conference (I/ITSEC) in Orlando, Florida entitled "Eliminating Traditional Training: The New Era of Human Performance Technology." The information in this dissertation significantly updates those previous works while still retaining sections of the source text. Full citations of the original works can be found in the References (Cavanagh).

Background

Self-service technology, of course, didn't arise in a vacuum. It is an evolutionary development, growing directly out of the world of workplace performance support. Before addressing the cultural impact of the recent explosion in self-service, it is helpful to examine its context and parentage in the milieu of employee workforce training and performance support.

In our postmodern, performance-focused business world, there is arguably nothing more important than worker productivity. Whether the organization is product or

service oriented, the micro performance efficiency of daily workplace tasks translates directly into the macro performance of the business itself. In many cases, it can mean the difference between solvency and a bankruptcy court.

In most firms today, performance is the metric by which everything is judged: stock performance, key performance indicators, sales performance, etc. An entire discipline surrounding "Performance Management" emerged in recent years, encompassing everything from training (e.g., human performance) to organizational structure (e.g., functional vs. matrix organization) to quality initiatives (e.g., ISO, Six Sigma) with numerous points in between. Consultants focusing in various performance improvement specializations work with companies to effect positive business results. Jon McKenzie goes one step further by connecting this type of performance to technology. "Performance Management…attunes itself to economic processes that are increasingly service-based, globally oriented, and electronically wired" (6).

Thus, effecting improved worker performance is intrinsically associated with technological advancement. Therein lies the benefit of *performance support technology*, which I define as *technology that enhances human performance by helping people use other technology*. This seemingly circular definition merely describes compensatory or instructional technology such as a software application's Help function. It assists us to use a particular piece of technology. As science marches further into the 21st century, workplace technology has become more and more capable of compensating for human shortcomings. So, it is of utmost importance to examine a seemingly mundane task such as using Microsoft® Word to type a letter, because, in the aggregate, it can have a dramatic effect on the quarterly earnings report. How can performance support

technology help employees better use workplace systems to improve their task efficiency and productivity? Put another way, how can technology's design be improved to better support the human worker? And what implications does this have for the multi-billion dollar (or euro or yen) corporate training industry? As it turns out, there are significant implications.

The universal integration of technology, especially McKenzie's electronic technology, is critical to consider related to worker performance. No matter what the job, the human worker needs to do certain things to fulfill his/her obligation to the organization and those things invariably involve technology. Whether the work calls for using a cash register, programming a computer, operating a telephone, driving a tractor, firing a rifle, configuring an IT network, wielding a shovel, painting a sign, or any number of other examples, there is no profession untouched by technology. According to postmodern philosopher Jean-François Lyotard, this "'organic' connection between technology and profit preceded its union with science. Technology became important to contemporary knowledge only through the mediation of a generalized spirit of performativity" (*Postmodern Condition* 45). This concept of *performativity* is at the very core of performance support technology. The essential function of performance support technology is to assist a human in performing a task. In the business world, the means used to accomplish this task are less important than the successful completion of the assignment, as long as the most efficient means are used. This notion of maximum efficiency is critical because it directly drives the financial pressures of performance management (the historicity of efficiency relative to performance support technology is discussed in more detail in Chapter Four).

Typically, workers are taught how to complete a task—and, by extension, how to use the required technology to accomplish that task—through formal, structured training. Whether that training occurs in a classroom-based lecture environment, a self-paced e-learning tutorial, or a textbook, it necessarily requires the worker to be removed from the job in order to learn. Although training's ultimate goal might be improved task performance, its means are completely antithetical to any notion of efficiency. A worker can't possibly be efficient if he/she isn't even in the task environment. This is the problem addressed by performance support technology, which is designed to contextually compensate for a human performer's lack of task competency. The support is situated within the task environment, in a just-in-time format, mitigating the need for external instruction. What the human doesn't know, the performance support technology does. It is a task performance "safety net." After all, what could be more efficient than the complete elimination of any instruction required to accomplish a task? Workforce performance expert Marc Rosenberg has written about this in the context of Electronic Performance Support (EPS), a specific instance of performance support technology:

> EPS was developed by people looking for ways to impact performance directly, without the intermediate steps involved in instruction. They wanted to enable performance in the context of work. They wanted to obliterate the line between learning and work so that, in reality, learning is work, and work is learning. The goal of EPS is not competence that resides in the individual, but rather *performance that resides in the situation* (97). [emphasis added]

In the contemporary business environment, employee training is too often perceived by executive leadership as a necessary evil. It is considered a budgetary expense as opposed to an investment with a measurable return. It begs an essential and provocative question: What if training could be completely eliminated? Although an extreme concept, if it could be reasonably proposed, it's a notion that would certainly attract the attention of the business community. If a CEO could effect the same workplace and financial results via performance support technology, without any employee training required, don't you think he/she would jump at the opportunity?

What if an airplane were designed with such sophisticated transparent support technology that a novice could pilot it fearlessly without any instruction, because the system ensured that it was impossible to crash, despite any weather contingency? In such an extreme scenario, would an understanding of Newtonian physics and weather principles even matter? They would be superfluous to the safe operation of the aircraft. Knowledge-based education would be unnecessary, as would skills instruction. The desired performance of the aircraft would have been achieved without either one. Where, in this acute example, is the role of today's trainer?

This distinction between training and performance is illustrated in an advertisement for the International Society for Performance Improvement (ISPI) which ran in *USA Today* on February 6, 2006. It reflects a growing corporate sentiment away from training as an end goal and toward performance as the primary criterion of success. The ad shows a male office worker with his tie caught in a paper shredder. The headline unequivocally exclaims: "Training is one thing. Performance is another."

Consequently, we find ourselves on the verge of a potential *post-training* era in which technical skills training will eventually become obsolete, replaced entirely by performance support technology. There will be no need to learn how to use technology because the technology itself will compensate for our inexperience or inability. As Marc Rosenberg said, the performance will reside in the situation. As the harbinger of this looming post-training era, performance support *transparency*, or the inability to distinguish a task from the technological support provided to accomplish that task, presents a challenge to today's training professionals. The time is coming in which performance support technology will be so effective at compensating for human performance gaps that the services of training professionals may no longer be necessary in order to achieve desired workforce performance.

The only question will be: can the worker perform a skill to an acceptable standard? How that goal is accomplished is irrelevant, whether by traditional training or via embedded technological support (or some combination thereof). Whatever strategy offers stakeholders the greatest return (*vis-à-vis* efficiency) will be the one implemented. In all likelihood, it will be a seamless fusing of Performance Management and what McKenzie calls Techno-Performance.

The concept of eliminating training could have a tremendous financial impact. According to the American Society for Training and Development (ASTD), American industry spends over $50 billion annually on training activities. The U.S. Department of Defense spends more than $17 billion annually for military schools that offer approximately 30,000 training courses to nearly 3 million personnel. As human workplace performance becomes increasingly dependent upon technology, the cost of

technical skills training under the traditional training paradigm will only grow in an attempt to keep up with that rapidly changing technology. Eliminating those training expenses—or even a portion of those training expenses—could have a remarkable impact on the corporate balance sheet.

If it's conceivable that at some future point the training industry will be reduced, eliminated, or transformed beyond recognition, then a forward-looking CEO might also wonder if the employee being supported is even necessary. If workplace performance can be achieved without technical training, then can business operational performance be achieved without certain employees? This is the question that propels the rising tide of self-service technology.

The Performance Support Paradox

History is riddled with examples of automation eliminating jobs. Johannes Gutenberg's printing press eliminated the need for wood engraving craftsmen. Eli Whitney's cotton gin automated the labor intensive task of separating cottonseed from cotton fiber. The entire typesetting industry was almost instantly eliminated from the publishing world with the introduction of the personal computer and word processing applications. However, performance support technology is quite distinct from automation. By definition, performance support technology is designed to *support* a human in accomplishing a task, not *replace* a human. Without the human, there would be no need for the support technology. So, how can technology specifically designed to

support a human be so effective that it eliminates the very human worker it was created to support? This conundrum is what I have labeled the *Performance Support Paradox*.

The Performance Support Paradox can be reconciled by recognizing that the *person being supported has changed*. Rather than supporting the employee, in many cases, the entire process now *revolves around the end user/consumer.* In the competitive, profit margin-conscious world of global commerce, this shift is inevitable. As Nicholas Mirzoeff observes, "the consumer is the key agent in the postmodern capitalist society" (27). Although a particular employee may no longer exist, a human is still being supported.

Consider an historical example: the elevator. For nearly one hundred years, the experience of riding in an elevator remained relatively unchanged, with the rider's interaction with the technology mediated by a trained elevator operator. Then, in the middle of the twentieth century, the Otis Elevator Company introduced self-service technology, allowing riders to operate the equipment themselves. Within ten years 500,000 elevator operators in the United States had lost their jobs (Fishman *New Machine* 93). But people still ride elevators. The human is still the epicenter of the elevator apparatus. Without a human passenger to transport, there would be no need for its self-service performance support technology. The apparatus would be nothing more than an empty box traveling up and down for no purpose. We just no longer need a trained expert to operate it for us. Fast forward to today and we can see that transparent performance support technology combined with increasing business performance pressures have manifested themselves in the current explosion of self-service technologies. The recognition that the *end-user (consumer) has now replaced the employee as the human*

axis of the entire performance support apparatus represents a tectonic shift in the training industry.

When performance support technology is integrated within a consumer self-service application, it permits a human to meet the technological system on his/her own terms, regardless of experience. The increasingly transparent support embedded within the system compensates for any performance shortcomings, allowing a novice to achieve the same level of performativity as an expert, realizing what Donald Norman has called "The Invisible Computer of the Future." Norman observed that "you use computers when you use many modern automobiles, microwave ovens, and games. Or CD players and calculators. You don't notice the computer because you think of yourself as doing the task, not as using the computer" (*Design* 185). The computer is transparent. The only metric that counts is the task performance, which is now electronically mediated whether we're aware of it or not. Rather than being situated in a training program or instruction manual, the performance now resides in the situation. As a result, technical training, or instruction on how to use technological systems, is quickly becoming unnecessary. Situated performance support technology offers just-in-time assistance to any user, regardless of experience, mitigating the need for any prior instruction. This technological evolution is manifesting itself in a variety of interesting ways throughout society, resulting in what may be a legitimate cultural transformation that touches all of our lives.

The Kiosk Culture

If we are indeed talking about a cultural transformation, then it's worthwhile to ask, "What is a *culture*?" In his detailed etymology of the word "culture," Raymond Williams notes that it "is one of the two or three most complicated words in the English language" (76). Lyotard suggests that shared knowledge is what "makes it possible to distinguish one who knows from one who doesn't… [and] is what constitutes the culture of a people" (Lyotard *Postmodern Condition* 19). For Lyotard, shared knowledge is the defining characteristic of a culture. Williams also observes that among the reasons for late 19th Century and early 20th Century hostility to the concept of "culture" was its connection "with uses involving claims to superior knowledge" (82). Undoubtedly, as described by Carolyn Marvin, the nascent electrical community of the late 19th Century was a quintessential sub-culture. Marvin validates Lyotard's definition of culture as protected community knowledge (particularly technological knowledge) when she describes the elitist nature of the "electrical culture" in the nineteenth century.

> Electricians were wont to indulge a powerful impulse to identify aliens and enemies, those suspect in electrical culture and perhaps dangerous to it…Outsiders were defined as those who were uneasy and unfamiliar with technical procedures and attitudes, especially literate ones. By a supplemental logic of explicit social control, any additional marginality of race, class, gender, or lifestyle was taken as confirming alien status (Marvin 15).

The “electrical culture” consisted of those who knew and understood the technology of the time. Certainly, the knowledge of how to interact with technology separates today’s trained workforce elite from the untrained consumer masses. We need those workers to ring up our merchandise, to issue our plane tickets, to take our lunch orders. We can’t do it ourselves because we haven’t been taught how to use the required technological systems. However, when viewed through Lyotard’s postmodern lens, transparent performance support technology obliterates those knowledge-based cultural divisions.

What emerges now is a homogenized consumer culture enabled by self-service technologies—a *kiosk culture*. No longer is the ability to interact with complex technology confined to a privileged workforce minority who has access to expensive and time-consuming training. With the proliferation of transparent performance support technology, any random consumer can now interact with the complicated technology formerly the exclusive domain of the trained service workforce. Obvious examples include pay-at-the-pump gas stations and supermarket self checkout lanes, both of which formerly required a trained cashier to mediate between the consumer and the point of sale (POS) cash register. The access to and ability to use a flight reservation system such as SABRE was once the rarified province of the travel agency industry. Now, with online flight and hotel booking, consumers can arrange more and more of their travel itineraries themselves.

The term “kiosk culture” captures two distinct but complementary notions. First, it comments literally on the pervasiveness of electronic kiosks, ATMs, and other self-service technologies. These devices are ubiquitous in our daily lives and have been

absorbed into our normal societal routines. Their physical presence is unavoidable and their use is now all but required to accomplish a multitude of everyday transactions. Second, "kiosk culture" also connotes the general acceptance and even encouragement of a self-service mindset for the postmodern citizen. From touchtone telephone answering systems to web-based electronic commerce to scanning our own groceries at the neighborhood supermarket, self-service is as much an expectation for the consumer as it is a business necessity for the provider. The kiosk culture represents nothing less than a cultural transition to a naturalized "do it yourself" attitude.

This cultural transition is consistent with a nascent self-service hegemony: the uniquely American capitalist desire for self-sufficiency, borne out of a cultural myth of the pioneer spirit and manifested today by the ubiquity of Home Depot hardware stores and the DIY (Do It Yourself) cable television network. The popularity of music services such as iTunes, where consumers can download just the songs they want and construct their own custom albums, is a further manifestation of the kiosk culture. This cultural myth of self-sufficiency—of *if you want something done right, do it yourself*—permeates the Western, and especially American, psyche. Business has merely capitalized on it (pun intended).

Some might presume that because the kiosk culture theorizes a dramatic, worldwide evolution via a specific technology, I am espousing a technologically deterministic viewpoint in the vein of Marshall McLuhan, who famously stated that "the medium is the message." To McLuhan, the technologically-enabled media transform society because they control our perception of it (McLuhan). Likewise, McLuhan's contemporary Walter Ong went so far as to claim that the technology of writing

fundamentally and irreversibly changes the human thought process. I am certainly not advocating such an extreme position. Being able to walk into a store and make a purchase without any interaction with another human being is certainly a change to the existing paradigm, but it does not represent a fundamental change to humanity. Yet, it would be foolish to discard whole cloth the notion that technology—including performance support technology—can and does significantly influence us. After all, the mere presence of a self-service choice in a retail establishment might be enough to alter our checkout behavior.

Still, others might believe that the concept of the kiosk culture is guilty of determinism's opposite extreme of technological volunteerism, where technology is merely a tool with no agency whatsoever—what Martin Heidegger called an "instrumental" definition of technology. However, the reality of the kiosk culture is more nuanced and sophisticated than an extremist label can capture. In fact, this entire dissertation is developed with the intention to offer a balanced, comprehensive treatment of the subject in the spirit of the following quote from Timothy Taylor:

> I am not rejecting the notions of technological determinism or volunteerism out of hand, but am instead saying that both positions are overtotalized and falsely binarized, and that opposing them masks the ways that some sociotechnical systems are more deterministic than others (though never wholly deterministic), that some provide for more volunteerism than others (though never total volunteerism), and that social actors do not have the same experiences with any sociotechnical system (37).

The kiosk culture concept might fit more appropriately into an Actor-Network Theory (ANT) framework, at least to a degree. To theorists such as Callon, Latour, and Law, ANT describes sociotechnical systems where the elements of the system are treated equally regardless of whether they are human or non-human (machine, social structures, information, environments, etc.). Each of these elements is an "actor" (or the less human-centric "actant") and a "network" is comprised of multiple actors. In such a construct, it's easy to see how the provider, the consumer, and the kiosk all play critical and dependent roles.

Within an ANT framework, Law and Callon speak to this theoretical middle ground espoused by Taylor when they state that "it is important to understand that actors are not simply shaped by the networks in which they are located (although this is certainly true), but they also influence the actors with which they interact" (Law & Callon *Life and Death* 25). The context for discussing the kiosk culture cannot be binary. It isn't that simple. It's a more dialectical process, with competing agencies negotiating their roles in the network. As will be explored further, a key reason for the recent growth of self-service technologies is the alignment of provider and consumer agencies, combined with the increased sophistication of performance support technology to catalyze the network. This is referred to later in this chapter as "a powerful nexus of influence."

The theoretical framework for this dissertation is admittedly diverse. It draws upon sociotechnical constructs, technology acceptance theories, economic statistics, workplace training strategies, cultural studies, instructional technology, and other eclectic disciplines. McLuhan has his place at the table of the kiosk culture, alongside Latour and

Heidegger, and many other theorists who might never ordinarily be mentioned alongside each other. However, via the interdisciplinary umbrella of Texts & Technology broadly, and the kiosk culture more narrowly, a network that includes actors located in economics, marketing, usability, cultural studies, technology theory, and instructional design can be woven into a single fabric that offers new insights into a societal development that affects almost everyone in the postmodern western world.

Context of the Kiosk Culture

Of course, the notion of self-service consumerism didn't begin with the introduction of pay-at-the-pump service stations and Automatic Teller Machines. It could be argued that the era of self service began in 1916 when Charles Saunders opened the first Piggly Wiggly grocery store in Memphis, Tennessee, requiring shoppers to choose their own food from the shelves and bring it to a central check-out area (Oi). Thus began a new relationship between the shopping public and retail providers—a new interface that continues to evolve today. Although today's concept of self service is mediated by electronic technology, the idea to take responsibility away from trained employees and place it directly into the hands of uncompensated consumers can be traced back in time right to Saunders.

Although their articles are separated by 23 years, Dawson and du Gay have each analyzed the impact of this shift to a Saunders-inspired self service grocery shopping model in Britain. British retailers were slower to adopt a self service paradigm than their American cousins, although the model has proliferated in the years since World War II,

especially since the 1960s (Dawson; du Gay). Like today, what this shift meant to both the retail service workforce and the shopping public is complicated. Du Gay observed that,

> seen from the vantage point of hindsight, self-service certainly effected a change in both the nature of the job of retail sales assistance (and management) and the social characteristics of those performing the work. However, that shift was effected over time, quite a considerable period of time, in fact and not immediately. That many retail workers could see self-service as a liberation not as a device that would fundamentally undermine the conditions of their existence for the worse again attests to the importance of context and culture. Self-service could seem easier work, cleaner and safer work, less servile work for those used to personal service. Only once personal service has almost disappeared can it then be reimagined as an ideal—as a lost "golden" age of skill and control for the retail worker (161).

With technology, particularly performance support technology embedded within electronic self-service application, the "skill and control" of the retail worker has been transferred to the untrained postmodern consumer.

This economic impact was predicted in 1978 by Jonathan Gershuny, when he coined the term "self-service economy." Also focusing primarily on the British economy, Gershuny correlated the statistical decline of certain professions such as domestic and laundry workers with the rise of household appliances that technologically allowed people to do their own chores. He predicted machines that would diagnose ailments and

prescribe medical treatment. He also envisaged learners who would assemble their own educations from open universities via video tapes, foreshadowing today's explosion of internet-based distance learning (Gershuny).

In 1991, Globerson and Maggard attempted to define retail self-service, listing the key characteristics of what they referred to as "a conceptual model of self-service." Within this model, they defined three broad constituent areas: the consumer sector, the environmental sector, and the organizational sector. Each domain contains several key factors that contribute to its relationship with the self-service model, particularly electronic self-service, such as that embodied by applications like pay-at-the-pump service stations and ATMs (Globerson and Maggard).

Table 1. Globerson and Maggard's Conceptual Model of Self-Service: Key Factors Per Sector

Consumer Sector	Environmental Sector	Organizational Sector
• Convenience • Time saved • Self-control • Money saved • Self-image • Risk • Self-fulfillment	• Governmental regulations • Trade constraints • Unions • Workforce availability	• The firm's organizational position • The firm's technical ability to introduce and maintain a self-service system

With the self-service model defined and contextualized via historical perspective, it's worthwhile to address the other disparate theoretical underpinnings of the concept of a kiosk culture. Let's begin with the provocative view of consumers as unpaid temporary workers. When the retail apparatus views consumers as limited employees, particularly within service organizations (Bowen; Mills and Morris), it fundamentally informs the

interface between buyers and sellers. From a purely capitalistic standpoint, letting consumers do a portion of the work is an effective way to improve profitability (Lovelock and Young). Yet, there is also an argument that the retail service experience can be significantly improved when the consumer is a true collaborator in the transactional process.

Moon and Frei acknowledge the cost savings associated with self-service: "An on-line banking transaction, for instance, costs just two cents, compared with 36 cents for an ATM transaction and $1.15 for a teller assisted transaction" (26). However, they also recognize the inherent challenges associated with a self-service model when profit is the sole rationale for its implementation. The answer, according to them, can be found in a "coproduction" model.

> The problem is that when a company does less, the customer ends up doing more—and most customers don't want to do more. In many cases, self-service sites just leave customers frustrated and annoyed. […] A better approach to e-commerce is what we call *coproduction*. In this model a company uses technology to shoulder many of the tasks involved in shopping and buying, relieving the burden on the customer (26).

When consumers take responsibility for the delivery of the service, as well as their own satisfaction, they become genuine "coproducers" of the service (Bendapudi and Leone). This is the conceptual essence of a partnership. With coproduction as the basis for a self-service implementation, the experience becomes less about exploitation and more about consumer empowerment.

This argument runs counter to the contention (often by the service workforce) that the capitalist apparatus is unabashedly exploiting the working consumer class. Companies have eliminated the cashiers who used to interact with their point of sale technology and replaced them with us—we all become uncompensated temporary workers on behalf of the corporate machine. However, when viewed through the lens of coproduction, the reality is more complicated than that. Rather than accuse the business community of wanton exploitation, we should recognize that the consumer is *complicit* in this shift to a kiosk culture. What, on the surface, appears to be a bourgeois exploitation of the masses is *simultaneously* a potent expression of consumer empowerment. The shopping public *prefers* the self-service option. A recent kiosk industry benchmark study mentions an example retailer where the consumer adoption rate of a self-service option is 85% (Carlin 2). This is far from the typical Marxist notion of alienation.

Consider the following statistics cited by self-service checkout developer NCR Corporation and IDC, a leading provider of global IT research (sponsors of the white paper *Self-Checkout Systems: Creating Value Across the Retail Store*, where 6,359 consumers were interviewed across Australia, North America, Europe, and Japan). While the source is admittedly biased, the figures are illuminating nonetheless:

- Nearly 70% of consumers indicated that they would be “likely” or “very likely” to try self-checkout. In the United States, the figure is 78%.
- 44% of consumers surveyed would be more likely to shop at a store offering self-checkout than in stores that didn’t, all else being equal.
- 97% of consumers aged 16-24 believed that there were “tangible benefits” in the self-checkout system, with 71% saying “speed” was a key benefit.

- Retailers with self-checkout options note that up to 50% of transactions go through self checkout and four out of every six merchants planned to at least double their self-checkout installations (Matthews and Whalen).

The Economist cites complementary statistics, reporting the following:

- 33% of airlines stated that by the end of 2004 more than half of their domestic customers would purchase their tickets from kiosks.
- Retail kiosks worldwide are predicted to grow by 63% over the next three years, to 750,000 (The Economist 21).

Technology research firm IHL Consulting states that:

- Sales from self-service kiosks will grow from a recent annual total of $161 billion to $1 trillion in 2006.
- From 2001 to 2003, there was a 78% increase in the number of people who used kiosks to check in at an airport.
- 95% of U.S. supermarkets will use self-checkout of some sort by 2006, contrasted with only 6% five years ago (Horovitz).

Some analysts estimate that one third of all service interactions are self-service, with that number predicted to rise to one half within four years (McLeod). In NCR's marketing collateral, company Vice President Mike Webster notes that "For the last five years running, the number one source of consumer dissatisfaction is the amount of time spent waiting in line," which is a pressure point that self-service technologies are specifically designed to relieve (NCR *Retailers Rely* 3). "As they become accustomed to serving themselves, customers are beginning to expect line-busting kiosks and self-checkout options, and will gravitate toward those businesses that offer the convenience,

speed, and control of self-service" (Carlin 8). Rather than being exploited, one could argue (and the kiosk industry certainly does) that these consumers are actually empowering themselves to improve their shopping experiences through transparent, performance support technology embodied in self-service kiosks. Brian Hayes writes that "the social effects of the do-it-yourself movement seem primarily beneficial" (13). Kevin Melchionne astutely observes that "Hayes locates do-it-yourselfing in automated tellers, self-service gas, fast food, and personal computers. For Hayes, these are all positive manifestations of American-style egalitarianism and self-reliance" (250). In other words, the kiosk culture is of the people, by the people, and for the people.

In the framework of cultural theory, Melchionne goes on to discuss the concept of "interpretive consumption," which is coproduction in a different context. However, as pervasive as coproduction is in our everyday lives, Meuter, et. al. do make the surprising observation that "no research has examined SST [self-service technology] coproduction" (63).

Once the larger capitalist system (including both sellers and buyers) accepts the concept of consumers as (uncompensated) temporary workers, then the question becomes how can industry support these new "employees" so they can successfully perform their responsibilities under a coproduction model? The answer lies in the same techniques used to support the traditional (compensated) service workforce. Meuter, et. al. cite prior research that advocates treating customers in the coproduction process as analogous to employees, helping to more clearly delineate the new customer role. "Defining the nature of the customer's role requires conducting a 'job analysis' of the customer's responsibilities as it is traditionally done for a firm's employees" (63). During Meuter, et.

al.'s discussion of the managerial implications of the research, the authors note that "applying employee-management practices to customers can lead to effective coproduction by increasing role clarity, motivation, and ability of customers" (78).

Rather than make use of complex and time-consuming formal training events (whether via a classroom or e-learning), employers have found success in consumer self-service situations by using the same strategies found in Electronic Performance Support Systems (EPSSs), sometimes also referred to as Electronic Performance Systems (EPS) or Performance Support Systems (PSS). Brown defines a performance support system as a

> software environment that provides a context within which work is done. Everything needed to do the job—information, software, expert advice and guidance, and learning experiences—is integrated and available, resulting in improved worker productivity and minimal support and intervention by others (6).

Marc Rosenberg referred specifically to EPSS (what he called EPS) in a previous quotation, describing its goal not as "competence that resides in the individual, but rather performance that resides in the situation" (97). It's easy to see how this overarching goal could be applied not just to traditional employees but also to self-service consumers.

The term EPSS is traditionally associated with Gloria Gery, who has written extensively about types of EPSSs (*Training vs. Performance; Electronic Performance Support Systems*), and is the author of a widely reproduced table that describes three levels of electronic performance support based on system features or behaviors (*Attributes and Behaviors*). Chapter Two of this dissertation focuses specific attention on

Gery's work with EPSS, as well others' theories, in the context of the Spectrum of Support.

Among the many studies that have been done to assess the efficacy of EPSSs to achieve acceptable workplace performance, one in particular is notable because it compares the performance of trained versus untrained personnel in relation to the use of an EPSS. Bastiens determined that EPSS users performed a specific task better than those who had participated in a structured, formal training program. However, the EPSS group did not demonstrate that they had "learned" as well as the formally trained group when evaluated via an external assessment (Bastiens). However, I contend that business owners care little whether their (temporarily-employed) customers learn, as long as they are able to successfully complete their transactional tasks. In the business world, the only true metric for success is *in situ* performance, not a constructed, abstracted test that a customer would never actually have to take.

Martyn Wild conducted a study that layered an extra level of complexity onto the concept of performance support systems. Wild examined how an electronic performance support system could be used for higher-order cognitive processing. He determined that novice teachers were able to use a performance support system to achieve "expert" performance levels in a lesson planning task (Wild). This type of complex cognitive activity goes far beyond a skills-based transactional task and points to the fact that a properly designed EPSS can truly bridge the gap between a novice and an expert, allowing untrained users to achieve expert performance. Although, in the context of a simple pay-at-the pump transaction, Wild's study is a bit extreme, it does hint at just what the self-service paradigm is capable of.

Simultaneously supporting both novices and seasoned experts is the goal of EPSSs and the same strategies can be found within self-service technologies. Constantine and Lockwood articulate three primary principles that can help achieve this goal: explorability, predictability, and guidance. Within those principles, Constantine and Lockwood go on to describe seventeen different techniques that can make software "interfaces self-teaching." These techniques include: starters, balloon tips or help, tool tips, progressive tool tips, embedded prompts, input prototypes, templates, start highlighting, workflow highlighting, dynamic affordances and constraints, instructive animation, anticipatory action, progressive enabling, progressive disclosure, implicit antecedents, idiomatic parallels, and thematic variation (Constantine and Lockwood).

In essence, what Constantine and Lockwood describe is a system that *adapts* to the needs of the user, whether novice or expert. The concept of adaptability is at the heart of an evaluation technique for software interfaces developed by Stary and Totter. Called *ActA* (*Ac*cessibility *t*hrough *A*daptability), the technique provides a heuristic for evaluating "universally accessible" technologies, which are "interactive software systems that allow diverse user groups to access information effectively" (Stary and Totter 101). The *ActA* technique could easily be applied to the self-service kiosk industry. It is "a structured technique…for checking user interfaces designed to be accessible for a variety of users. *ActA* enables the measurement in terms of a system's capability to provide accurate interaction features for individual users and their (situative) needs" (101). The concepts of being accessible to a variety of users and supporting their situative needs are exactly the requirements of self-service kiosks. In short, the system must adapt to the needs of *any* user, which speaks to the compensatory nature of performance support

technology. This position is consistent with a growing trend in technical communication as articulated by David Dobrin when he defines technical writing as "writing that accommodates technology to the user" (54). In this context, embedded performance support strategies could be considered a type of technical communication, adapting, accommodating, and ultimately translating between the human and the machine.

Enabling any user to successfully interact with technology is the central focus of Ben Schneiderman's "Universal Usability" movement. Schneiderman outlines a research agenda that includes strategies for addressing the following challenges, among others:

- *User diversity*: Accommodating users with different skills, knowledge, age, gender, disabilities, disabling conditions (mobility, sunlight, noise), literacy, culture, income, and so forth; and
- *Gaps in user knowledge*: Bridging the gap between what users know and what they need to know (Schneiderman 86).

Among Schneiderman's suggestions for addressing gaps in user knowledge is a collection of compensatory strategies that include several examples of performance support technology (90).

How successfully a system adapts to a user's needs is an important factor in that user's decision to select a self-service option. How complicated is the task that the self-service consumer must complete (or, at least, how complicated does the task seem)? Campbell proposes three categories of task complexity: (1) psychological experience, (2) interaction between task and performer, and (3) the objective set of task characteristics (Campbell), all of which impact a user's perception. Building upon this notion of task complexity, Davis has developed a Technology Acceptance Model (TAM), which

theorizes that when users are faced with new (software) technology, two primary factors dictate whether or not they will use it: (1) perceived usefulness (PU), which is "the degree to which a person believes that a particular system would enhance his or her…performance" and (2) Perceived ease-of-use (EOU), which is "the degree to which a person believes that using a particular system would be free from effort" (Davis).

Looking specifically at self-service, Bateson identified various criteria that customers use when deciding between self service and full service options. A significant finding was that consumers prefer self service when they can better control the experience (Bateson). Bitner claims that customers prefer self service technologies (SSTs) when they bail consumers out of difficult situations (convenience when needed), when they are better than the interpersonal alternative (saving time and money, affording easy access), and, perhaps most importantly, when they work. Customers do not like SSTs when they fail, when they are poorly designed, when the customer makes a mistake, or when there is no service recovery (Bitner).

Nicholas, et. al., studied the characteristics of users and non-users of a medical kiosk system. They found that younger users were more likely to use the kiosk option, but also observed that the demographics of the geographic area surrounding the kiosks being studied may have been a contributing factor. They also stated that the public nature of the kiosk may have inhibited usage to view private medical information. De Moerloose, et. al. found that information kiosks can be successfully implemented in a mall or within a retail store environment. However, the information must be current and relevant and focused on the items that customers are most interested in (De Moerloose, et.al.).

One previously-cited study represents an especially detailed attempt to quantify precisely why consumers make particular service selections. In "Choosing Among Alternative Service Delivery Modes: An Investigation of Customer Trial of Self-Service Technologies," Meuter, et. al. describe a comprehensive research project designed to determine key motivations behind consumer decisions to choose self-service options. They reference the concept of coproduction when they observe: "not only must customers change their behaviors, but in a self-service situation, they must also become coproducers of the service, with the responsibility for delivery of the service and for their own satisfaction." (61) As previously stated, if consumers are required to become coproducers of the service—uncompensated temporary workers—then there must be some compelling reasons for them to choose this option. This is precisely the subject of the study.

The authors define three key "consumer readiness variables" for study: *role clarity*, meaning the customer's understanding of his/her contextual responsibilities during the transaction; *motivation*, both instrinsic, such as feelings of accomplishment, and extrinsic, including self-interests such as price discounts or convenience; and *ability*, which describes a consumer's skill level and confidence to complete the self-service interaction. These consumer readiness variables are linked to a long list of antecedent variables which act as predictors of consumer readiness. The two hypotheses posit that the consumer readiness variables mediate the relationship to the other variables and predict the likelihood of trial (a consumer selecting the self-service option).

Two studies were conducted on consumers refilling mail-order pharmacy prescriptions. Study 1 explored the usage of an interactive voice response (IVR) self-service telephone system and Study 2 researched an internet-based self-service system.

The researchers developed a survey instrument and pilot tested it first with selected employees of the sponsoring firm (n=14) and then with a convenience sample (n=21). The survey instrument was designed to test all four consumer readiness variables (instrinsic and extrinsic motivation being separated), six innovation characteristics, and four individual difference variables. It used a seven-point Likert scale.

In Study 1, of the more than 60,000 customers who had recently placed a prescription refill order using the IVR system, 800 were randomly selected, with 406 responses. Of the more than 60,000 customers who did not use the IVR system, 1,200 were randomly selected, with 499 responses. Thus, 2,000 total samples were mailed and, accounting for those that were returned but unusable, the total response rate was 41%. Study 2 used the same methodology to reach 2,000 users and nonusers of the internet-based prescription ordering system. 401 self-service users and 333 nonusers returned surveys, with an overall response rate of 37%.

Although the response rates were fairly low and reason for concern, the authors go to great lengths to detail the results in both textual and tabular form. While the results from the two studies were not quite identical, there was significant overlap and it is clear, based on these surveys, that role clarity and extrinsic motivation were the two strongest predictors of consumer readiness to select self-service.

Understanding consumer motivation to select self-service has important societal and economic implications. The authors support my central argument when they state that the consumer coproduction process, particularly in the grocery industry, “has revolutionized the typical interface between the customer and the service provider as well as the behaviors required of customers in the grocery industry” (63). Similarly, Garrety

and Badham also echo the notion of a new societal interface based upon user-centered design principles, which they claim “are tools for engendering new forms of socio-technical relations” (191).

Once a consumer has chosen a self-service technology, how successfully do they interact with it and what factors influence that success (or failure)? That question happens to be at the center of an article by Regina Colonia-Willner entitled “Self-Service Systems: New Methodology Reveals Customer Real-Time Actions During Merger.” In this report, Colonia-Willner describes her research into the successful usage of a bank’s automatic teller machine (ATM) relative to whether the user is a novice or an expert. In addition, a particular emphasis was placed on determining whether the user’s age or level of education are contributing factors to successfully using an ATM. A key aspect of this study is that it was conducted in the natural environment, not in a controlled laboratory setting, presumably allowing more realistic data to be collected.

The study population consisted of 15,099 customers aged 16-79 years old of a major international bank that had recently acquired a large regional bank. The opportunistic exploitation of the merger situation was an ingenious method to distinguish a novice user from an expert. It was stated (although not terribly well supported) that the regional bank’s culture was much more interpersonal than automated and that ATM usage at the regional bank was far less than at the acquiring bank. Furthermore, the acquiring bank’s ATM system was completely different from the regional bank’s system, meaning that the newly acquired customers had no experience with their new ATM system, rendering them “novices.”

A number of independent (mostly demographic) variables were studied along with two dependent variables: time spent to complete an on-line transaction and the transaction's accuracy. While maintaining customer privacy, data was programmatically collected over 22 days across 20 bank branches, resulting in 44,435 visits to 103 ATMs with 60,259 total transactions (as defined by the author, multiple transactions could occur during a single "visit"). Two different versions of the ATM software were compared against the novice and experienced user groups and each group was analyzed against its own performance with the two different software applications, as well as against the performance of the other group.

Ultimately, Colonia-Willner found that age, while a predictor of time spent, is not a predictor of accuracy—and the time difference for older users was only a matter of a few seconds on average (although older users did tend to conduct less complex transactions). Education level was also a predictor of time spent but not of accuracy. Interestingly, Colonia-Willner also makes the somewhat contradictory but nonetheless fascinating observation that while college-educated users may complete transactions more quickly, they are not necessarily more accurate than their less educated colleagues, which may be an indication of performance support technology strategies that accommodate a wide range of users.

Several additional results of the study have important connotations for this discussion of the kiosk culture. For example, the transactional error rate between novice and experienced users was very similar (Table 2), implying that the system supported both groups equally well.

Table 2. Error Rate Results—Experienced vs. Novice

	ATM Software Version 1	ATM Software Version 2
Error Rate: Experienced	M=10.5% / S.D.=0.27	M=3.1% / S.D.=0.15
Error Rate: Novice	M=11.5% / S.D.=0.29	M=3.2% / S.D.=0.15

I contend that supporting novice and experienced users equally is one of the primary conditions required of a successful self-service application, and is the result of compensatory technology strategies that permit a novice to meet the system on his/her own terms. Clearly the data from this study supports one of the foundations for my argument that self-service is becoming the dominant consumer interface of the postmodern era.

Yet Colonia-Willner's data also prove that there is still much room for improvement in the systemic application of compensatory technologies, even in a technology as mature as ATMs. For example, she found that more than 10% of attempted ATM withdrawals and 50% of attempted bill payments were unsuccessful due to customer error. The total customer error rate was 8.5% of all transactions during the study. Considering all transactional errors, 77% were the result of customer error, 22% were due to equipment error (e.g., receipt tape jamming), and 1% were system communication errors (which prevented transaction processing). A key area for future study would target this human error rate and determine reasons and mitigation strategies to improve performance. The author herself hints at this future research in her conclusion, when she discusses the need for "recommendations for the design of smarter machines

that recognize each customer profile and pace the machine responses to meet the customer's needs" (265).

The New Consumer Interface

Since the industrial revolution and the Taylorization of the Western workforce, the interface between the technological workplace apparatus and the worker has become increasingly more efficient—arguably, increasingly more *transparent*—with increased profits resulting. With the postmodern evolution from a worker-focused paradigm to a consumer-centered system, this shift portends an ascending capitalistic interface, one that will very likely become the dominant consumer interface of the 21st Century. Meuter, et. al. discuss how "coproduction" relative to self-service technologies (SST) has transformed the traditional consumer interface.

> Customer use of a new SST implies coproduction of the service, which frequently requires customers to engage in new behaviors. For example, in the grocery industry, customers are increasingly given the option of scanning their own grocery items and paying for and bagging their food without assistance from a sales clerk. This option has revolutionized the typical interface between the customer and the service provider as well as the behaviors required of customers in the grocery industry (63).

Rather than walk up to a human cashier to purchase our goods, we'll scan them ourselves. Rather than ask a clerk for assistance locating an item, we'll press a few buttons on an information kiosk, which will display a store map and print walking

directions for us. We've long since accepted as normal automated phone answering systems, where we press buttons when prompted or speak answers when told to by mechanized voices. We arrange our own travel online. We pay for our gasoline at the pump. Technology now enables us to do it all ourselves. Consider the following from the Wall Street Journal:

> Nancy Lafreniere has never worked in a supermarket but she can ring up groceries faster than the most seasoned cashier. Her edge: a wireless computer on the front of her shopping cart at the Super Stop & Shop in the Boston suburb where she lives. Ms. Lafreniere uses a hand-held bar-code reader called the "Shopping Buddy" to scan all of the groceries herself as she walks through the aisles. The computer keeps a running tally of her purchases, and since it knows her shopping habits, it also can offer appropriate instant discount coupons for items right on the aisle she's cruising. All Ms. Lafreniere does at the checkout counter is pay and go (Higgins).

In its high-tech concept store, grocery retailer Food Lion has installed four self-checkout lanes for every six traditional lanes. Food Lion has also implemented shopping area self-scanning and bagging capabilities (as opposed to the traditional "register area"), with payment being the only task required for checkout. The grocery chain has even instituted a personalized bar code system to prevent double scanning mistakes and unwanted scans (e.g., from an accompanying child), while also preventing shrink (a retail term for lost product/revenue due to error or shoplifting) (Carlin 10).

Other technologies being tested by retailers include the ability to pay for groceries simply by placing a finger on a scanner at checkout, eliminating the need to carry cash, checks, or credit cards. The Pay By Touch consumer payment service has developed a system that links shoppers' credit cards or bank accounts with a digital image of their finger. When this technology is integrated into technologies such as the "Shopping Buddy," paying for products is now literally as simple as pointing your finger. The next predicted trend is radio frequency identification (RFI) technology, where tiny computer chips implanted in merchandise will transmit purchasing information to a receiver near the store exit and automatically charge a consumer's credit card —thus eliminating the need to even scan a product. "Supermarket operators say the ["Shopping Buddy"] gizmos will make shopping faster and easier, build customer loyalty by tailoring discounts and make for a smoother shopping experience" (Higgins).

The kiosk industry itself aggressively promotes the concept of an improved customer experience, a better *relationship*. NCR's own corporate catchphrase hints at this dynamic and is displayed prominently on their web site: "Transforming Transactions into Relationships." The kiosk culture is being offered as a culture of relationships: friendly machines that will speed you on your way much more efficiently than people could ever hope to do. NCR boldly tells retailers that "your customers know that self-service is better service" (NCR *Retailers*). With a decidedly subjective spin, the kiosk community even suggests that self-service technology is good for the retail workforce, claiming that it can "bolster staff morale by reducing clerical redundancy and affording personnel the opportunity to 'engage' customers one-on-one" (Carlin 11). Kiosks can even assume the less desirable duties of customer interaction.

> Kiosks are perfect for taking over more routine tasks, such as looking up reward points and redeeming special offers... (W)hile both live customer service personnel and kiosks may offer the same end result, such as an order being taken, the kiosk offers a faster, richer experience. Unlike a roaming salesperson, a kiosk stays where it's installed. Customers don't have to hunt for help. Kiosks are the perfect medium for providing after-hours service, in the middle of the night for example, when many workers prefer to be home asleep (Kerner).

Kiosks can also bridge the language gaps so frustrating to travelers and consumers in our increasingly global society. A programmed kiosk computer can “speak” far more languages than any ordinary human, and certainly far more than the typical customer service representative.

Although this may seem attractive, there are those outside the kiosk community who are less sanguine about the growth of self-service technologies and who might regard this growth in a postmodern light as “the victory of the capitalist technoscience” (Lyotard *Postmodern Explained* 30). Stevenson Swanson of the Chicago Tribune penned an editorial that irritated many in the kiosk community. In it he states that

> American consumers are shouldering an ever-growing chunk of the work involved in everyday transactions. The explosion in self-serve options is generating a backlash. Communications experts say people are more isolated than they used to be in the days of face-to-face service, and other observers question how much time people are really saving if they must

> constantly adjust to new machines, absorb new instructions and deal with the inevitable snags (Swanson).

Swanson quotes Nicols Fox, the author of an op-ed in the Washington Post and a forthcoming book, both entitled *The Case Against Efficiency,* who claims that the extra work for consumers inherent in the self service model is exhausting us. Swanson also fears "that new developments in do-it-yourself technology will exclude the elderly or the poor, especially as companies start charging customers a premium for doing business the old fashioned way" (Swanson). Indeed, airlines already charge a penalty fee for issuing the very paper tickets that were the only option for consumers a short time ago. As Nicholas Mirzoeff observes,

> The economic distinction between the electronic haves and have-nots is being biologized insidiously as a form of "natural" selection on the "Darwinian" model: that is to say, those most able to deal with computing environments have become the new technocratic elite on merit, while less able people have fallen behind. This attitude turns contempt for the poor, especially those of color, into a scientific theory that would be laughable if it were not being taken seriously by significant numbers of people (107).

Gail Lippincott has cautioned interface designers and other technical communicators to consider the unique needs of the quickly aging baby boomer generation, who are at risk of being excluded from the kiosk culture. "If we consider the rapid internet-driven trend that makes crucial health, civic, and product information available primarily or even exclusively online, thus decreasing or eliminating access to this information through

traditional print sources, we can appreciate the urgency behind helping older adults become technologically savvy" (Lippincott 157).

Others fear the loss of privacy associated with increasingly networked self-service technologies, where "patterns of consumption are mapped with remarkable precision by ATMs, credit cards, and check-out scanners" (Mirzoeff 28). Such fears reinforce a perception that our movements, purchases, and preferences are all under constant virtual surveillance, realizing an electronic version of Michel Foucault's panopticon. Big Brother may be watching.

Complex issues of privacy and social mores are already manifesting themselves within the kiosk culture. As more and more personal healthcare information is managed via self-service kiosks, the physical placement of those systems is a potential concern. Any random passer-by can see what may be extremely sensitive personal material because of the public location of a kiosk and its easily-viewed display screen, challenging the privacy intentions of the U.S. Health Insurance Portability and Accountability Act (HIPAA). A particularly acute example is a family planning group in Wisconsin that has stirred controversy by installing the "Contraceptive Kiosk" at several Wisconsin universities. These informational "kiosks allow eligible women to order state-subsidized contraceptive patches, birth control pills or condoms" (J. Lovelock 40). Because the kiosk culture cuts across all segments of society, it is not immune from the larger social and political debates. In this regard it is an actor in a larger network, with its actions dictated by diverse array of directors, each with its own agency.

Some retailers have specifically positioned themselves opposite the kiosk culture. Grocery retailer Whole Foods, for example, prides itself on its knowledgeable human

staff and high quality “natural and organic foods”. Even the term “natural and organic” connotes everything that is not the impersonal, technologically-oriented kiosk mindset. The Whole Foods experience is also a relationship; however, it is not a relationship based on efficiency but on the high-touch impact of human interaction and specially cultivated products. However, their indirect anti-kiosk stance in support of all things natural and organic does result in a significantly higher grocery bill. Yet many people clearly believe that the relationship is worth the premium price since Whole Foods boasts on its web site that it is “the world's leading retailer of natural and organic foods, with 170 stores in North America and the United Kingdom.”

Paul English, a software engineer and blogger, became something of a cult figure by creating a website that provides secret keypad combinations that will bypass the automated IVR phone answering systems of various companies and directly route a caller to a live human being. That effort, now known as “Gethuman,” became so popular with the general public that it required its own staff to manage it. The site’s popularity is indicative of a rebellious potential backlash against the faceless, impersonal dark side of self service. Indeed, in her research, Ulrike Schultze describes this conflict in the context of

> a continuum of service delivery mechanisms ranging from customers’ exclusive reliance on service relationships to their exclusive reliance on SST. There is considerable tension between these two poles: service relationships imply a social contract and embedded relationships, while SST-based service encounters are typically governed by formal contracts and arm’s length relationships (Schultze 29).

To many, the tensions created by SST and its "arm's length relationships" are very real and corporations would be wise to consider the ramifications of blindly adopting an SST interface in the myopic service of higher profits. In additional research, Schultze and Orlikowski

> found that the introduction and use of a network technology that was designed to deliver service through impersonal interactions had important implications for the embedded relationships comprising a firm's service strategy. Because network relations are enacted through the work practices and interactions of customers and providers, the use of the self-serve technology by customers led to arm's length relations at the firm level. For a firm relying on embedded relationships and social capital to generate revenue, such an enactment raised serious challenges for the viability of its business model. These challenges and unintended consequences are likely to emerge whenever firms deploy IT without considering the microlevel practices and social interactions that enact their macrolevel business strategies and network relations (Schultze and Orlikowski 105).

Another seemingly anachronistic defiance of the shift to a kiosk culture comes in the form of the regional laws that specifically prohibit consumers from pumping their own gas. The idea of motorists pumping their own gas was explored as early as 1947 by Frank Ulrich at his Los Angeles service station. When he offered a five cent discount for people to pump their own gas, he sold $500,000 in the first month, doubling his business (McLeod). While the U.S. Department of Energy estimates that approximately 90% of today's gas sales are self service (57), as recently as the 1960's only about one percent of

U.S. gas sales were self-service (Vandegrift and Bisti 63). At that time, twenty-three states prohibited customers from pumping their own gas (Johnson and Romeo). Yet, today, only two states remain in that category. New Jersey and Oregon still require a professional attendant to fill your car's tank for you. Pay at the pump technology is literally against the law. The debate about the value of these laws rages passionately between supporters and detractors. Those who want the laws repealed would generally agree with the comments made by writer Adam Schaeffer in the conservative publication "National Review." Schaeffer states that the New Jersey law

> might have made some sense in 1949 when the law was passed and when most of the population still smoked and stupidity could conceivably kill at the gas station. But times have changed and pumping gas is a safe activity that almost everyone but the handicapped can perform with the greatest of ease. Pay-at-the-pump technology is standard at gas stations coast to coast. Motorists fly through stations with the breathtaking efficiency only Americans can take for granted. That is, except in New Jersey and Oregon — the only two states atavistic, sadistic, and masochistic enough to still require thousands of "professionals" to waste time, money, and inconvenience customers (Schaeffer).

Indeed, scholarly research supports the notion that the laws are essentially anachronistic and may even result in a variety of troubling economic consequences, including higher gas prices. "The bans on self-service are a case in which regulations provide only minor benefits to a narrow interest group, while imposing large but diffused costs on

consumers" (Johnson and Romeo 632). Vandegrift and Bisti go so far as to state: "Eliminating the ban would permit…lower self-service prices. In contrast to the assertions of the New Jersey Legislature, the lower self-serve prices would benefit the poor. The poor almost surely prefer to pump their own gas in return for lower prices" (79).

Yet, the laws have their supporters, many of whom can be found in online discussion forums. Reasons cited in favor of the laws typically include the convenience of not having to deal directly with New Jersey's summer and winter weather extremes and a deserved perk to compensate for perceived state tax inequities. However, one such supporter touched on a much larger issue that resonates across the entire kiosk culture when he/she posted the following in an online forum: "Plus, when all of this country's jobs are being contracted out overseas, this is one place where kids can go to still find a job. Pumping gas is one job that can not be contracted out to folks in India (or wherever)....And I really and truly appreciate the gas pumpers...love 'em. I even tip 'em when I know they are freezing or sweating their asses off" (Muimiu).

The threat of the displaced worker is felt very keenly by the labor force endangered by the rise of the kiosk culture. The kiosk industry itself touts the labor-saving nature of its technology, claiming that a single self-checkout unit can replace two and a half retail employees (Carlin 10). In an interview on National Public Radio's "Talk of the Nation," this threat was explicitly confronted by Greg Denier, Director of Communications for the United Food and Commercial Workers Union. While tactfully stating that his union doesn't resist new technology, Denier clearly warns that the self-

service paradigm is driven wholly by the desire for corporate profits, at the expense of both jobs and customer service (Denier).

This argument is countered somewhat by anecdotal statistics from retailers such as McDonald's. In restaurants where kiosks have been initially implemented, such as those in Haines City, Florida, the result has actually been an *increase* in the labor force. This is due to several factors. First, McDonald's customers who order at a kiosk typically have larger orders and order more quickly than those dealing with a human cashier. With up to 50% of customers using the kiosks and spending 30% more per ticket, that's more food being ordered more quickly, requiring additional staff in the kitchen to prepare it. Second, with increased volume, the counter staff has remained constant, both to serve those patrons who prefer not to use the kiosk and to distribute the added product being generated by the kiosks and larger kitchen staff. Finally, some McDonald's have even hired "kiosk representatives" who act as kiosk hosts to help neophytes with the self-service technology (Fishman *New Machine* 92). I would expect these "host" positions to be quickly eliminated as the kiosk systems become ubiquitous and management's confidence in the embedded performance support technology improves. Yet, the net effect is that, at least in this case, the threat of the displaced worker may not be valid.

Continental Airlines states the total flight check in time average at their self-service kiosks is 66 seconds with bags and a mere 30 seconds without bags. Just as importantly, not only is the process speed increased, but many claim that the total experience is improved. For example, during the kiosk check-in process travelers can access a seating chart of the plane, see where they are assigned, and pick a new open seat based upon a long list of their own internal, personal criteria. "No ticket agent has the

patience to walk through this with any passenger, let alone every passenger. The kiosk handles it in seconds. And it can be programmed to operate in 12 languages" (Fishman *New Machine* 92-93).

Some have also claimed that the efficiency created by self-service technologies is due only to their novelty. When kiosks become naturalized as the dominant, default choice, they will cease being more efficient. When consumers have to wait in a long line at the supermarket, and then check themselves out, they will respond by actively seeking out establishments that offer human service. If the line is the same in both places, why should I do all the work? Yet, this argument is dubious. When examined in the light of ATMs and pay-at-the-pump technologies, which have become the dominant, default consumer interfaces of their industries, the prediction of less efficiency due to a lack of novelty has not been realized. Quite the contrary: in both of those examples, the technology's default status has, arguably, enabled ever greater transactional efficiency.

Steven Johnson claims that an interface "shapes the interaction…[and] serves as a kind of translator, mediating between the two parties, making one sensible to the other. In other words, the relationship governed by the interface is a *semantic* one, characterized by meaning and expression" (S. Johnson 14). The new interface of the kiosk culture is no different, subtly redefining the relationship between providers and purchasers. Performance support technology fulfills that translator role. Because it compensates for a human's lack of ability to use a piece of technology (or the technology's lack of ability on its own to be understandable by a human), it mediates "between the two parties, making one sensible to the other." It is the retail embodiment of Johnson's definition of

an interface. As a corporate strategy, NCR, as might be imagined, embraces this notion, even specifically invoking the term “interface.”

> Each opportunity to deliver information or to interface with the customer through the web, help desks, kiosks and other means is an opportunity to support and nurture the customer relationship. After all, products and services are short lived, but the customer relationship continues (NCR: *Asking*).

So who is right, NCR or the United Food and Commercial Workers Union? Are consumers better served or worse served by self service? Although legitimate arguments can be made in either case, the statistics clearly indicate that, at least in the Western world, most people feel better served by self service. Plus, it seems almost pointless to even ask the questions. As Intel co-founder Andrew Grove once remarked, “Technology happens” (Isaacson). The kiosk culture is a *fait d’accompli*. Although we can question its fairness, we can no longer legitimately ask if the kiosk culture should exist. It already does.

Such a statement might be considered by some as a lapse into what Nardi and O’Day have dubbed the “rhetoric of inevitability.” They have rightly observed

> how often technological development is characterized as *inevitable.* We are concerned about the ascendance of a rhetoric of inevitability that limits our thinking about how we should shape the use of technology in our society. Some commentators welcome the “inevitable” progress of technology—that is the view of the technophiles, who see only good things in future technological developments. Some decry the inexorable

> advance of technology—that is the view of dystopians, who wish we could turn our backs on the latest technologies because of their intrusive effects on our social experience (Nardi and O'Day).

However, I am not espousing a position at either extreme. While I might appreciate the convenience of self-service, I think it's valid to ask at what cost have we purchased this convenience? What I am trying to do by characterizing the kiosk culture as a *fait d'accompli* is to observe a societal fact. There is no inherent judgment that this is necessarily a good or bad thing. I am neither technophile nor dystopian. Much like the contextual discussion earlier in this chapter in which I quoted Timothy Taylor's middle ground between technological determinism and volunteerism, there is also a middle ground regarding the inevitability of the kiosk culture. Certainly the displaced service workers impacted by self service technologies would side with writers such as Ellen Rose, who encourages us to resist passively accepting technological inevitability. Especially if we are directly affected, we have every right to question the promotion of a technology that could eliminate our professions and livelihoods. However, such a position is as infused with agency as the opposite position espoused by business owners and the kiosk industry.

Regardless of your position (whether technophile or dystopian), the fact remains that the growth of the kiosk culture is already a reality and we must deal with it directly. My purpose here is to, as objectively as possible, examine the landscape of the kiosk culture and analyze its causes and consequences, both positive and negative. If a majority of consumers feel better served by the technology, and corporations can use that same technology to reap higher profits, this undeniably creates a very potent nexus of

influence. With the addition of effective performance support technology as the catalyst to ignite the power of that nexus, the result is the very explosion of self-service technology that we see occurring today. And it is only the beginning.

Travel agents seem to be particularly at risk of going the way of the elevator operator, due largely to the combination of fiscal efficiency and consumer preference. In 2003 corporate online travel bookings tallied $18.8 billion. Experts predicted that by 2006 that figure would reach $36.5 billion, a growth of 95% over just three years. That growth comes at the expense of travel agency commissions. The Ace Hardware company claims that since it began phasing in the web-based Orbitz travel services and phasing out travel agencies, the average fare has dropped 30% and transaction costs have dropped 60%. These are compelling statistics and provide a powerful incentive to adopt a self-service paradigm (Pack).

In many ways, to again echo Marshall McLuhan, the kiosk medium may very well be the message. As explored further in Chapter Four, it is a message of maximum efficiency, even at the expense of interpersonal human relationships. Recent research validates the notion that social contact is not especially important to most shoppers, exploding “the myth of ‘shopping as socializing’” (Cox, et. al. 257). The dynamics of the kiosk culture validate Mirzoeff’s contention “that culture is where people define their identity and that it changes in accord with the needs of individuals and communities to express that identity” (Mirzoeff 24). The emergence of the kiosk culture says that when we go to the grocery store, all we truly care about is buying our groceries. It is a task-based, goal-oriented activity.

Ulrike Schultze has been quoted outside the scholarly community in the popular press reinforcing this very notion. According to her: “In most cases, it’s not as though you are sacrificing a valuable human experience…Take the example of ordering a hamburger at McDonald’s…The person you are talking to is just rattling off information from a script: ‘Do you want a large Coke with that? Do you want this or that special?’ An electronic interaction isn't going to be much different. When was the last time you had a conversation with somebody at a checkout line that changed your life?” (Mcleod) Actually speaking to a human cashier is an unnecessary distraction and reduces our efficiency in accomplishing the task.

However, what about the all-too-common situations where a self-service technology still requires the intervention of a trained expert—what Swanson called “inevitable snags?” An item doesn’t properly scan, the receipt tape runs out, the coupon is rejected. These are situations where the self-service paradigm actually reduces task efficiency. True. However, I would argue that these situations are the result of poor design or inadequate performance support technology. As Donald Norman says, “when you have trouble with things—whether it’s figuring out whether to push or pull a door or the arbitrary vagaries of the modern computer and electronics industry—it’s not your fault. Don’t blame yourself: blame the designer. It’s the fault of the technology, or more precisely, of the design” (Norman *Design x*). If you are aware of the support, or, more specifically, the lack of support, then the implementation has failed and the transparency has dissolved. “When instructions have to be pasted on something…it is badly designed” (Norman *Design xii*). If properly implemented, a novice user of SST should achieve the same level of performativity as an expert, without necessarily realizing that he/she is

being assisted, even if the user makes an error. Human beings aren't perfect. They make understandable mistakes. The embedded support should compensate for *any* human performance shortcomings. In the aforementioned examples, it clearly does not. They are simply cases of poor self-service implementations, analogous to a poor customer service experience in a human interaction.

Note that this does not undermine the basic message of efficiency offered by the kiosk culture. It is merely indicative of a new technology's explosive growth. Kiosk system designers are still figuring out how to properly design and implement systems. However, they are well aware of the goal, as stated in a recent industry publication: "Self-service will only alienate customers if it is extended too far, poorly designed, or difficult to use" (Carlin 39). The designers of the kiosk culture understand the essential post-training nature of their technology, shifting the transactional emphasis from trained employees to untrained consumers. "Kiosks are used by the average consumer, rather than by specially trained people, so they must be reliable, durable and easy to read and use" (Kioskmarketplace). As time passes and self-service technology becomes more integrated into our daily lives and expectations, such instances of failure will diminish, transitioning the role of the human employee exclusively to non-transactional activities (this is addressed in more detail in Chapter Four).

The kiosk culture is a culture of human-mechanical interdependence—a natural extension of the industrial revolution. If, as Victoria O'Donnell has written, culture is "*defined as the actual practices and customs, languages, beliefs, forms of representation, and system of formal and informal rules that tell people how to behave most of the time*" (O'Donnell 554), then the kiosk culture tells us how to behave in the postmodern world

of machines: when we pull into a gas station we will pump our own fuel; when we go to a bank, we will withdraw funds at the ATM; when we go to the grocery store, we will check ourselves out. By interfacing with self-service technology, we become not only self-sufficient but self-*efficient*.

The catalyst for this new dominant interface—performance support technology—grows increasingly more transparent every day (more about this in the next chapter), hiding its presence from the user, becoming a Hegelian vanishing mediator. Whether your individual perspective of self-service technology is positive or negative, there can be no denial of its growth and emerging dominance.

CHAPTER TWO:
TECHNIQUES IN TRANSPARENCY

> A display that could prompt the user through the series of steps required for programming [makes] the difference between a valuable, usable system and a next-to-useless one.
>
> - Donald Norman, *The Design of Everyday Things* (101)

> I…wonder about the wages, both personal and social, of spending so much time with a machine that has slowly absorbed into itself as many complications as possible, so as to present us with a façade that says everything can and should be "easy." I began by ridding my system of Microsoft...UNIX always presumes you know what you're doing. You're the human being, after all, and it is a mere operating system.
>
> - Ellen Ullman, *Salon Magazine*

Since prehistoric hunters first sharpened a stick, humankind has employed technology to help accomplish specific tasks. From the development of papyrus paper to Gutenberg's printing press to Fulton's steam engine to today's supercomputers, mankind's history of improved efficiency and performance is as much a history of technological evolution.

As long as commerce has existed, human workplace performance has been a critical issue in any enterprise's profitability. Setting aside unethical performance practices—such as child labor, abusive working schedules, and the forced use of dangerous machinery—the legal and ethical development of workplace performance interventions has generally been associated with employee training. However, as the speed of the modern economy continues to grow, increased pressure on organizations to improve productivity has led them to develop performance interventions that are no

longer merely compensatory external training programs but are designed at inception as an inherent component of any workplace system.

If performance support should ever be completely integrated into workplace technology so seamlessly that the support is indistinguishable from the task itself, then absolute *transparency* will have been achieved. As discussed in Chapter One, training, as a result, would become superfluous and unnecessary. Within the domain of technical skills instruction, training could be entirely supplanted by integrated performance support technology, placing the emphasis on context-relevant human support rather than on instructional methodology. This is the phenomenon at the very center of the emerging post-training era. Is such a state realistic? Is true transparency possible? Not only is it possible, but we are well on our way towards attaining it.

The Context for Transparency

In the past, workers were taught technological skills via the same strategy as that used for knowledge: in a classroom. Whether the context is lab benches or software instruction, the model is typically an instructor-led, lecture based classroom environment. All too often, the metric for classroom success has been merely attendance and Level 1 feedback, according to Donald Kirkpatrick's Four Levels of Evaluation. Even when training is aligned to learning outcomes (Level 2), traditional assessment instruments have typically only tested knowledge—usually cognitive recall—not skills, and certainly not performance based skills tied to business operational metrics.

Looking at another strategy, on-the-job training (OJT) also has a long tradition, extending back hundreds of years to the practice of apprentices and masters. A naïve youth was apprenticed for several years to an experienced tradesman, who trained the youth in the profession's technological skills (e.g., a blacksmith's hammer and anvil). Another example: the British and American navies of the 18th and 19th centuries typically sailed with a complement of boys rated as midshipmen. These boys were considered officers in training and, over several years, were taught all the nautical knowledge and skills (e.g., using a sextant to navigate) necessary for a successful military career.

Of course, both classroom instruction and on-the-job training are still in use today. However, each is a slow, inefficient method of performance improvement and an unacceptable burden on resources. Consider: when an organization employs an on-the-job training strategy, it suffers not only from having an unproductive rookie in its ranks but it also suffers further from removing a productive employee from active tasking in order to train the aforementioned rookie. In unforgiving industries such as retail, this can be fatal.

Suppose a retail store manager spent two hours teaching each new employee how to use the point of sale (POS) cash register. According to the National Association of Convenience Stores (NACS), recent annual employee turnover within that industry has been as high as 163.5% (NACS). At that turnover rate, with an estimated staff of 12 part-time customer service representatives, the store manager is conducting the exact same training almost 32 times each year, just teaching employees how to use the cash register. Think of all the other mission-critical activities that could be accomplished in that time.

Now suppose that the cash register is designed in such a way that it is self-instructional. The performance support for that cash register is built into the system itself. The manager no longer needs to spend so much time on instruction and can instead focus his/her performance interactions on problem areas and customer service.

Self-paced e-learning, perhaps with built in simulation exercises for improved proficiency, is a good first step towards achieving this goal of integrated support. E-learning has been the recipient of much recent "buzz" about being, as Cisco CEO John Chambers has stated, the "next major killer application." Much of this "buzz" is deserved. As Richard Lanham states: "Certainly the current textbook publishers…are guilty of no fresh thinking. The current state of the art is being created in the gigantic world of business and government training programs. There, interactive video-and-text programs…are proliferating" (9). This may be true and is validated by e-learning's explosive growth in recent years (research firm IDC states that the worldwide e-learning market will reach $23.7 billion in 2006). Think of the efficiencies created for our over-tasked convenience store manager by a single e-learning program on the use of the cash register. The program is developed once and delivered multiple times, all without the intervention of the store manager.

However, despite the efficiencies created by online instruction, too often, e-learning, which may be media rich and flashier than traditional text or classroom-based deliveries, is merely knowledge-oriented and offers little in the way of actual performance-based instruction. David Jonassen has articulated e-learning's current challenge: "Unfortunately, most e-learning replicates the worst features of face-to-face instruction. So, it may be cheaper to 'deliver' knowledge over the Internet, but it will not

be more effective" (Jonassen). In addition, even if the e-learning program is truly performance-based (such as in a simulation exercise), it is still presented as an external, compensatory solution, separate from the specific task and work context. In many cases, such instruction is even referred to as a "virtual classroom," further reinforcing its separation from the actual task being taught. Such online instruction is not situated in the performance environment. It is *abstracted by its very nature*, and, therefore, at an inherent disadvantage in its goal to effect a context-specific behavioral improvement.

This is supported in research cited by Barry Raybould (Streibel; Seeley Brown; Suchman) concerning situated cognition and cognitive apprenticeship, which "has shown that learning is most effective when performed in the context of actual work. In addition, many organizations report that 85-90% of a person's job knowledge is learned on the job, and only 10-15% is learned in formal training events" (Raybould *Emerging Development Methodology* 8). As stated by Donald Norman, "performance relies upon the physical presence of the task environment" (*Design* 80). Wouldn't it be better if the cash register were just designed more intuitively, so that extra instruction isn't necessary? This is, in fact, exactly what's happening in many cases. This is the very seed of the kiosk culture tree.

As discussed in Chapter One, retailers, from supermarket chain Winn-Dixie to The Home Depot home-improvement stores are now offering automated checkout machines that allow customers to scan merchandise themselves. Other retail chains, including discounters, gas stations, movie theaters and department stores, also have turned to machines to help take payments, control inventory and hire workers. Airlines tout their self-check-in kiosks, where passengers can check in for flights and obtain

boarding passes without talking to the employee handling baggage, who could be monitoring a half-dozen machines (Meitner).

Understanding how to use technology to accomplish required tasks will become the only metric that matters for organizations. Performance support tools that guide the human worker on how to use the technology at hand will become the bridge between the organic and the mechanical. Recognizing the various types of tools available for performance support is a necessary prerequisite for implementing an effective—and practical—solution. Unfortunately, the field of Human Performance Technology (HPT)—which promotes a systematic, scientific process for performance improvement, including the workplace interaction of people and machines—does not currently have a cohesive method of classifying the various types of performance support that help workers use their technology.

That isn't meant to imply that much scholarship and professional discourse hasn't been presented about performance support systems, especially about electronic performance support systems (EPSS). Much has been written about what constitutes successful performance centered design (PCD). The HPT community has even collectively adopted a variety of terms to describe efforts to design and implement performance support systems. However, these terms are neither consistent nor universally adopted. As HPT continues to mature, it can be argued that a broader classification system is necessary to effectively compare "apples to apples." Only by placing various types of performance support technologies into context with each other can we adequately examine where we have been, look at where we are, and map a course to take us where we want to go.

We are not starting from scratch. Many authors and researchers have developed classification terminology and definitions. Gloria Gery has written extensively about types of EPSS, and is the author of a widely reproduced table that describes three levels of electronic performance support based on system features or behaviors (*Attributes Chart*). Gery has also provided several shorthand terms to describe various types of performance support systems. These terms, which have been generally adopted by the HPT community, include:

- *External support***,** which requires that the user break from the work context in order to access support.
- *Extrinsic support***,** which is available within a performance system, though the user must break the task flow to obtain it.
- *Intrinsic support***,** which is inherent to the interface and, to workers, is seen as part of the system (Gery *Attributes and Behaviors*).

However, Barry Raybould has also described two types of EPSS: stand-alone and embedded. He defines each as:

- *Stand-alone*: systems that are independent of larger databases or networks of computers that exist in an organization but provide workers with information they need to do specific tasks.
- *Embedded*: systems in which the software application becomes the EPSS. There is no distinction between the performance support system and the software application (Raybould *What is*).

In Raybould's terms, the stand-alone concept overlaps both Gery's external and extrinsic support definitions, and the embedded concept describes the same notion as Gery's intrinsic definition.

Ariel Performance Centered Systems, a leading performance improvement consultancy, currently uses the term "linked support" as a synonym for Gery's "extrinsic support" and "embedded support" as a synonym for Gery's "intrinsic support" (Ariel). In addition, writer and consultant Cheryl Locket Zubak suggests the term "Embedded Help," which she describes as "user assistance that is part of the real estate and functioning of the user interface of a software application." Zubak further clarifies embedded help by offering five distinct types: stationary (designed as part of the interface), process (invoked when a user takes a specific action), instructional (controlled by the user), context (a broader form of process help), and agent (in which users allow the system to automatically fix errors) (Zubak).

In just these few examples, it can be seen how the HPT community is struggling with terminology. Standardization of the discourse terminology has been an issue in all technological endeavors throughout history. As Carolyn Marvin observed in her study of electric communication in the 19th century: "(E)lectrical engineering, which had emerged only in the decade before the founding of the AIEE (American Institute for Electrical Engineers)…by the time of its organization had achieved no clear consensus about the meaning of the term *electrical engineer*. The broader title *electrician* was equally vague" (Marvin 10). Marvin goes on to describe:

> In 1893 Professor E. Hospitalier…chaired a Committee on Notation for the International Electrical Congress, which recommended wide-ranging

> standards for electrical language and systems of notation…In response to an inquiry about the best word to describe "execution by electricity," the *Electrical Review* reported a variety of suggestions, including *elektrophon, electricize, electrony, electrophony, thanelectrize, thanelectricize, thanelectrisis, electromort, electrotasy, fulme, electricide, electropoenize, electrothenese, electrocution, electroed, electrostrike, "and finally joltacuss or voltacuss"* (50).

Clearly, the HPT community is in a similar situation today, with no clear consensus about commonly used terms and concepts. Like the electrical community of the late 19th century, today's HPT community is struggling with what Michel Foucault has called "discursive formation."

> Whenever one can describe, between a number of statements…a system of dispersion, whenever, between objects, types of statement, concepts, or thematic choices, one can define a regularity (an order, correlations, positions and functionings, transformations), we will say, for the sake of convenience, that we are dealing with a discursive formation…The conditions to which the elements of this division (objects, mode of statement, concepts, thematic choices) are subjected we shall call the rules of formation. The rules of formation are conditions of existence (but also of coexistence, maintenance, modification, and disappearance) in a given discursive division (38).

Thus, the HPT community is faced with these essential questions: When describing HPT interventions, which terms should the HPT community use? Even when we decide on

proper terms, are we sure we are using them consistently with our colleagues? When the term “intrinsic system” is mentioned to clients or colleagues, do they immediately picture the intended system or is extra explanation necessary? Despite the introduction of these terms and others into the lexicon of performance support, technology and design continue to advance, creating both gaps and overlaps between the terms. For example, is Zubak’s embedded help intrinsic or extrinsic? Does it depend on its implementation? Are certain types of embedded help external, extrinsic, or intrinsic?

In addition, there is no universal agreement on the use and application of even generally accepted terms. With such a large technological “gray area,” what may appear to be intrinsic support for one user may be considered extrinsic by another. Using Gery’s terms, at what point does a software application’s help function go from being extrinsic to intrinsic? Is there a generally accepted trigger that propels the system to a higher-level of support or is it a more graduated scale?

Finally, most of these terms were offered specifically to address the domain of EPSS, omitting the broader classification needs of non-electronic performance support technology. Not all performance support technology is electronic or computerized. Clarifying the position of non-electronic support in relation to that of EPSS would be a great benefit to resolving these quandaries.

The Spectrum Of Support

Given this lack of terminology consensus, it seems appropriate to insert into the discourse an attempt at a standardization of the community lexicon. As Daniel Headrick

states: “In order to capture a new piece of information and place it in the existing body of knowledge, one must identify it with precision, in other words, give it a distinct name. To avoid ambiguity and confusion, a one-to-one correspondence must exist between every item and the object it represents” (Headrick 17). In this case, a one-to-one correspondence must exist between every label and the concept it represents.

The “Spectrum of Support” provides a comprehensive classification system for understanding various categories of performance support technology, helping to map an evolutionary course towards ultimate transparency. The intent of this system of standardization is to offer an inclusive classification tool for performance support technology that encompasses all aspects of performance support, electronic or otherwise. This Spectrum of Support describes the comprehensive range of technological performance interventions, from disconnected compensatory offerings (such as a paper-based instruction manual) to integrated anticipatory support (such as intelligent agents). A consistent classification system for performance support technology will also enable a deeper understanding of its influence on the world of self service. A standardized classification system permits us to examine how successful kiosks achieve their success and the role that performance support technology plays in the human-machine interaction.

The use of the term “spectrum” is intentional. A spectrum indicates opacity (e.g., color spectrum, light spectrum) and illustrates the evolution of performance support technology toward an eventual goal of transparency, *where there is no distinction between a task and the technological support provided to accomplish that task*. The goal of transparency has been the object of almost all new technologies and media. Whether

we are watching a film, listening to digitally-recorded music, or attempting to perform workplace tasks, we want to forget that the technology is there, assisting us, mediating the experience.

The history of human performance technology can be traced across the spectrum, from the most basic forms of performance support to the most complex. To begin the discussion, it is important to first define the terms of the new classification system. As shorthand, the spectrum can be abbreviated with the mnemonic *2E3I*, which addresses all five of the classifying terms:

- External
- Extrinsic
- Intrinsic
- Intuitive
- Intelligent

These terms should be familiar. They are not additions to the performance support discourse. But within the context of the Spectrum of Support these terms build on the work of Gery, Raybould, and others, and represent a developmental growth of our understanding of performance support technology. As the field expands, so must its context expand accordingly. As a rule, the two terms that begin with “E” are of a lower order than the three terms that begin with “I.” Each term is illustrated in Figure 1.

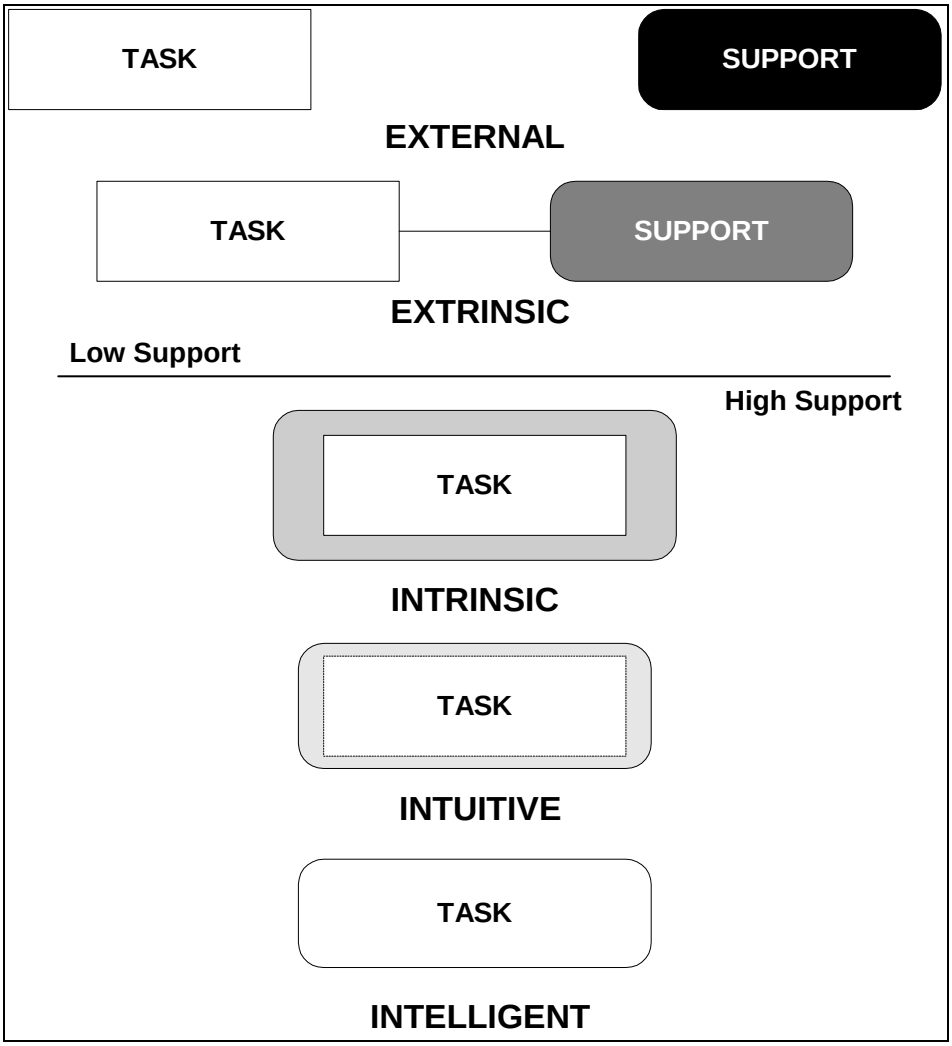

Figure 1. Spectrum of Support

External

Consistent with previous definitions of external support, this type of assistance is disconnected from the task it is intended to support. Instead, it is wholly compensatory and represents the lowest level of performance support. Its opacity within the spectrum is occluded. Examples of external support include:

- Paper based instruction manuals

- Classroom instruction
- Supplemental video demonstrations and/or instructions
- Technical support call centers or websites (see Figure 2)

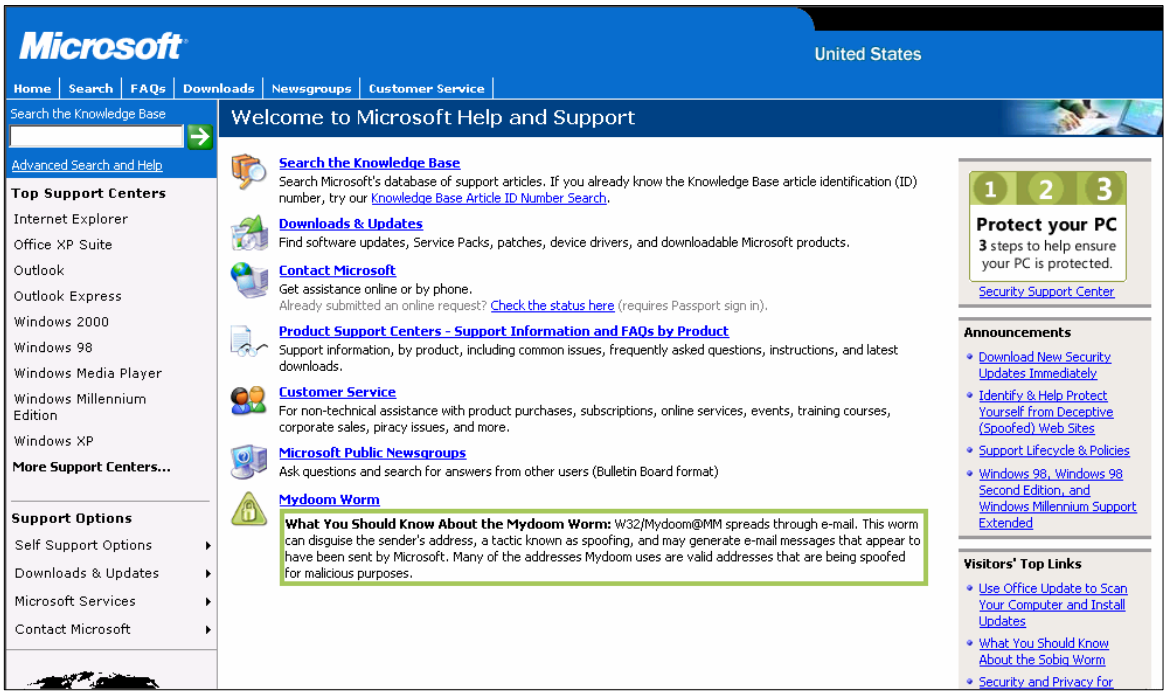

Figure 2. Example of External Support: Microsoft® Online Help and Support (Image Source: http://support.microsoft.com)
Microsoft product screen shot reprinted with permission from Microsoft Corporation.

For a human to take advantage of the support, he/she must be removed from both the task itself and the performance environment. In many cases, such as classroom-based training, the removal is both temporal and spatial. The user must access the support at a time and place that are different from the time and place required to actually perform the task. By definition, external support cannot be situated. This puts external support at a disadvantage to more robust, transparent, support strategies. By way of example, Donald

Norman has written about the difficulty he encountered using a Leitz Pravodit slide projector with a single button on the remote controller. Eventually he learned that pressing the sole button once triggered a different response from pressing it twice. In no way was this procedure intuitive or explained by the device. “Who could discover this operation without the aid of the manual?” (Norman *Design* 5) The external manual not only assisted the user to achieve the proper performance, it was *required*. However, when Norman needed to use the projector, the manual was nowhere to be found. When an external support strategy is employed, there is an inherent risk of total performance failure should the support be unavailable.

Extrinsic

Also consistent with previous definitions, extrinsic support represents a performance support intervention that is included within the general work environment, but its use requires a distinct break from the task itself. This type of support may also be described as being *embedded* (as the primary attribute). The support is included within the task environment, but is not seamlessly integrated into it.

Extrinsic support is not contextual; it requires that the user take some action in order to seek support, fundamentally breaking the task context, even if the work environment remains the same. Because the support intervention must be specifically selected or externally linked, but is still loosely related to the task, it can be considered *hyper-contextual*. The context is only meaningful after choosing to obtain support. In Internet parlance, the support is hyperlinked, thus making it hyper-contextual.

Examples of electronic extrinsic support include:

- A software application's traditional Help function
- The organized use of internet browser bookmarking
- An interactive map kiosk at a mall or theme park

Two non-electronic examples of extrinsic support are:

- An installation instruction label affixed directly to a replacement mechanical part or instructions for the use of a fire extinguisher affixed directly to the equipment (see Figure 3)
- A poster displayed in a public restroom with employee hand-washing instructions

Figure 3. Example of Extrinsic Support: Fire Extinguisher Instructions Label (Image Source: Kidde http://www.kiddeus.com/GetImage/1FBA63B1333F529F85256F10006EFE5B/2010.jpg) Image used with permission.

Consider the example of the fire extinguisher with an instructional label directly affixed to the device. Most of us, thankfully, have never had occasion to use a fire extinguisher. Likewise, most of us have never received any formal instruction how to use

one. Yet if we suddenly found ourselves faced with an emergency situation that required us to use a fire extinguisher, we will not have the luxury of time to access complex or disconnected (external) performance support, such as an instructional manual, a training video, or a class. The support *must* be situated. It *must* remove the division between task and instruction. Although the human must break the task flow (putting out a fire) to access the support, he/she is still in the task environment (a burning room). The performance support technology takes the form of embedded instruction and allows an untrained novice to achieve the same level of performativity as a trained professional. The novice's proficiency may be significantly less than a professional firefighter's; however, the metric for success in such a situation is solely based on a user's ability to extinguish a blaze. There are no "style points" awarded.

By affixing the instructions on how to use the technology directly to the technology itself, the fire extinguisher accomplishes the same goal as a software application's Help feature. A software user must break a task flow (such as writing a letter) to access the embedded assistance (searching Help to find specific formatting information), but remains in the general task environment (within the software and/or on the computer). This differs from external support, which would require the user to both break the task flow and exit the general task environment.

Intrinsic

As the first shade of the higher-order spectrum, intrinsic support represents the first level of transparency (although still partially occluded). As defined within the

spectrum, intrinsic support is support that is inherent within the task context but is event-driven. Rather than merely being embedded, which is the primary attribute of extrinsic support, intrinsic support is considered *integrated.*

However, because launching the support is event-driven, intrinsic support can also be described as *reactive*. A worker must take some action that triggers the support function. The support, however, is provided within the task context and the user is not required to break the task workflow to take advantage of it. Although reactive, the integrated nature of intrinsic support means that it is *accommodating* to the human performer. The support seeks to make the task easier or the process to achieve a performance outcome more efficient. Jim Elsenheimer has written about this type of support relative to EPSS, although he labeled it as "intelligent support" (another example of inconsistent discourse terminology). Among other observations, Elsenheimer noted that

> This type of support can be programmed to recognize the task being performed, or the skill of the user, and anticipate the user's needs…A skilled user may require less detailed process support than a less experienced user. While frequent prompts and help may best support a new user, they may actually slow an experienced user. [This] support can present the optimal balance for an individual task. As a backup, it is always a good idea to allow the user to override the system's choice, in case they personally desire more or less support (32).

As Elsenheimer observed, because intrinsic support is inherently reactive, it can occasionally inadvertently make the task process less efficient. Take the example of the

"Paper Clip" assistant within Microsoft® Word (MS). Suppose you are writing a formal business letter. As you begin to type and format the letter, the MS Word application recognizes your formatting attempt as a triggering event. The program offers performance support in the form of an animated paper clip, which states that you appear to be writing a letter, and offers help (Figure 4). You can choose from several options, including pre-formatted letter templates, to make the task easier. Although helpful and a successful implementation of intrinsic support, the Paper Clip sometimes interprets the triggering event incorrectly, resulting in the task process becoming slightly less efficient because users must stop what they are doing to decline the offered support. This is the quandary cited in this chapter's epigraph by Ellen Ullman when she states that she has removed Microsoft from her system. "You're the human being, after all, and it is a mere operating system" (*Dumbing Down*).

On balance, however, intrinsic support, including MS Word's Paper Clip assistant, is effective. Because it represents the first level of the spectrum's higher-order support, it is dramatically more useful than extrinsic support.

Other examples of intrinsic support include:

- Braille characters on an Automated Teller Machine
- Software Balloon Help
- A cellular phone's stored list of recently called numbers
- One-number speed dialing
- Task-based software wizards

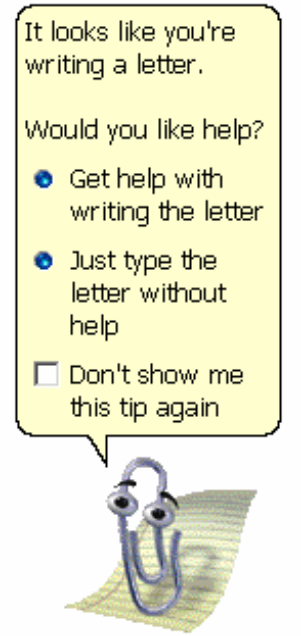

Figure 4. Example of Intrinsic Support: Microsoft® Paper Clip Help
(Image Captured from Microsoft® Word 2003)
Microsoft product screen shot reprinted with permission from Microsoft Corporation.

Intuitive

Intuitive support represents the second-highest level of the spectrum. Like intrinsic support, intuitive support is also integrated into the task environment and workflow process. However, intuitive support is more seamlessly integrated into the task, thus increasing its transparency within the spectrum.

Rather than being event-driven and reactive, intuitive support is *proactive*; meaning the support technology itself takes some level of independent initiative to improve the task process. Because it independently compensates for human error and ignorance, intuitive support is also considered *adaptive*. It adapts the system to accommodate human performance issues. Perhaps the best way to explain the behavior of intuitive support is through several examples.

Continuing with the letter writing example task offered as part of the intrinsic support discussion, Microsoft® Word also contains helpful intuitive support functionality. If the support is enabled, the application will automatically correct spelling errors (for example, “teh” will automatically be changed to “the”) as you type. This differs from the Paper Clip assistant in that there is no specific triggering event and the system does not ask if the worker wants to change the spelling. The system makes a proactive *assumption* about what the human worker wants and corrects the work accordingly.

Another example of intuitive performance support is the recent development of Personal Video Recorders (PVRs) such as the popular TiVo® and ReplayTV® systems. Also known as Digital Video Recorders (DVRs), these systems augment television-viewing opportunities without using traditional videotape technology. Being digital systems, DVRs offer many benefits including the ability to pause live television programs to then continue them at a more convenient time and parental controls to limit access to certain programming.

From an intuitive performance support perspective, several features proactively assist the viewer with task management (for example, recording broadcast content). Using one example DVR system, TiVo® will record and digitally store up to 80 hours of television programming. The programming it records is dependent on the viewer’s preferences. For any viewer who has ever struggled with programming a Video Cassette Recorder, the DVR concept significantly assists capturing the desired television programming.

The TiVo® website details several system functions that qualify as intuitive support.

- *Season Pass™:* automatically finds and records every episode of a series all season long, even if the network schedule changes
- *WishList™:* finds and records programs that feature a favorite actor, director, sports team or even topic
- *Smart Recording:* automatically detects program line-up changes and adjusts recording times
- *TiVo® Suggestions:* TiVo® can be "trained" to suggest and auto-record programs to match specific interests (TiVo®).

Because all of these features make proactive assumptions of viewer interests and then act on those assumptions to automatically record appropriate content, it is a clear example of intuitive support. The intuitive support automatically adapts the television recording process to accommodate the viewer, including making a transparent adjustment if the network programming schedule changes.

Operating in a manner similar to *TiVo® Suggestions* is Pandora.com, which is an online music service that serves up custom playlists based upon favorite artists or songs. Grown out of the Music Genome Project, Pandora.com employs advanced algorithms to suggest other options you may enjoy as determined by previous selections. Users swear by the uncanny accuracy of the service. This differs from online retailer Amazon's suggestions in one important manner. Amazon analyzes prior purchases and product searches and then recommends other, similar choices. If Amazon used the TiVo® and Pandora model, the company would proactively purchase the similar items and ship them to you without your intervention. That, of course, would be infuriating to the shopping public. Instead, Amazon uses the same programmatic strategy to identify additional

choices but stops short of proactive, intuitive support. Its service is intrinsic, akin to the MS Office Paper Clip, since the user must accept or decline the suggestion.

When examining intuitive support such as MS Word's auto-correct feature and DVRs, the difference between the task (correctly typing a document or recording television programs) and the performance support that enables the successful completion of that task becomes less defined. The transparency increases.

When a viewer turns on the television, is there any measurable difference in watching a live broadcast from one stored within a DVR system? Because almost the entire task of program recording is automated, even including decisions about what types of programs should be recorded; the tasks of programming and/or recording and watching become blurred. Did I decide this would be a good show to watch or did TiVo®? Does it matter as long as the task is successfully accomplished?

Intelligent

The highest level of support in the spectrum is intelligent support. With intelligent support, the task and any associated performance support are fully transparent. Because this performance support goal has yet to be fully realized, it is difficult to offer concrete examples. Intelligent systems can be defined as *anticipatory*. These systems aim to know what you want before you do. This is the domain of artificial intelligence and intelligent agents, both of which are the subjects of extensive research and writing. The ultimate goal of a *prescient* system remains the same. An intelligent support system will be indistinguishable from the task it is designed to support.

What does the intelligent support system of the future look like? There are many opinions and research funds being expended to answer that question. It would have been difficult to predict the rise of computers at the turn of the 20th century. Here at the dawn of the 21st century we are equally challenged to look into our own crystal balls. Anthony Smith attempts to describe what the library of tomorrow may look like, as intelligent support becomes integrated into its *modus operandi*.

> Advanced thinking about libraries today…tends to look…toward a time when computerized knowledge systems will begin to interact directly with human beings by sharing, in one form or another, the use of natural language. This form of artificial intelligence depends upon building into the computer the power not merely to reason in an abstract way, but to analogise, absorb and use metaphorical links and to suggest connections between patterns and ideas in the way scientists do in their most creative moments…The real computerized library would function as a consultant. It would not need even the intervention of a human reader, but could help another library deal with a problem, raising the questions entailed in a given issue of research rather than just answering a direct inquiry (131).

The following notions of intelligent support are offered only as suggestions and may not even fully conform to the ultimate definition of an intelligent performance support system. In reality, the systems of the future may not yet even be imagined with a contemporary frame of reference. With that caveat, the following concepts approach the idea of intelligent performance support:

- Facial recognition algorithms that identify user expressions and modify the workflow accordingly
- Self-targeting, self-launching, self-guiding ordnance
- Mechanical equipment that will not function unless properly held
- Advanced software agents that perform tasks
- Artificial intelligence built into all aspects of daily life (toast that cannot burn, cars that cannot crash)
- Direct cerebral downloads of knowledge and/or skills

These examples may seem to fall more into the domain of science fiction than reality. Yet, there are those who think otherwise. Ian Pearson, head of British Telecom's futurology unit, predicts that as early as the middle of the 21st Century, human beings will be able to download their brains into supercomputers, achieving "cyber immortality" (CNN *Brain downloads*). Hans Moravec has postulated a similar concept, where "our mind will have been transplanted from our original biological brain into artificial hardware" (70). If it's possible that in 50 years we will be able to download the contents of our brains to computers, it's also conceivable that we may be able to upload content from computers to our brains. Need to know how to configure a database, operate a tractor, or even fly a plane? No problem. Simply upload the knowledge from a convenient software module and get to work. It's the über extreme of transparent performance support.

The entire spectrum of support is summarized in Table 3.

Table 3. The Spectrum of Support

TRANSPARENCY	TERM	ATTRIBUTES	EXAMPLES
	External	Disconnected Compensatory	• Paper-based instruction manual • Video tape demonstration of installation process • Tech support call center • Tech support web site
	Extrinsic	Embedded Hyper-Contextual	• Traditional software Help • Installation instructions label affixed to a replacement part • Browser bookmarking • "Wash Your Hands" poster over public restroom sink
	Intrinsic	Reactive Integrated Accommodating	• Software Balloon Help • Paper Clip Help • Braille characters on ATM machines • Speed Dial
	Intuitive	Proactive Adaptive	• Word processing auto formatting and correcting • DVRs
	Intelligent	Anticipatory Prescient	• Advanced software agents that actually perform tasks • Artificial intelligence built into all aspects of daily life • Direct cerebral downloads of knowledge/skills

Placing the Kiosk Culture Within the Spectrum of Support

In the context of the Spectrum of Support, recall Stary and Totter's structured technique for measuring a system's capability to provide accurate interaction features for individual users and their (situative) needs: *Ac*cessibility *t*hrough *A*daptability, or *ActA* (101-116). Stary and Totter astutely observe that successful human-machine interaction

must be situative, since (especially in the case of self-service cash registers) the users vary but their performance situation remains constant. Also recall Rosenberg's assertion that an attribute of Electronic Performance Support is performance that resides in the situation. Example adaptive support technologies employed to make kiosks more human centered and easier to use include motion sensors that detect when a user approaches (and can trigger an audio greeting) and infrared (IR) readers for wireless data transfer.

When examining how video games function as models of instructional design, James Paul Gee lists situated meaning as one his 36 Learning Principles. Certainly, when interacting with a kiosk or computer screen—along with the concomitant icons, menus, links, audio cues, video clips, and "if-then/action-reaction" Boolean interactions—the user is in the same semiotic domain as video games. According to Gee, "learning in any semiotic domain crucially involves learning how to situate (build) meanings for that domain in the sorts of situations the domain involves" (26). Learning always occurs in a kiosk encounter, even if it is accomplished transparently through intuitive design and embedded performance support technology. How did you know what to do when confronted for the first time with a pay-at-the-pump gas station? You learned in the pay-at-the-pump's semiotic domain via the technology's own situated meaning and accomplished the task—even as a novice—with an acceptable performance competence.

Kinetics, Inc., a leading developer of self-service kiosks which has produced approximately two-thirds of the airport e-ticket kiosks in the United States, employs several key design tenets in the development of their systems (Figure 5). These tenets work directly to address Davis' previously discussed Technology Acceptance Model (the perceived usefulness and perceived ease of use of a system). The Kinetics principles

include supporting a task that already needs to be done (not merely inventing a task and providing a computer to do it); starting with simple, discrete tasks and then adding additional or more complex tasks once users become familiar with the technology; improving the task not just by improving speed but by expanding user options and control; and designing for each implementation's unique requirements (Fishman *New Machine* 93).

Figure 5. Kinetics© TouchPort II Airline e-ticket Kiosk
(Image Source: http://www.kineticsusa.com/touchport2.htm)
Image used with permission

NCR, a major manufacturer of self-service retail systems (who recently acquired Kinetics), employs graphical user interface design strategies that they call in their marketing materials a "more inviting look and feel" and "larger more 'touchable' buttons" on their touch screen systems. NCR even adds a level of mechanical personification when they refer to the system interface as "friendly". Clearly, these are attempts to mitigate any issues associated with Davis' "perceived ease of use."

Using a technique called “multi-pathing,” good self-service technologies accomplish Constantine and Lockwood’s “instructive interaction,” which is an effective technique for accomplishing situated meaning. An example of instructive interaction is the elegant implementation of graphical user interface (GUI) Tool Tips, also known as Balloon Help. Recall that Balloon Help is considered an intrinsic implementation of performance support within the Spectrum of Support.

Placing the cursor over an element of a software application GUI causes a small window to appear that explains its name and/or functionality. By doing so, Balloon Help offers users exactly what they need when they need it and accomplishes that delicate balancing act of supporting both novice and expert users at the same time—satisfying another of James Paul Gee’s learning principles gleaned from video games: the Explicit Information On-Demand and Just-in-Time Principle. “The learner is given explicit information both on-demand or just-in-time, when the learner needs it or just at the point where the information can best be understood and used in practice” (138). He refers to this type of learning as being situated in context (132). Aaron Marcus has properly observed that typical software interfaces contain a multitude of graphical/iconic information and that “For better or for worse, most computer users must master as novices an astonishing range of signs” (Marcus 40). So how can a performance support strategy such as Balloon Help mitigate this issue?

Balloon Help supports a novice by providing him/her with quick explanations for everything he/she may need to access. As I described in an essay for the Usability Professionals Association’s *UPA Voice*:

> These explanations, however, are not merely dumped on the user in a long list, such as might be found in a manual or Help menu, but are presented in a context-specific fashion, providing support without significantly affecting the task flow. Experts can also benefit from the delayed display aspect of Balloon Help. In most cases, even experienced application users won't know or remember everything about how to use the software. In situations where rarely used or new features need to be accessed, experts can pause their cursor over the element and, after a second or two, the explanation is provided. The support does not appear unless the cursor remains motionless for a moment; therefore, the support will not distract the expert with unnecessary help when accessing familiar features (because, presumably, there will be no need to linger over the iconic element) (Cavanagh *Ode*).

By using such a delayed display tactic, Balloon Help also demonstrates a successful implementation of one of Donald Norman's recommendations for user-centered design, specifically that "the design should not impede action, especially for those well-practiced, experienced users who have internalized the knowledge" (*Design* 189). In short, the performance support technology enables novices to achieve expert task performance without impeding the proficiency of the genuine expert. This is just as true for a self-service checkout system as it is for Balloon Help. The performance support technology completely collapses traditional stage-based expert-novice developmental models, which "represent learning in terms of increasingly complex levels of a particular domain of knowledge" (Freedman 72). With performance support technology such as Balloon Help,

there are no levels. A novice and an expert can each perform the same task without compensatory instruction.

NCR promotes its intuitive user interface (UI) as a competitive differentiator. According to NCR marketing literature, their Human Factors Engineering (HFE) team has incorporated audio instructions and animated demonstrations into their FastLane© self-service retail register system (Figure 6). Like the delayed display strategy of Balloon Help, these compensatory technologies are linked to "timing mechanisms" so that they are only activated "if a user takes too long to perform a specific function, such as placing an item in the bag." According to Marcia Crosland, an NCR Human Factors Engineer, NCR's "self-checkout has to accommodate the range of capabilities and skills in the retail population…The very skilled worker won't even have to look at the user interface" (NCR *Global Growth* 7).

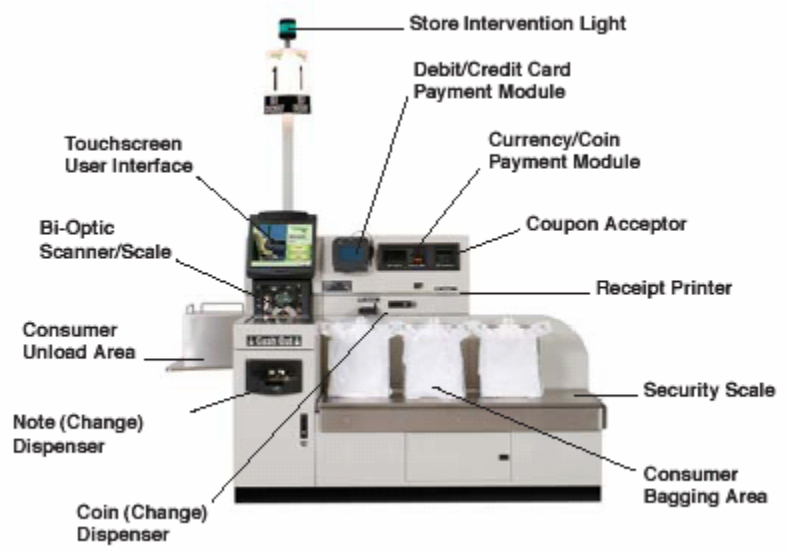

Figure 6. NCR FastLane© Retail Self Checkout System
(Image Captured from: http://www.ncr.com/products/pdf/hardware/SCOT_fastlane.pdf)
Image used with permission

Supporting novice and experienced users is critical, since no business wants to alienate any segment of its customer base. In Regina Colonia-Willner's extensive analysis of Automatic Teller Machine (ATM) usage, she concludes that it "is important to set the 'time out' parameters of the machines as a function of transaction complexity, and pace complex information to be presented in several screens." Unfortunately, she found that this often was not the case. ATM machines allow the same amount of time for both simple and complex transactions. Users are "timed out" or the process is shut down when customers take too long on a complex activity. When this happens frequently, customers are prone to abandon ATM activity, opting to take their business to the bank teller instead (243-267).

The Design of Everyday Kiosks

The idea of transparent task performance support is summed up very well by Donald Norman with the simple declaration that "the device must explain itself" (*Design xi*). With his landmark book *The Design of Everyday Things* (originally published as *The Psychology of Everyday Things*), Norman expressed the collective frustration of human beings everywhere who struggled to successfully interact with common devices and technology such as faucets and doors. In addition, he detailed a number of key rules for designers that will ensure the usability of their products. When analyzing self-service technologies in light of Norman's design guidelines, it soon becomes apparent that the successful implementations are those that conform to Norman's rules. Therefore, it is worthwhile to spend the following few pages reviewing some of Norman's design

protocols and examining their applicability to self-service and performance support technologies.

Design Principles

Towards the end of Chapter One, I referenced situations where self-service technologies actually decrease the task efficiency—what Swanson called “inevitable snags”—and I stated that if the user fails to perform a task, the performance support technology is at fault. Donald Norman would agree. These technological failures are essentially an analog for human customer service failures. If true transparency is to be realized, we should not be aware of the support being provided. Nothing could shine a brighter light on the opacity of performance support technology than its own failure to support. Such failures are evidence that we have not yet achieved total transparency and that we have yet to completely enter the post-training era where novices and experts can achieve the same level of task performativity in all technological interactions. However, as designers rapidly evolve the nascent technologies behind self-service installations, the incidence of failure will decrease exponentially. As validation, consider how few errors occur with relatively mature self-service instances such as ATMs and pay-at-the-pump mechanisms. The rest of the kiosk industry will soon catch up.

When they do catch up, it will likely be because they have adhered to Donald Norman’s design tenets as outlined in “The Design of Everyday Things.” Norman lists the following seven rules (188-189):

1. Use both knowledge in the world and knowledge in the head.
2. Simplify the structure of tasks.
3. Make things visible: bridge the gulfs of Execution and Evaluation.
4. Get the mappings right.
5. Exploit the power of constraints, both natural and artificial.
6. Design for error.
7. When all else fails, standardize.

Use Both Knowledge In the World and In the Head

When Norman references knowledge in the world, he is, in essence, referring to the same concept that Marc Rosenberg describes when he talks about worker performance residing in the situation, rather than in the worker's head. "When we first see an object we have never seen before…the appearance of the device must provide the critical clues required for its proper operation—knowledge has to be both in the head and in the world" (*Design* pg. x). Knowledge in the head is simply another way of describing training. A system that requires extensive training to use likely neglects the available knowledge in the world. "Put the required knowledge in the world. Don't require all the knowledge to be in the head" (140). A successful kiosk designer understands how to tap into social/cultural knowledge and exploit it to simplify the kiosk's use, continually making trade-offs between knowledge in the world and in the head. One of the most important of these trade-offs is "ease of use at first encounter" (79), echoing Davis' Technology Acceptance Model. The extent that a kiosk designer is able to tap into societal knowledge in the world, the easier it will be to negotiate for a first-time user. However, doing so can yield a system that is cumbersome and unwieldy for experts who

must accomplish the same task and have already internalized the required knowledge and skills. Yet, Norman cautions us that once the user achieves task proficiency—or expert performativity—"do allow for more efficient operation when the user has learned the operations, has gotten the knowledge in the head" (140). Successfully balancing between a design that supports novices and one that supports experts is the compensatory role of performance support technology. Recall the previous discussions of software Balloon Help and time-out mechanisms, which are strategies that accomplish this delicate balancing act within a graphical user interface.

A kiosk is specifically designed to indicate its function. There is a screen analogous to a television or a computer that invites watching. The screen is positioned at approximately head height, encouraging the viewer/user to stand in front of it, in just the position necessary for interaction. Often the kiosk case or housing is constructed in a colorful or attractive style, further inviting users to approach. By constructing kiosks in this manner, designers are tapping into what Norman calls a mental model. Mental models are "the models people have of themselves, others, the environment, and the things with which they interact." (*Design* 17) A good kiosk system simply looks like you should stand in front of it and do something. It fits a mental model.

Similarly, many kiosks tap into common knowledge "in the world" by adopting a web-like interface scheme, such as that employed by DaimlerChrysler and their development partner McGill Digital Solutions in their 2004 Kiosk Magazine Award-winning interface design (Figure 7). In describing the award, Kiosk Magazine stated that Chrysler's Vehicle Information Center (VIC) "is the automotive industry's largest data-driven interactive product information system. However, information is one thing and

ease-of-use is something different. McGill has developed an appealing and simplified navigation process so that each user is never more than a few clicks from the information desired" (Kiosk Magazine). By capitalizing on common user understanding of web navigation conventions, Chrysler and McGill were able to develop a system that offers an immense volume of data in an easily-navigable format.

Figure 7. Knowledge in the World. Web-based Interface Scheme
(Image Source: http://www.kiomag.com/kioskawards04/)
Image used with permission

Incidentally, a web-based navigation system also makes smart business sense. Many establishments, especially retail outlets, are implementing web-connected kiosks in a strategy called "Elastic Walls." Also known as "virtual inventory," the elastic walls model uses in-store kiosks to expand the establishment's product offerings. Given the high costs of storage and display space, elastic walls allow in-store shoppers to order items from the company website that may not be readily available in the physical "brick and mortar" store. For example, "Stop & Shop Supermarket's 'Endless Aisle' kiosks enable customers to order unusual food items that aren't normally stocked on supermarket shelves" (Carlin 14). Such a strategy offers a compelling return on

investment since it turns potentially lost sales due to unavailability into confirmed transactions, which can even be included in the customer's in-store checkout. The elastic walls strategy would not be possible unless designers took advantage of common web interaction knowledge already in the world.

Simplify the Structure of Tasks

"What good is the technology if it is too complex to use?" (Norman *Design* 30) This is a significant question, especially when considering human-computer interaction. I have often heard friends and acquaintances lament the latest version of a commonly used software application because of all the new features that have been added. Rather than being helpful or "value-added," these new features generally go unused and do nothing but complicate the interface, gumming up the application's usability. Microsoft, while not solely culpable, is certainly responsible for adding myriad unnecessary features to relatively straightforward applications such as Word and Excel. How many of us use even a small percentage of Word's thousands of features? While impressive and certainly valuable for expert users, they oftentimes overcomplicate the graphical user interface for novices or those who merely need basic functionality. And when Microsoft does attempt to provide compensatory performance support technology, such as intrinsic or intuitive auto-formatting, the results are often incorrect, further complicating the task.

Norman calls this quest for ever more system capabilities "creeping featurism," which

> is the tendency to add to the number of features that a device can do, often extending the number beyond all reason. There is no way that a program can remain usable and understandable by the time it has all of those special-purpose features…Creeping featurism is a disease, fatal if not treated promptly. There are some cures, but, as usual, the best approach is to practice preventive medicine (173).

Although the situation may now be changing, successful kiosk installations to date have typically limited their functions to a single, simple task. Recall the design tenets employed by Kinetics that include the goal to design for each implementation's unique requirements. An airport e-ticket kiosk helps you check in for a flight. Period. Although the technology could certainly handle more complicated, multi-purpose applications (such as also selling music CDs, scheduling automotive maintenance, and serving as a wedding gift registry, etc.), adding such superfluous layers of complexity would do nothing to help the user accomplish the task: checking in for a flight.

Peter Berens, president of Apunix Computer Services, has commented on the need for kiosks to operate and communicate on a back-end infrastructure basis (as opposed to a front-end, user-facing basis) in a simple and reliable manner. He advocates the use of kiosk appliances, which are hardware and software sets designed specifically for self-service kiosks (and which, coincidentally, his company happens to sell), as opposed to the more common practice of using an embedded PC computer system. His description of the value of a kiosk appliance can be easily extrapolated to refer to the entire kiosk apparatus, especially in regards to the interaction with a user: "Kiosk

appliances…are devices…crafted to do only one thing" (Carlin 25). The more a kiosk tries to do, the more it risks becoming unusable.

Performance support technology can be used to diminish the negative impact of creeping featurism (balloon help is able to accomplish this goal) and mitigate what Norman calls "the paradox of technology." "The same technology that simplifies life by providing more functions in each device also complicates life by making the device harder to learn, harder to use…The paradox of technology should never be used as an excuse for poor design" (*Design* 31). Even with the assistance of performance support technology, a designer reaches a point of diminishing returns when the system is so feature-rich that an inordinate amount of compensatory support is required for basic use. In most cases, the wisest design decision may be to constrain the kiosk system's capabilities so as not to require so much compensatory support. ATMs and airline e-ticket kiosks do this very well.

There is some evidence that kiosk designers are starting to experiment with increased feature sets. The industry itself seems to be aware of the risks inherent in trying to do too much. A recent industry benchmark study states that

> As technology becomes cheaper, capabilities increase, and component sizes decrease, kiosks are going to be increasingly able to do more things for more people. *It is vital that every deployment have one critical function that will draw users to the kiosk*, but once that is established, related functionality can be added to enhance customer service and increase profitability (Carlin 34). [Emphasis added]

The strategy promoted by the statement above for increasing complexity is consistent with another one of the previously-mentioned Kinetics design tenets: starting with simple, discrete tasks and then adding additional or more complex tasks only after users become familiar with the technology (Fishman *New Machine*). When done well, as Kinetics does with its airline e-ticket kiosks—such as allowing users to change a seat assignment—it can truly be "value-added." However, if a designer finds him/herself needing inordinate amounts of compensatory performance support technology to make the system usable, a better solution may be a simpler design.

Make Things Visible: Bridge the Gulfs of Execution and Evaluation

This design tenet seems fairly obvious—of course things should be visible. However, by "visible" Norman doesn't just mean that we should be able to see them. Devices should inherently show us—by shape, design, affordances, and constraints—what we're supposed to do with them and how we should do it: "one of the most important principles of design [is] *visibility*. The correct parts must be visible and they must convey the correct message" (4). Consider the example of a hammer. Someone with no experience with tools might look at a hammer and have no idea what it is or what its purpose is. Where is the performance support technology in this example? Perhaps there could be an external training manual for the proper use and function of a hammer. Yet, when have you ever seen such a manual displayed next to the rack of hammers for sale in your local hardware store? Is it even necessary? I would argue that, true to Norman's call for making things visible, the hammer's performance support strategy can be found in its

very design. Our hardware neophyte would reach into the toolbox and very likely grab the hammer's handle instinctively. It just looks inherently "grabbable." It doesn't make any sense to hold it in any other manner (certainly not by the awkward head). Once the neophyte is holding it, the weighted head makes swinging it a natural activity and the head's flattened shape on one end appears to be made specifically for whacking things. The function and use of a hammer is self-evident in its visible design. The hammer's design takes advantage of what Norman calls "affordances," which are "the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used" (9). Norman himself references the origin of the term and general concept of "affordance" to perceptual psychologist J.J. Gibson, although Norman applied the notion to product design. The hammer can't be reasonably held any other way except by its handle. Its designed affordances intuitively guide the user towards its proper operation.

Of course, a hammer is a simple device with a simple purpose. One could argue that advanced technology, especially electronic and computerized technology, is far too complex for such simplistic visible design. Norman himself makes this argument. "When affordances are taken advantage of, the user knows what to do just by looking: no picture, label, or instruction is required. Complex things may require explanation, but simple things should not" (9). Yet, with the emergence of increasingly transparent performance support technology that compensates for user skill gaps, is this really true? Why shouldn't complex things be able to communicate their use just by looking? Why can't complicated, computer technology be made visible? If we can imagine an airplane

designed with support technology that allows a novice to successfully pilot it, why not the PC on our desk? The same holds true for the kiosks in our lives.

When kiosks and other self-service applications are successful, a key element of that success is good, visible design. When we approach an airline e-ticket kiosk, for example, we shouldn't need special training or assistance to accomplish our transactional task of checking in for a flight. The kiosk itself (Figure 8) is designed specifically to encourage us to stand in front of it, with a small shelf and a viewing screen. There is no chair. This is no place to settle in for a long duration and the standing design reinforces that. The goal of the kiosk, after all, is to process transactions as quickly and efficiently as possible. As stated in Chapter One, Continental airlines claims kiosk check-in times as short as thirty seconds for passengers with no baggage (Fishman *New Machine*) and certain transactions can even be completed in only fifteen seconds (Carlin 11). Some hotels have used self-service kiosks to reduce their checkout time from an average of eight minutes to an average of only 32 seconds (Carlin 17). This physical kiosk design is a three-dimensional application of the rhetorical concept of "audience stance," which Mary Hocks, writing about online documentation, describes as the "ways in which the audience is invited to participate…and the ways in which the author creates an *ethos* that requires, encourages, or even discourages different kinds of interactivity for that audience" (Hocks 632). The physical kiosk structure requires, encourages, and discourages very specific kinds of user interactivity.

Figure 8. Delta Airlines E-Ticket Kiosk.
(Image Source: American Renolit Corporation:
http://www.americanrenolit.com/Products/Surfacing/Commercial/Images/2.jpg)
Image used with permission.

When considering the actual kiosk screen—the graphical user interface (GUI)—Norman's concept of visibility is equally important. The kiosk industry itself recognizes the criticality of the self-service GUI. In a recent industry benchmark survey, 32% of respondents indicated a "Difficult User Interface" as a cause for kiosk failure "(up from 14%) last year. [Survey data] suggests that customers are becoming more comfortable in approaching kiosks, yet the GUI (graphical user interface) still represents a critical element of the customer experience" (Carlin 39). In addition, 63% of industry respondents indicated that "Onscreen Graphics" are Important or Very Important to their kiosk installations (Carlin 24). An industry publication marketing the use of touchscreen technologies offers the following advice to those who plan to implement self-service kiosks:

> If you don't think first impressions are important, talk to someone who's deployed a kiosk with an unattractive welcome screen. It's the first thing

> customers see when they approach a kiosk. And after looking at the screen, those customers make a snap judgment about whether to try the self-service route, or head to the nearest employee for help. If the screen is inviting to touch or read, the kiosk project is likely to be a success. Bright, crisp images that leap off the screen; colors that look like real life; sharp, clean lines that define a page...these are the promises of display technology. A kiosk can be an irreplaceable tool for generating sales, increasing customer satisfaction and expanding employee productivity. But if the display on the kiosk is not attractive and effective at presenting content, it could jeopardize a significant investment (Kiosk Marketplace 3).

To Norman, "Visibility indicates the visual mapping between intended actions and actual operations" (8). In this case, "mapping" refers to the relationship between two things (23). For a kiosk GUI to be successful, it must use visual strategies to indicate task performance mapping. For example, an airline e-ticket kiosk may present a screen to a traveler to confirm an itinerary (Figure 9). The screen offers no user prompt or textual directions. At the bottom of the GUI, we see a row of rectangles with rounded corners, each labeled with text. All are "dimmed" except the one in the lower right, which is labeled "Continue" with a small right-pointing directional arrow.

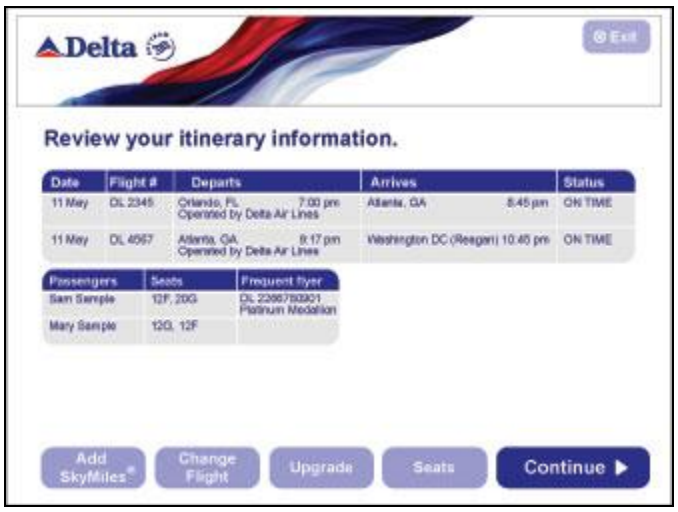

Figure 9. Delta Airlines e-ticket Itinerary Confirmation Screen
(Image Source: Delta Airlines
http://www.delta.com/traveling_checkin/airport_information/airport_checkin_options/checkin_kiosk_locations/checkin_kiosk_demo/itinerary/index.jsp)
Image used with permission.

When looking at this screen, how do we know what to do? What is the next expected behavior? The design of the screen is such that once we have confirmed our reservation, the next thing we want to do, naturally, is "continue" to the next step in the check-in task. The labeled rectangle in the lower right looks like a conventional computer software button. By simply pressing it with our finger, we are able to proceed in the check-in task sequence. How do we know to press it? The GUI uses natural mapping to make the "Continue" touchscreen button look *buttonish*. To repeat Norman's definition of visibility, the button shape and label indicate "the visual mapping between intended actions and actual operations." In addition, the button is of a sufficiently large size for user comfort and interaction (Colle and Hiszem). Likewise, when a user needs to change her seat assignment, she merely presses the touchscreen button labeled "Seats." This option is not as prominent in the GUI (being "dimmed" in coloration) because it is not on

the critical path of task completion. It is a task tributary—a value added option to the traveler, certainly, but one that requires a return to the itinerary confirmation screen in order to proceed. Changing the seat assignment is not required to complete the check-in procedure. Pressing “Continue” is.

The strategic use of forms, colors, and web-styled conventions creates an organizing pathway through the task interaction. For Mary Hocks, “this coherence provides a calm sense of modernist order that is simultaneously visual and navigational. Order reassures readers that they won’t get lost and that the text has a structure that can be tracked visually as well as verbally” (Hocks 637). Of course, Hocks was directly referring to digital texts, yet the principle still applies. A kiosk display screen is also a text that must be “read” and understood.

Should the traveler elect to change her seat assignment, she reaches another screen that takes advantage of natural visual mapping (Figure 10). In this case, the natural mapping is literally *a map* of the airplane cabin. The traveler’s seat is indicated with the same critical blue as the “Continue” button. To choose another seat, the traveler simply touches it on the map. Likewise, on the screen that requires the user to indicate the number of bags she intends to check (Figure 11), the traveler simply counts the number of iconic graphical suitcases and touches the one with the corresponding number. From a semiotic viewpoint, the natural mapping is signified iconically by the suitcase graphic and the quantity is easily understood. These are both illustrations of Norman’s observation that “Natural mapping, by which I mean taking advantage of physical analogies and cultural standards, leads to immediate understanding” (23).

Figure 10. Delta Airlines e-ticket Seat Assignment Screen
(Image Source: Delta Airlines
http://www.delta.com/traveling_checkin/airport_information/airport_checkin_options/checkin_kiosk_locations/checkin_kiosk_demo/seats/index.jsp)
Image used with permission.

Figure 11. Delta Airlines e-ticket Baggage Screen
(Image Source: Delta Airlines
http://www.delta.com/traveling_checkin/airport_information/airport_checkin_options/checkin_kiosk_locations/checkin_kiosk_demo/baggage/index.jsp)
Image used with permission.

In a recent industry publication, Paul Weiner, market manager for Elo TouchSystems (a manufacturer of kiosk touchscreen technology) offers the following unscientific advice related to the usability of visual kiosk displays:

- "Always make the touchable areas obvious
- Limit choices the user has to make
- Guide the user as much as possible
- Have simple navigation buttons like back, forward, start
- There should be no indication of the operating system underneath (users shouldn't feel it's a computer)
- No double-clicking, no pull-down menus, no scrolling or dragging
- Offer large buttons
- Have bright colors (avoid reflective black) and use a textured background
- Make sure the user focuses on the entire screen, not just the arrow
- Cursors shouldn't be needed
- Give users immediate feedback so they know it's working (sound effects or visual highlights)
- Try "fun" squishy, 3-D buttons
- Use customers' language
- Use funny sounds on touch
- Make action fast to prevent frustration" (Kiosk Marketplace 18)

Using strategies such as these, the kiosk screen communicates its intention and function via a form of digital visual rhetoric. We must quickly and easily understand

what the system is trying to communicate to us and respond accordingly. The intention and function must be "visible." As Hocks comments,

> The screen itself is a tablet that combines words, interfaces, icons, and pictures that invoke other modalities like touch and sound. But because modern information technologies construct meaning as simultaneously verbal, visual, and interactive hybrids, digital rhetoric *simply assumes* the use of visual rhetoric as well as other modalities (Hocks 631).

The kiosk screen literally invokes other modalities beyond the visual, particularly touch. A recent industry report by consultancy Frost & Sullivan stated that "touchscreens have proven to be the most natural way of interacting with machines that provide information on demand. By simply touching an icon, even people who are not familiar with computers can complete a transaction" (Kiosk Marketplace 16). The use of visually-connected touch technology is a deliberate strategy to equally support both novice and experienced users at the same time. Ironically, a new technology called DViT (Digital Vision Touch) developed by Smart Technologies uses a proprietary digital camera and software package to *visually* determine when a user actually makes contact with a touchscreen system (Kiosk Marketplace 22). The system uses visual technology to validate the touch modality.

What about situations where the ability to convey visual information is limited—such as instances where there is a language barrier or when the primary user population may be visually impaired? Even as he advocates the importance of visibility, Norman acknowledges this challenge: "Sometimes things can't be made visible. Enter sound: sound can provide information available in no other way" (*Design* 102). With audio,

additional feedback can be provided to the user in the form of clicks, beeps, and other confirming signifiers. Norman calls these aural strategies “auditory icons” (103). Aaron Marcus refers to the same concept with the label “earcons.” Marcus defines earcons as “auditory signs associated with visual displays” (39). In practice, kiosks apply these visual/auditory strategies when they use motion sensors to activate an audio greeting, when a user takes too long to complete a task and the delay triggers an audio explanation, when redundant instructions are provided in an alternate language, or when a user makes an error and a discordant tone sounds. In essence, what the effective use of audio does for a kiosk system is to make it *more* visible to the user via a deliberate, organized strategy of controlled synesthesia.

Although I can’t claim that I entirely agree with his assertion, Mirzoeff makes a point worth considering when he provocatively states that “There is no inherent reason that computers should use a predominantly visual interface, except that people now prefer it this way” (6). It’s an extreme position and one that the kiosk community is hesitant to adopt, preferring to rely primarily on a more traditional display that privileges the visual over the aural. “Sound attract loops and proximity sensors have not yet drawn major utilization patterns, possibly because they can alienate rather than attract customers if not done the right way” (Carlin 24). Although multiple modalities are key features of self-service technologies, they are first and foremost a visual apparatus.

Another important facet of Norman’s concept of visibility is the bridging of the gulfs of execution and evaluation: “Make things visible, both for execution and evaluation” (140). The Gulf of Execution is the difference between the device’s intentions and the allowable actions. Norman contends that a system must “make the

results of each action apparent. Make it possible to determine the system state readily, easily, and accurately, and in a form consistent with the person's goals, intentions, and expectations" (140). Norman uses the following example to illustrate how a device can bridge the gulf of execution, touching upon my own concept of transparent performance support technology—enabling the technology to compensate for human performance shortcomings.

> Self-threading [film] projectors do exist. These nicely bridge the gulf. Or look at VCRs. They have the same mechanical problem as film projectors: the videotape has to be threaded through their mechanism. But the solution is to hide this part of the system, to put the task on the machine, not the person. So the machinery bridges the gulf (51).

In this example, the technology mitigates the human's lack of knowledge and skills—or training—related to threading a projector. Thanks to the technology, the task performance resides in the situation.

When Norman refers to the Gulf of Evaluation, he is describing "the amount of effort that the person must exert to interpret the physical state of the system and to determine how well the expectations and intentions have been met" (51). In other words, the system must provide feedback to the user. "Feedback—sending back to the user information about what action has actually been done, what result has been accomplished—is a well known concept in the science of control and information theory" (27). When you press the "Continue" button on the airport kiosk screen, the display changes to the next step in the process. When you press the Start button on a pay-at-the-pump fuel dispenser, the displayed price per gallon changes and gasoline flows through

the hose. You know you have completed the behavior correctly (or incorrectly) because of primarily visual system feedback. “Nothing succeeds like visual feedback, which in turn requires a good visual display” (101). When a kiosk system is visible, in all senses of the term, it successfully mediates the task performance, regardless of the user’s experience.

Certainly there are many factors that contribute to a self-service technology’s success. Yet, it is difficult to deny the important role that Norman’s concept of “visibility” plays in a kiosk’s usability. Because kiosks cannot rely on external, compensatory performance support such as instruction manuals or training classes (consumers simply wouldn’t tolerate it), their function and use *must* be completely self-evident. A first-time user must achieve the same task success as an experienced user. Only by offering a “visible” system that bridges both the gulf of execution and the gulf of evaluation can kiosk designers accomplish that goal.

Exploit The Power Of Constraints, Both Natural And Artificial

As its name implies, a “constraint” is a strategy designed to limit certain actions and guide a user down a specific path. Norman counsels designers to “use the power of natural and artificial constraints: physical, logical, semantic, and cultural. Use forcing functions and natural mappings” (140). A bar handle on a door typically implies that a user must pull it to open the door. A flat metal pad implies pushing. These sociocultural signifiers naturally communicate the door’s function. Successful kiosks do the same thing. There is no other way to use an airline ticket kiosk than by standing in front of it.

You cannot proceed unless you press the iconic button on the touchscreen. The user's choices are limited, which leads him/her through the transactional process successfully and mitigates potential opportunities for human error. It's when self-service technologies become overly complex and offer too many unrestricted choices that they encounter usability problems. Self-scanning merchandise may seem simple enough. However, a complicated grocery self-checkout kiosk may confuse users when they don't know how to weigh their produce or account for coupons or pay with cash. This is the point at which performance support technology must intervene, offering audio prompts, video demonstrations, and other compensatory strategies to assist the user. When these performance support strategies fail or are inadequate or just poorly executed, the entire system may fail. Constraints permit kiosk designers to control the transaction and limit human error.

Norman includes forcing functions within the category of constraints. "Forcing functions are a form of physical constraint: situations in which the actions are constrained so that failure at one stage prevents the next step from happening" (132). These are essentially a physical version of a Boolean if/then statement. If the user completes *X* action then *Y* action becomes available. This is also called a *trigger* or *gate* strategy. No matter what cul-de-sac choices an airline traveler makes during check-in—such as changing seat assignments—he/she must still return to the critical task path and press the Continue button or he/she will not be able to proceed. Enabling the power of constraints by limiting choices can often be a more effective strategy for design success than increasing system complexity and bolting on compensatory performance support strategies.

Design For Error

To err is human. So goes Alexander Pope's famous maxim. Since we have already defined performance support technology as centered around the human being's performance, it's reasonable to assume the potential for unavoidable human error in any self-service transaction. Successful kiosk installations recognize this reality and prepare accommodation strategies to adapt the system to any user. "If an error is possible, someone will make it. The designer must assume that all possible errors will occur and design so as to minimize the chance of error in the first place, or its effects once it gets made. Errors should be easy to detect, they should have minimal consequences, and, if possible, their effects should be reversible" (Norman *Design* 36).

There is arguably no feature in a typical software application as useful as "Undo." It is an accommodation for simple human error. Self-service applications use the same essential strategy to assist users in recovering from mistakes. It may be called "Back" or "Cancel" or another on-screen term, but the intention and results are the same. The human erases the consequences of a blunder and is able to proceed with the task. An "undo" feature helps to ensure performativity and is all but required for any human-computer interaction.

When an error is possible due to a human's inability to remember long or complex chunks of data, it's incumbent on the electronic system to carry this burden. As Norman states, "the system should provide technological assistance for any temporary memory requirements" (191). This may take the form of a running total for retail items purchased for a self-checkout system or an application code for an employment kiosk or a

policy number for a health information kiosk. A computer is inherently more capable of storing and recalling vast reams of data. If there is a risk of transactional failure from a human's inability to do the same, then the designer has a clear performance support strategy to implement.

When All Else Fails, Standardize

"Cultural issues are at the root of many of the problems we have with new machines: there are as yet no accepted conventions or customs for dealing with them" (85). One way to overcome the novelty and confusion of a new apparatus is to leverage existing standards and conventions in the service of the new machine. For example, in the aforementioned example of Delta's e-ticket kiosk, there is a screen that prompts the traveler to input his/her SkyMiles frequent traveler number. To enable this data input, the system has adopted a standard cultural convention: the typewriter keyboard (Figure 12). Any number of keypad configurations could have been selected. Yet, the traditional QWERTY keyboard arrangement of letters and numbers was implemented. One can only presume that this decision wasn't made to support the manual dexterity of proficient typists (the QWERTY arrangement is designed to maximize typing speed by clustering the most-used letters around each hand). Kiosk users must press each letter on the touchscreen deliberately and individually. It simply cannot be used in the same manner as a typewriter or computer keyboard. Yet, the QWERTY configuration was still implemented. This keyboard arrangement is familiar and long-established. Although the user won't be typing per se, usability and transactional efficiency are improved by

adopting a typing convention. Travelers will more quickly be able to locate the necessary alphanumeric characters when contained in the QWERTY configuration. Note that the configuration also employs the previous design rule by allowing for error correction via "Back" and "Clear" buttons.

Figure 12. Delta Airlines e-ticket Frequent Flyer Screen
(Image Source: Delta Airlines
http://www.delta.com/traveling_checkin/airport_information/airport_checkin_options/checkin_kiosk_locations/checkin_kiosk_demo/frequent_flyer/index.jsp)
Image used with permission.

The same strategy was at work in a prior example: the award-winning interface design that employed familiar web navigational conventions. In that case, a very large database of information had to be quickly and easily navigable. By leveraging a sociocultural convention, the system designers were able to ensure task success. "If you can't put the knowledge on the device, then develop a cultural constraint: standardize what has to be kept in the head" (170).

Counterpoint

Yet, lest we become too enamored with the benefits of combining user-centered design and performance support technology, it's worthwhile to recognize that there is another side. Bolter and Gromala reject the notion of absolute transparency as a design goal. They challenge some of the traditionally-held assumptions about the usefulness of invisibility as an engineering objective, observing some of the ways such thinking can limit innovation. Eschewing the metaphor of a window representing transparency, they instead suggest the trope of a mirror. They replace transparency with reflectivity, suggesting that any human-computer interaction consists of a fluctuation between instances of each (*Windows and Mirrors*). Bolter and Grusin observe that "the transparent interface is one more manifestation of the need to deny the mediated character of digital technology altogether. To believe that with digital technology we have passed beyond mediation is also to assert the uniqueness of our present technological moment" (*Remediation* 24).

Tapscott offers his own position relative to our present technological moment, one where the very definition of transparency may be redefined by a generation raised from infancy in the world of digital culture.

> As the new media grows in connectivity, content, applications, and user populations, a new kind of transparency is emerging. Increasingly, N-Geners [*the Net Generation born in the 1980s and 1990s*] don't see the technology at all. They see people, information, games, applications, services, friends, and protagonists at the other end. They don't see a

> computer screen, they see their friend's messages, their 'zines, their fan clubs, their chat groups (Tapscott 39).

To such users, the interface is already transparent. Their perspective is that the interface isn't some mediating mechanism allowing them to accomplish specific tasks, it is intrinsically grouped into the "stuff" of their digital lifestyles. It is invisible because they don't think in those terms. Like a Magic Eye picture, where a viewer relaxes his/her eyes and "discovers" a hidden image embedded within a seemingly random design of shapes and colors, today's digital generation views their networked world with permanently "relaxed" eyes. They automatically see the hidden picture and don't even realize that it's supposed to be obscured by shapes and colors.

This chapter began with epigraphs from Donald Norman and Ellen Ullman. After spending a considerable amount of time analyzing Norman's design guidelines, it seems appropriate to give Ullman the chapter's last words:

> Pretty graphical interfaces are commonly called "user friendly." But they are not really your friends. Underlying every user-friendly interface is a terrific human contempt. The basic idea of a graphical interface is that it does not allow anything alarming to happen… To build … a crash-proof system, the designer must be able to imagine—and disallow—the dumbest action. He or she cannot simply rely on the user's intelligence: who knows who will be on the other side of the program? Besides, the user's intelligence is not quantifiable; it's not programmable; it cannot protect the system. No, the real task is to forget about the intelligent person on the other side and think of every single stupid thing anyone might possibly do.

> In the designer's mind, gradually, over months and years, there is created a vision of the user as imbecile. The imbecile vision is mandatory. No good, crash-proof system can be built except it be done for an idiot (Ullman *Out of Time*).

For critics like Ullman, design constraints are no more than electronic shackles, preventing us from doing what we really want. It is a way to keep us in our places so we don't mess up the electronic system. Such a mindset is anathema to genuine performance support, which posits that the electronic system must adapt to and compensate for the performance needs of the user. When systems are designed in the manner described by Ullman (and there are plenty of examples), they privilege the non-human actor over the human one.

Is it healthy for designers of self-service systems to consciously or subconsciously assume their users are idiots? Probably not. But, as Ullman so acerbically points out, the mindset has its utility. And the consequences of this attitude have implications for the central notion of the kiosk culture as a postmodern societal interface. Ullman would likely agree with Stevenson Swanson and Nichols Fox and Greg Deiner and Paul English and the others who oppose the rise of the kiosk culture for various reasons.

> In the workplace, home office, sales floor, service kiosk, home—we will be "talking" to programs that are beginning to look surprisingly alike: all full of animated little pictures we are supposed to pick, like push-buttons on a toddler's toy. The toy is supposed to please us. Somehow, it is supposed to replace the satisfactions of transacting meaning with a mature

> human being, in the confusion of a natural language, together, in a room, at a touching distance (Ullman *Out of Time*).

The risk, as always, and as will be explored in more detail later in this dissertation, is the sacrifice of our humanity in the service of task efficiency. Where we each fall on that continuum is dependent upon our individual contexts and may be dynamic based upon particular situated needs.

CHAPTER THREE:
SOCIETAL IMPLICATIONS OF THE KIOSK CULTURE

> Culture is much more than an interesting context in which to place technological accomplishments; it is inseparable from technology itself.
>
> - Emily Thompson, *The Soundscape of Modernity* (9)

> It is important to remember that technology has never been manifested in the arts in a simple way.
>
> - Douglas Kahn, *Noise, Water, Meat: A History of Sound in the Arts* (15)

Introduction

Although the impact of transparent performance support technology is obvious in the milieu of business, the kiosk culture is also infiltrating the least likely areas of society. One need look no further than their automobile to see myriad examples in action. The car tells us when the door is ajar, when the gas tank is empty, when tire pressure is low, the temperature inside the car, the temperature outside the car, mileage per gallon, as well as many other pieces of crucial task performance information. Furthermore, cars can now provide visual and auditory satellite-based navigational instructions, respond to driver voice commands, automatically manage braking and steering in emergency situations, and take the initiative to contact authorities for potentially incapacitated humans when the air bags are deployed. New “smart car” technology is on the way that includes headlights that can see around corners and sensors to literally prevent accidents.

Another area is medicine, with electronic self-diagnosis technology. Already there is experimentation with a virtual psychologist (Peltz) and online resources such as WebMD and other sites that allow the untrained masses to review symptoms and possible

diagnoses without the intervention of a medical professional. Even our own personal hygiene is subject to the influence of transparent performance support technology. What technology could be simpler than a toothbrush? Like the example of a hammer discussed in the previous chapter, the function and use of a toothbrush appears to be self-evident in its visible design. Yet, the new Oral B Triumph electric toothbrush possesses a number of integrated performance support technologies to assist us in performing the tooth brushing task. For example, the Triumph boasts several interchangeable brushheads for specialized brushing needs (e.g., FlossAction™ and PowerPolisher™), customized electronic brushing modes (Clean, Soft, Massage, Polish), and a number of features grouped into what Oral B calls "Smart Technology." These Smart Technology options include an integrated timer to ensure that you brush for the full recommended two minutes; a battery charge level indicator; a notification when individual brushheads need to be changed; automatic recognition of the installed brushhead and a proactive, *intuitive* adjustment to the brush mode setting; and a display that can be programmed in one of 13 languages. In addition the Triumph provides an audio tone every 30 seconds during brushing as an aural indicator to spend the appropriate time brushing each quadrant of the mouth. The Triumph also has a built-in pressure sensor that automatically (proactively, intuitively) stops pulsations when you brush too hard. And, in case the transparent support isn't transparent enough, the toothbrush also comes with *external* performance support in the form of a 35 page user's manual (Oral B).

The sports industry has long pursued technological enhancement to human athletic performance such as tennis racquets with larger "sweet spots" in the string bed, Teflon-enhanced bodysuits for Olympic swimmers, graphite golf clubs, etc. The military

invests significant funds into researching and applying augmented reality technologies, which place a mediated, virtual layer between a human performer and his/her environment. (Sherman and Craig 18) Pacemakers and other implanted medical devices already support the human's very physiological performance, as do high tech prosthetics for amputees and urological implants for a much more intimate kind of performance. With the emergence of nanotechnology, we are faced with the very real possibility of microscopic robots coursing through our bodies, assisting us in myriad ways. In this scenario, where does the organic human end and where does the machine begin? Which is responsible for the "performance," whether that's running a four-minute mile or regulating a heartbeat?

Various segments of society are grappling with these complex questions, sometimes with heated controversy. In the world of competitive athletics, the PGA Tour made headlines in 2000 when they fought to prevent golfer Casey Martin from using a golf cart during tour competitions. Martin suffers from Klippel-Trenaunay-Weber Syndrome, a congenital circulatory condition that makes it extremely painful to walk (W. Johnson). Placing aside the legal and ethical issues on both sides of the debate, the situation is illustrative of the challenge that performance support technology presents to society at large. The PGA contends that the golf cart serves as an unfair technological advantage to Martin, regardless of his physical handicap. Although extreme, this is consistent with the professional golf community's attempt to mitigate the impact of technological innovation on the game. The USGA maintains a full-time research facility that annually tests almost 900 different types of golf balls and over 2,000 other pieces of equipment such as clubs, shafts, and tees. The USGA does this to ensure that equipment

conforms to “the Rules” or run the risk that “advances in technology could soon overtake skill as the major factor in success” (USGA). Unlike business performance where maximized shareholder value is the overriding metric, in athletics the method used to achieve performance is just as important as the result.

One of the most dynamic areas of athletics to grapple with performance support technology is the world of competitive running. Reebok, for example, offers the Pump Wrapshear sneaker equipped with a “pump smart valve” that controls an internal pump chamber “that inflates or releases, depending upon your foot and the activity of each step. When engaged, it automatically inflates to 5 psi of continuous pressure for your most comfortable run” (Reebok). But shoe technology goes far beyond the needs and comfort of the average jogger. The issues in running are the same as those faced by golf. The sanctioning body of organized running, U.S.A Track and Field, has recently disqualified Spira footwear’s new Volare II shoes from competition (Frampton). The reason is the innovative technology embedded within the sneaker’s soles. The WaveSpring™ technology (Figure 13) consists of integrated metal springs that the company claims returns 87%-96% of a runner’s energy with every step (Spira). The performance support technology—the embedded springs—enables a human to better use other technology—the running shoe—in a way that the athletic authorities have determined to be unfair.

Figure 13. Spira WaveSpring™ Technology
(Image Source: http://www.spirafootwear.com/technology.html)
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Image used with permission.

As innovative as it is, Spira's running shoe technology pales in comparison to the intuitive performance support provided by Adidas' new Adidas_1 sneaker (Figure 14). Claimed to be "the world's first intelligent shoe," the Adidas_1 actually contains a miniature computer. A sensor in the shoe's heel continually monitors changes in weight, pace, and surface type 1,000 times per second and sends that information to "the shoe's computer brain" in the arch. The computer analyzes speed and compression data to determine the optimal level of cushioning. With direction from the computer, "a light, yet-powerful motor driven cable system adjusts cushioning in the heel to give you the perfect level of shock absorption at all times and in all conditions" (Adidas). This is a very concrete example of the Spectrum of Support's intuitive category in action. Like Microsoft Word's auto-correct capability, where the performance support technology makes a proactive assumption about the human's intentions and takes independent action to mitigate performance inadequacies, the complex technology integrated into the Adidas_1 shoe dramatically enhances a runner's abilities, making decisions and

implementing corrective actions with no input from the human. When evaluated, critics have given the Adidas_1 shoes high marks, particularly the intuitive support, which

> remembers your patterns to constantly give you the best support. Of course, if you prefer a softer or stiffer ride, you can make those adjustments manually. So how did it feel running in these things? Great! The bottom line is that it's a really comfortable, solid shoe. We played with the settings so I could feel the range available, but once I just let the shoe adapt to me, it just felt good. And that's the point. You shouldn't constantly feel the shoe adjusting, you should just be able to run comfortably over any terrain (Rubin).

The support is transparent. Unless he/she makes a point of thinking about it while running, the human is unaware of the support during the performance of the task. Of course, at a retail cost of approximately $250 per pair, the support may not be so transparent to the human's bank account.

Figure 14. "adidas_1 - the first intelligent shoe"
(Image Source: adidas
http://www.adidas-salomon.com/en/bizmedia/image_library/recent/default.asp)
Image used with permission

When physical performance goes beyond athletics to core physiological functions, such as eyesight, hearing, and maintaining a regular heartbeat, this is the domain of medicine and biotechnology. If performance support technology is defined (as it is in this dissertation) as technology that helps a human use other technology, then how does a hearing aid or a pacemaker fit that definition? What technology do they help a human use? These devices certainly enhance performance, as a prosthetic assistant, yet the technology they support is the human body itself. Classifying the human body as a technology is a provocative and controversial contention and one that I'm not necessarily advocating here. This issue is addressed in more theoretical detail in Chapter Five, especially as it relates to the fear of a posthuman cyborg future, which is important to consider relative to performance support technology, especially when experts predict the possibility of brain downloading by 2050, as mentioned in Chapter Two.

Another societal area besides athletics, where the means by which a result is achieved is just as important as the result itself, is the world of art. An artist's talent, technique, media, and a host of other factors are integral to an appreciation of his/her work. With the introduction of performance support technology to the domain of artistic expression, fundamental questions are being raised about who is really responsible for that expression, the human or the machine.

The Work of Art in the Age of Mechanical Production

When Walter Benjamin wrote his famous essay *The Work of Art in the Age of Mechanical Reproduction,* he shone a light on the cultural changes inherent in technology's ability to infinitely reproduce and distribute art. One of the important consequences of this development is the democratization of art's availability, allowing the general population to experience artwork that they would otherwise be unable to access—artwork that previously was only available to a privileged elite.

Now technology has advanced to a point where not only is art's reproduction available to anyone who wants it, the very production of art is now accessible to almost everyone, even if the prospective artist is utterly devoid of training, expertise, or even talent. The do-it-yourself aesthetic of the kiosk culture has been actualized by the introduction of performance support technology into all manner of artistic expression. Just as with consumer-oriented tasks, performance support technology compensates for any skill-based shortcomings, allowing a novice to achieve the same level of performativity as an expert. The very process by which art is produced has been democratized. But when these support technologies are applied to the creation of art, the cultural implications are quite different from those in the business milieu. It raises essential questions such as: *What is good art*? *Is art developed with the assistance of performance support technology as valuable as that produced without it? Who really is the artist—the human or the machine?*

Software such as Dramatica and Scriptware has existed for years that assists the aspiring screenwriter prepare a screenplay. In many cases, this support goes far beyond

surface assistance such as formatting and spelling to include brainstorming services, story ideas, and other cognitive help normally considered the sole domain of the artist. Marketing literature for Dramatica® Pro touts the collaborative aspect of the software's artistic support: "You'll never be alone when you work alongside the 'Ultimate Creative Writing Partner.' Together you'll solve the plot and character problems that prevent many good stories from becoming great enough to sell…It's like having a successful author sitting by your side and mentoring you." Another software product from the same company, Writer's DreamKit™ (Figure 15), is promoted specifically as a tool for beginning screenwriters and even promises to co-write your script. "(A)s your mentor, the Writer's DreamKit will do something no other writing program can do—it predicts parts of your story based upon creative decisions you make!" (Write Brothers 5-6)

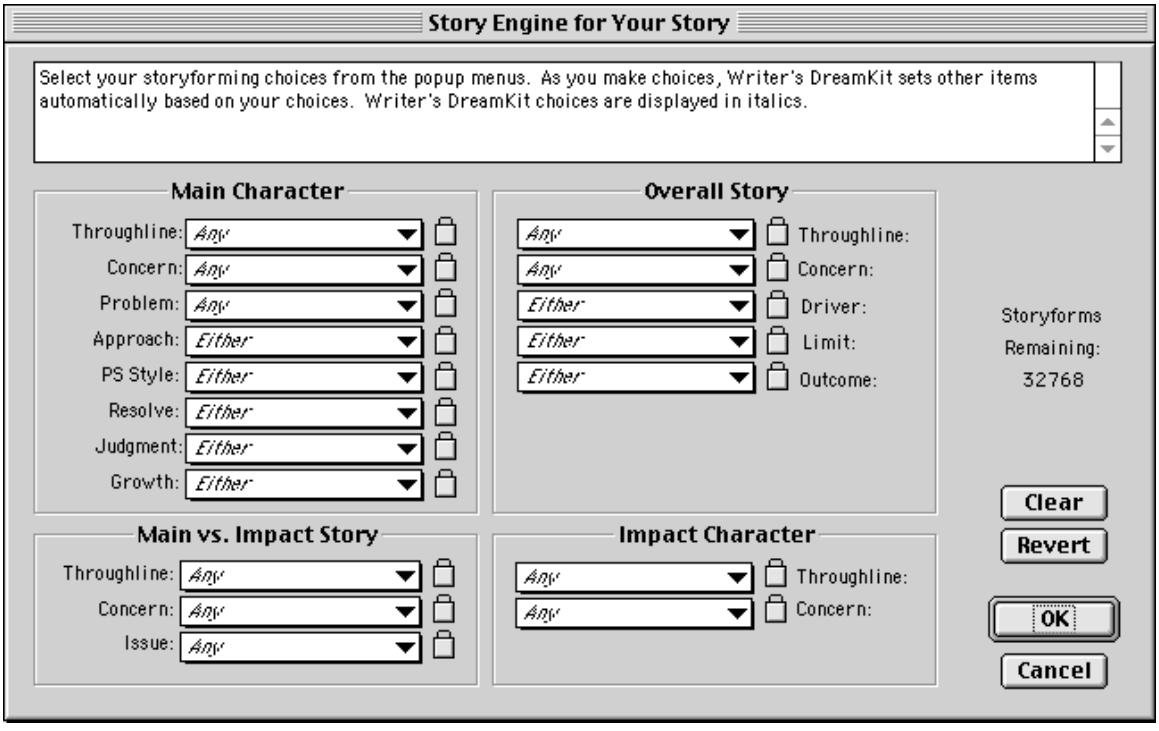

Figure 15. Writer's DreamKit Story Engine.
(Image Source: http://www.screenplay.com/images/products/wdk/story_engine_lg.gif)
Image used with permission

With technological tools like these and low-threshold distribution mechanisms such as iUniverse's self-publishing service (and even simple web posting and blogs), we have achieved the promise of Benjamin's blurred distinction between artist and audience. Benjamin predicted that

> the distinction between author and public is about to lose its basic character. The difference becomes merely functional; it may vary from case to case. At any moment the reader is ready to turn into a writer. As expert, which he had to become willy-nilly in an extremely specialized work process, even if only in some minor respect, the reader gains access to authorship… Literary license is now founded on polytechnic rather than specialized training and thus becomes common property (232).

Just as we no longer need to be a trained cashier in order to use the complex point-of-sale (POS) technology of the retail industry, likewise we no longer need to possess any expertise in how to write a screenplay to accomplish the writing task. The embedded performance support technology compensates for our lack of competence. The "readerly" has literally become "writerly," where "the reader [is] no longer a consumer but a producer of the text" (Barthes *S/Z* 4).

But what about other artistic endeavors, especially those that require the direct use of complex technology? The most obvious example might arguably be photography. Unlike painting, for instance, where the artistic technology (e.g., the brush) doesn't easily permit compensatory performance support, photographic equipment utilizes a variety of compensatory performance support technologies, such as red-eye reducing flash bulbs,

auto-focus, and backlight adjustments. Even before the introduction of this technological assistance, photography had already secured a place as an equalizer between the amateur and professional.

From the middle of the nineteenth century, "with its low cost and availability, photography democratized the visual image…For the first time, it was possible for the ordinary person to record his or her life with certainty and to create personal archives for future generations" (Mirzoeff 65). Although the technological elite of the time tried to categorize photography as a pursuit solely for society's upper classes, the low cost of materials and relative usability of the technology trumped any attempts to restrict its growth. "With the invention of the collodion-glass negative process in 1852, prints became affordable to all…working people. They availed themselves of this resource en masse to the despair of elite critics who disparaged the results as 'fried fish pasted onto metal plaques'" (Mirzoeff 72). But the genie was already long out of the bottle. "Despite the attempts by [*photographic pioneers Louis Jacques Mande*] Daguerre and Fox Talbot to claim elite status for their devices, photography was quickly claimed as the people's medium" (Mirzoeff 71). With the addition of compensatory performance support technology to photographic equipment, this even more true today.

One might argue that any literate and reasonably coordinated person can string two words together or point a camera and press a button and, as such, literary authorship or photographic competence are easier for an amateur to achieve than an artistic pursuit more dependent upon manual dexterity. For instance, what about music?

At one time in our past, playing music was a common amateur activity and musical training was a requisite component of the bourgeois education. But with the

advent of mechanized music in the late nineteenth century, such as that offered by the gramophone, homemade music rapidly declined. As observed by Timothy Taylor:

> The turntable (the descendent of the gramophone) is a technology that made it possible to have music anytime, and that threatened to turn producers of music into consumers of music…People who might have once made their own music learned to buy it instead. Concepts such as genius, talent, and masterpiece that inhibit many people from making music became even more instantiated in Western European cultures (204).

This inhibition manifested in what Emily Thompson calls "a wide chasm" between professionals and amateurs. An early attempt at musical performance support to reduce that chasm was the simplified sheet music produced by publishers for home use.

> As amateurs gradually abandoned their own music making and listened increasingly to professional musicians, a wide chasm opened between the two groups… Sheet music publishers did their best to bridge the gap, by offering 'Brilliant but not Difficult' versions of the most popular showpieces, but the effect of the discrepancy was gradually but effectively to silence many amateur performers of music. By the end of the century, countless parlor pianos had been replaced by automatic 'reproducing' pianos or other mechanical devices that recreated the performances of great concert pianists. …The result of these trends was a new dissatisfaction with amateur music and, perhaps more significantly, a heightened engagement by amateurs with the experience of listening to professionals (49-50).

Thompson quotes an 1894 article from the *Atlantic* magazine which describes the term "amateur" pejoratively, equating amateur efforts with "bad work" (49-50).

Benjamin's colleague Theodor Adorno would likely agree with the *Atlantic*'s assessment, excoriating any attempts to produce "Brilliant but not Difficult" sheet music of popular tunes for the untrained masses. He refers to such products designed to bridge the gap between amateur and professional as a

> sort of musical children's language…it differs from the real thing in that its vocabulary exists exclusively of fragments and distortions of the artistic language of music. In the piano score of hit songs, there are strange diagrams. They relate to guitar, ukulele and banjo, as well as the accordion—infantile instruments in comparison with the piano—and are intended for players who cannot read the notes. They depict graphically the fingering for the chords of the plucking instruments. The rationally comprehensible notes are replaced by visual directives, to some extent by musical traffic signals. These signs, of course, confine themselves to the three tonic major chords and exclude any meaningful harmonic progression. The regulated music traffic is worthy of them (*Fetish Character* 290-291).

Adorno would agree that playing a musical instrument is difficult (clearly privileging the piano) and rightfully so, or it might have no more value than any other common activity, as unique as walking across the room. Mastering a difficult activity such as playing a musical instrument is what makes the artist admired. Even that great contemporary prophet of technological usability, Donald Norman, accepts the usability challenges of

musical instruments, stating that they "take years of dedicated practice to be used properly, and even then, errors and poor performance are common among nonprofessionals. The relative unusability of musical instruments is accepted, in part because we know of no other alternative, in part because the results are so worthwhile" (*Emotional* 77-78).

But is this really the case? With today's technology, do instruments really *need* to be so difficult in order to retain their value? Just as you might be able to envision the design of an airplane with embedded transparent performance support that enables an untrained novice to pilot it successfully, why can't you picture a musical instrument equipped with similar performance support? What if a piano's keys could be internally illuminated in time to a musical score, allowing a novice to perform within an acceptable margin of error even if he/she had never sat on a piano bench before? What if a saxophone's interface (its keys) could be equipped with both visual support (such as lights or shades of color) and haptic feedback (such as localized vibrations or mild electrical sensations)? What if other, more sophisticated and transparent performance support technology were embedded within musical instruments? Instruments are, after all, technology. Recall that performance support technology is technology that helps us use other technology. Norman himself alludes to this possibility when he states that

> Colored pencils and musical instruments are good examples of direct manipulation systems. But I, for one, am not a good artist or musician. When I want good art or good music, I need professional assistance. So, too, with many direct manipulation systems for which there is a backup

> intermediary ready to take over when asked, available for advice when needed (*Design* 185).

In this case, the "backup intermediary" would be the embedded performance support technology. When a novice user is unable to accomplish the artistic/musical performance, he/she activates the support (directly or indirectly) and the resulting performance is one far more polished than the novice could otherwise achieve. Figure 16 is an example offered by the Hammacher Schlemmer catalog company that illustrates this concept.

"Digital Trumpet

This is the digital trumpet that generated over 20 instrument sounds and allows musicians to perfect valve fingering, tempo, notes, and key changes before learning to master breath control and mouthpiece placement of an actual brass trumpet. It has a powerful built-in speaker, and the internal memory chips can generate over 20 sounds, including seven trumpets, eight brass instruments (including the tuba and trombone), five woodwinds (including oboe and clarinet), strings, and a synthesized human voice. By simply humming or singing into the mouthpiece, you create accurate notes and tones, with the option of playing along to accompanying songs; 10 songs are pre-loaded (including Respect and When the Saints Go Marching In) and more can be added to the internal memory using the included software. *A training mode uses illuminated LEDs, allowing you to follow lighted valve cues, and the accompaniment will slow down or pause to give you time to achieve correct tempo*. Has MIDI in/out and headphone jacks. AC adapter included; can also be powered by four AA batteries (not included)."

Figure 16. Digital Trumpet from Hammacher Schlemmer. Emphasis added. (Image and text source: http://www.hammacher.com/publish/72835.asp?promo=QSearch&ls=CF) Image and text used with permission.

If, as Thompson suggests, the widening gap between musical novices and professionals is a symptom of modernity—something surely celebrated by a high modernist such as Adorno—then, perhaps the obliteration of that gap by transparent

performance support technology is indicative of a postmodern evolution. In this context, the only relevant criterion is the musical performance. How that performance is achieved is irrelevant. This is no different than the goal of performance support in an industrial environment. As long as the desired business performance is achieved, the means hardly matter. To apply an earlier quote from Marc Rosenberg regarding the workplace, the goal of artistic performance support technology is "not competence that resides in the individual, but rather performance that resides in the situation" (97). When viewed via this extreme postmodern perspective, terms such as "novice" and "expert" become meaningless. There are no novices or experts. There is only *in-situ* "performance."

Timothy Taylor addresses this transition directly, connecting it to the "modern" chasm between amateurs and professionals, but recognizing what may be a postmodern shift. "Before the advent of recording technology and radio, people made their own music most of the time, but what is radically different today is that it is now possible to create entire worlds of sound all by yourself with your computer" (139). The days are now gone when you need formal musical training in order to produce music. The *performance now resides in the situation*. "Digital technology…makes home music making possible as never before. One can create complex, polyphonic music at home with a computer and other digital equipment without having had years of piano lessons" (T. Taylor 13). We have reached a musical point where Benjamin's reader (listener) has become writer (composer). And this is not limited solely to music. "The relatively low cost of new media…and the internet allows many more people to be both producers and consumers of visual and other media" (Mirzoeff 256-257). The postmodern atomization of both artistic production and distribution have contributed to this new producer/consumer

phenomenon, where at any given time, any given individual can be found on either side (or both) of the creation-consumption continuum.

Although performance may be the most important metric for success in both business and art, unlike many businesses, the art world cares very much about the human being responsible for the performance. With transparent performance support, the difference between the artist and the technological helper is hazy at best. Richard Lanham describes the challenge in attributing artistic responsibility and assessing talent:

> Programs available widely and cheaply…allow novices to compose pleasant sounding music by enlisting the computer as co-composer. Far from…thinking that the computer diminishes human originality and skill, the authors of such programs often regard the physical skills needed for performance, and the theoretical knowledge needed for notation, as elitist prejudices…What "musical talent" is thought to be may itself change…In Laurie Spiegel's Music Mouse, you move the Macintosh mouse around on its pad and the linear motions are translated by the computer into musical sounds. Time and space, drawing and music, are made one by digitization. And if the music sounds good, as often it does, what does "good" mean here? "Who" has created the goodness? (12)

Does it matter "who" is responsible, as long as the result—the performance—is the desired outcome? In order to explore this premise, at least in a limited, anecdotal capacity, I downloaded a music composition program from the Internet, one promoted specifically for children. Entitled "FlexiMusic Kids Composer," it is one of a suite of music creation applications developed by an independent programmer in India and self-

marketed on the web. I chose this product because of both its specific focus on kids (and adults) with no musical experience and its very low acquisition threshold. A demo can be downloaded for a free trial and the cost of purchase is only $10.

These two criteria (technological compensation of a skills deficiency and easy financial accessibility) are important to attaining a level of "cultural democracy," a term coined by Simon Frith and discussed by Taylor: "what does this 'cultural democracy' mean? Alan Durant outlines three different ways the term *democracy* is used," the third of which is particularly germane to this discussion, where "democracy refers to 'something which results from a low or easily-attainable skills-threshold for using the technology.'… In order for everyday people to make this music, however—in order to be 'democratic'—the technology involved has to be affordable and/or available" (T. Taylor 161-163). The FlexiMusic Kids Composer product satisfies both of these criteria: a low skills-threshold for using the technology and a low cost. These happen to be the very same criteria that enabled the "democratization" of the visual image by photography in the mid nineteenth century.

The product is simple to use. A number of tracks can be created, each of which contains a musical sound or tone (such as a drum, a beep, a guitar note, etc.) called a "beat" and the rhythm for that tone, called the "star." The selected combination is literally painted onto each track with an iconic paintbrush allowing the novice composer to choose when it should be played and when it should be silent. The combination of several tracks of various beats and stars results in a musical composition. The song's tempo can be adjusted and it can be saved as a .wav media file for easy distribution. To appeal to kids, it uses a bright, colorful interface and photographs of children (Figure 17).

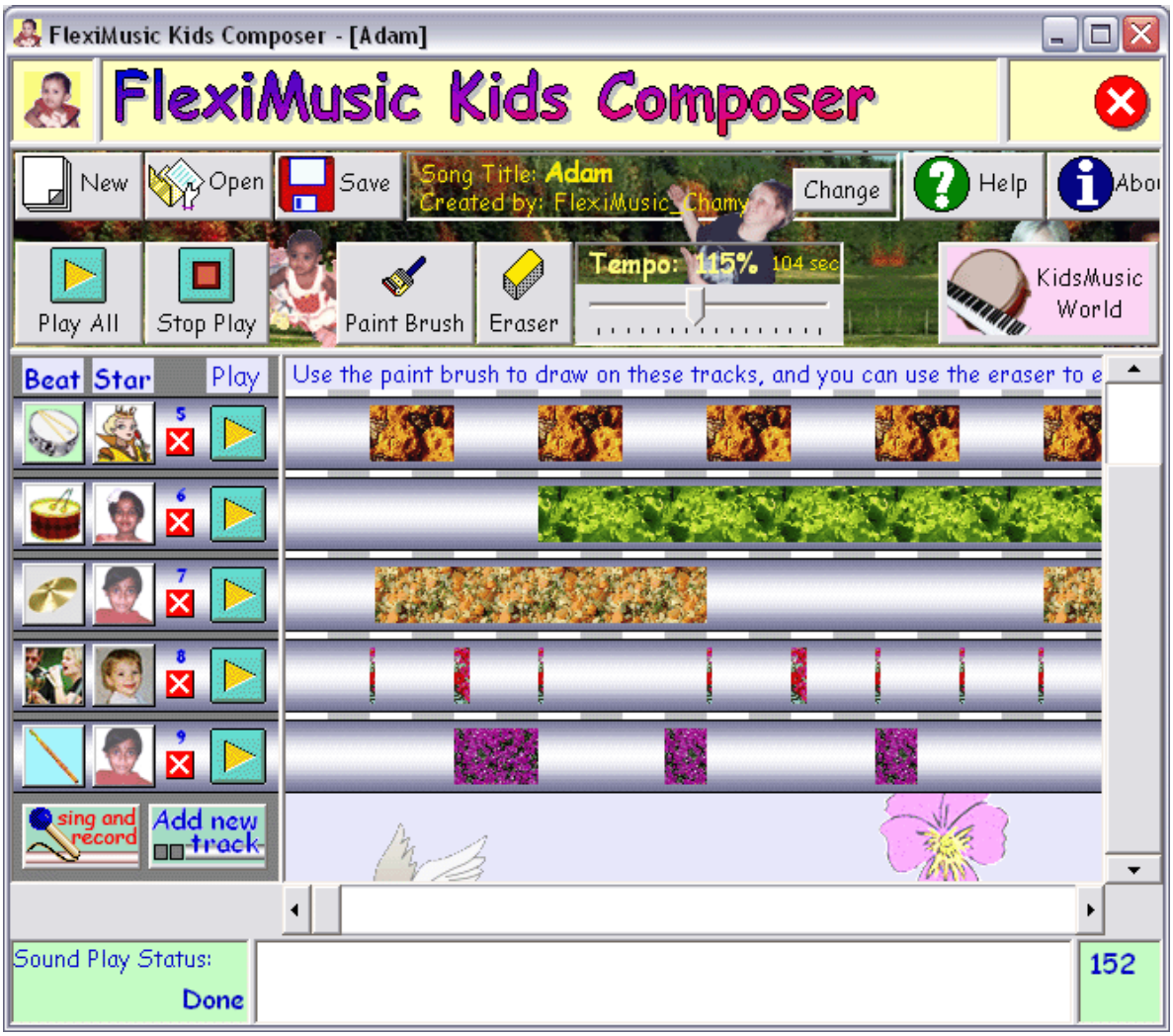

Figure 17. FlexiMusic Kids Composer Graphical User Interface
Image Source: http://www.fleximusic.com/kidscomposer/kidscomposer.gif
Image used with permission.

Could such a product really enable an inexperienced novice to create a meaningful musical composition? To test this, I compared three separate compositions in a purely subjective analysis. I chose myself as the first composer. As a point of fact, I know nothing about musical composition. I do not play an instrument. I do not read music. I am the quintessential novice. The second composer was my four year-old son. Although he is, admittedly, younger than the intended audience of the Kids Composer

product (a user would need to be able to read to follow all of the instructions), I wanted to see just how far the system would go in meeting a user on his/her own limited terms. The extent of my son's musical experience consists of periodically pounding on a piano's keys in a random cacophony. Deliberately choosing a preschooler with, naturally, no musical experience would allow me to examine the software's performance compensation capability in an extreme context. The third composer was my sister-in-law, a semi-professional musician. Although she is not a composer, she is a clarinet player in a metropolitan concert band that performs in public venues throughout Central Florida. She reads music, understands music theory, and has years of musical experience.

My sister-in-law and I each spent no more than an hour composing our songs. My son spent perhaps twenty minutes. Although I assisted my son in reading directions and occasionally clicking objects on the screen, he made all the decisions about what beats and stars to select, where they should be painted on each track, and the compositional tempo. I will let each listener be the judge of the success of these efforts, but I offer the following as my own personal observations. Without a doubt, each composition is indeed music. That a four year-old can make a few selections and, within twenty minutes, create a piece of original music, is certainly a testament to the product's success.

As a hypothesis, one might reasonably expect that the composition created by my sister-in-law would be superior to mine, and mine superior to my son's. And, true enough, that does subjectively seem to be the case. However, I was surprised at how little qualitative difference there seemed to be between the three compositions. Although my sister-in-law's piece may be better than mine, it isn't *that much* better. And my song isn't *that much* better than my son's. All three seem to be clustered together within a range of

"fair" on a musical spectrum spanning from "poor" to "excellent." I recognize the ambiguity of this assessment, but such is the fate of someone attempting to quantify taste.

What, after all, is "taste?" As Lanham said, what is "good?" Is there any objective definition of good taste that can be applied across society? As Freedman says, "even the term *art* has traditionally signified a judgment of quality" (53). Sociologist Pierre Bourdieu has attempted "to found a science of aesthetic knowledge" (Freedman 7), contending that such knowledge is vitally important to successful interaction with contemporary society. In many cases, having *good taste* can be a prerequisite for success in all other aspects of your life. Indeed, taste, rather than being individually determined, can be argued as being a result of one's economic class (Bourdieu). Bourdieu would contend that "the knowledge on which taste is based has long been considered a form of cultural capital and it is important to demonstrate that one has this knowledge in order to succeed in the context of an economy based on such capital" (Freedman 5). However, "Bourdieu understands little of what it means to create a work of art and has excluded the whole creative process in his theory" (Freedman 8). How taste relates to the creative process is precisely the issue raised by a performance support application such as the FlexiMusic Kids Composer.

This notion of quantifying aesthetic taste was an issue addressed by pioneering acoustical physicist Wallace Sabine as early as 1902. Sabine first became known for the development of a scientific acoustical formula that allowed him to predict how sound would behave in any interior environment, based upon a set of variables. After the initially favorable reviews of the musical acoustics of the newly-constructed Boston

Symphony Hall, on which Sabine consulted, dissenting critical voices began to complain about those very same musical acoustics.

> Wallace Sabine ultimately dealt with the highly subjective opinions of the critics and the public in the only way he could; he attempted to objectify them. In 1902, he embarked upon a study of 'The Accuracy of Musical Taste in Regard to Architectural Acoustics,' declaring this problem fundamental to any future work…Sabine had a committee of faculty members from the New England Conservatory of Music listen to piano music in five different rooms in the conservatory. He altered the reverberation time of each room by introducing varying amounts of sound-absorbing materials…and each committee member indicated when they felt each room sounded best. Sabine then evaluated the consistency of opinion expressed: the average optimal reverberation time for the five rooms was 1.08 seconds, and the average departure from this value was just 0.05 seconds. Sabine indicated that he found this high degree of accuracy in musical taste 'surprising' (Thompson 55-56).

What Sabine was attempting to do, in true scientific fashion, was determine an algorithm for taste. Whether he or his acoustical successors achieved this goal is debatable. Throughout the history of sound, the amount of ideal reverberation continued to be adjusted based upon the individual preferences of the audience and the fashion of the time. Sabine, of course, was trying to objectify the *external* quality of the sound. He wanted to answer the question: *what is good sound*? He did not address the *internal* quality of sound, specifically its content—*what sounds good?* This, naturally, begs the

question: can an algorithm be developed that describes exactly what constitutes a “good” song? Can we derive a formula for taste?

In essence, that’s exactly what products such as Kids Composer and its brethren attempt to do. On order for a novice—a four year-old—to possibly compose a song, any song, in twenty minutes, the system must make some transparent “intuitive” performance support decisions about how that song will be composed. Those decisions—the variety of choices offered, the amount of user control—constitute a *de facto* taste algorithm. By changing the values of the few variables in the formula we are permitted to adjust, we create an original composition within prescribed limitations.

The result however, seems to be (to echo Roland Barthes in *Image-Music-Text*) a general “flattening” of the qualitative differences between songs (189). On the bottom end, the system prevents you from producing something so horrible as to be universally unrecognizable as music. However, by so doing, it also prevents you from really excelling at the top end. The very performance support decisions that enable a novice to compose a song actually preclude someone with real talent and experience from composing something truly wonderful. The system is only capable of producing music in the aforementioned “fair” range.

The results might be different with a different software product, but I suspect not. It seems that an equation could be derived that states that the user’s ability to leverage his/her own talent and experience is directly proportional to the amount of control that a piece of software affords that user (Figure 18). That amount of control, however, is also proportional to the risk that a novice has of failure. The lower the risk of failure, the lower the ability to excel.

Greater User Control =	**Greater Risk of Failure** **Increased Ability to Excel**
Lesser User Control =	**Lesser Risk of Failure** **Decreased Ability to Excel**

This equation can very likely be applied to any example of artistic performance support technology, including the earlier examples of screenwriting software.

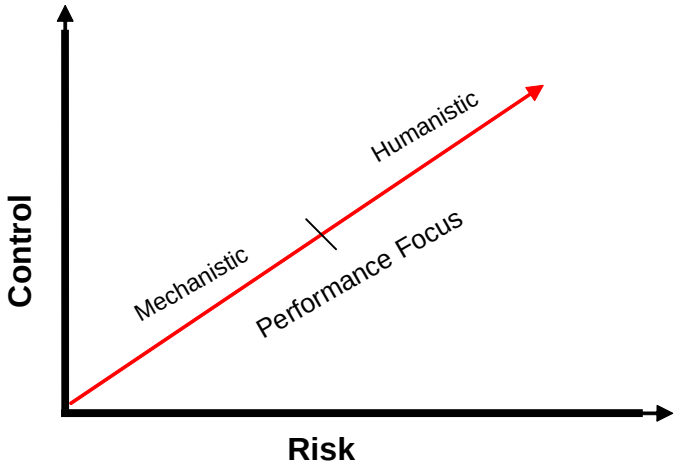

Figure 18. Control vs. Risk with Artistic Performance Support Technology

As the amount of user control lessens, the greater the level of mechanical influence. Conversely, as the amount of user control increases, so do the humanistic/organic characteristics. Control is an important issue relative to performance support across all areas of society—whether in business, the arts, medicine—since it is intrinsically linked to risk and success (financial, artistic, physiological). Control is the flipside of the Spectrum of Support's transparency. The more control a user is permitted, the less

transparent any offered support will be. Norman addresses this issue directly when he writes:

> All tasks have several layers of control. The lowest level is the details of the operation, the nimble finger work of sewing or playing the piano, the nimble mental work of arithmetic. Higher levels of control affect the overall task, the direction in which the work is going. Here we determine, supervise, and control the overall structure and goals. Automation can work at any level. Sometimes we really want to maintain control at the lower level. For some of us, it is the nimble execution of the finger or mind that matters. Some of us want to play music with skill. Or we like the feel of tools against wood. Or we enjoy wielding a paintbrush. In cases like these, we would not want automation to interfere. At other times we want to concentrate on higher level things. Perhaps our goal is to listen to music, and we find the radio more effective for us than the piano; perhaps our artistic skill can't get us as far as can a computer program (*Design* 197).

The risk of creative failure is mitigated, of course, through the use of artistic formulas. An artistic formula, like a mathematical formula or algorithm, is simply a structure in which variables can be adjusted to produce a predicted result. However, unlike mathematics, where a formula is generally perceived as a useful tool, artistic formulas have traditionally been denigrated as clichés and the work of hacks. "The more stuffed the poem with 'formulas,' the more it passes for successful," wrote Roland Barthes (*Minou Drouet* 112). Unfortunately, in the world of arts education, where the

professional artists of tomorrow are being trained, “the value of originality is imparted at the same time as the value of following rules” (Freedman 8). This mixed message—originality vs. following rules—is fundamental to the challenge faced when trying to balance issues of control.

Adorno doesn’t spare the rod when addressing the formulaic structure of popular music. He laments the “standardization” of this music and foreshadows the very “flattening” evidenced by entry-level compositional software such as Kids Composer.

> The harmonic cornerstones of each hit—the beginning and end of each part—must beat out the standard scheme. This scheme emphasizes the most primitive harmonic facts no matter what has harmonically intervened. Complications have no consequences. This inexorable device guarantees that regardless of what aberrations occur, the hit will lead back to the same familiar experience, and nothing fundamentally novel will be introduced (Adorno *On Popular Music* 17).

Of course, what constitutes a formula may only be in the eye of the beholder. Just because Adorno or the musical elite might denigrate the music of a currently popular but critically-panned artist such as Ashlee Simpson doesn’t mean that her music has no value. She brings pleasure and enjoyment to her fans, who would likely roll their eyes if Theodor Adorno suddenly appeared and told them they were being duped by the great manipulative apparatus of corporate music. The critical lambasting of Ashlee Simpson and her music is consistent with Mirzoeff’s observation of mass culture (specifically visual culture) that “the generalized antipathy of intellectuals to popular visual representations may be displaced hostility to those who participate in and enjoy mass

culture" (11). But are the critics even relevant? The Beatles and Elvis were panned at first, too. Besides, is there anything wrong with someone listening to what they like and actually enjoying it? Does everyone have to enjoy the same music?

This is likely the primary reason why achieving a "taste" algorithm is so difficult. If you prefer Ashlee Simpson and I prefer Beethoven, then how could our tastes possibly agree in order to be captured in any type of meaningful equation? The answer may lie in those very differences. What if you could choose the type of music you liked best and then the embedded performance support technology helped you create music in that style? Inventor Ray Kurzweil has written at length about this issue and his "Poet's Assistant" software is an excellent example of this concept.

> The *Poet's Assistant* provides a simple word processor ("poem processor") in which you write your poem or song lyrics. Besides providing standard text editing features, the Poet's Assistant monitors your "poem-in-progress," and provides a wide range of helpful suggestions as you type…Each suggestion is based on a "poet personality" that you select…The standard version…includes 50 poet personalities…For example, the Poet's Assistant can provide rhymes (words that rhyme with one of your words) or half-rhymes that were used by Robert Frost; alliterations used by Yeats; a set of "next words" used by Shelley; and entire lines (or stanzas) of poetry that are based on (but which were not actually written by) Emily Dickinson (or based on a combination of contemporary poets). From these lines and/or stanzas, you can find ideas for words and turns of phrase (Kurzweil *RKCP: Features*).

Kurzweil also offers the next step in mechanistic art, what he terms a completely "cybernetic poet" in which a human being isn't even necessary. Called the Ray Kurzweil Cybernetic Poet (RKCP), the system auto-generates poems using an algorithm based upon pre-selected poet styles. The algorithm is rooted in an analysis of the selected poet's technique, including

> the (i) words, (ii) word structures and sequence patterns based on RKCP's language modeling techniques (while attempting not to plagiarize the original word sequences themselves), (iii) rhythm patterns, and (iv) overall poem structure. There are also algorithms to maintain thematic consistency through the poem. RKCP uses a unique recursive poetry generation algorithm to achieve the language style, rhythm patterns and poem structure of the original authors that were analyzed, without actually copying the original authors' writings (Kurzweil *RKCP: How It Works*).

When tested, it was difficult for a combined general audience of juvenile and adult readers to determine which poems were written by the actual poet and which were written by the computer. Consider the following examples cited by Kurzweil:

> *What seas what shores what granite islands towards my timbers*
> *and woodthrush calling through the fog*
> *My daughter.*
>
> From *Marina* by T.S. Eliot

Imagine now a tree in white sails still whirled

About the leaves

will be of silences

Calm and angels

Written by the Kurzweil Cybernetic Poet after reading poems by Raymond Kurzweil and T.S. Eliot

According to Kurzweil, sixteen total readers achieved only 63% correct (man vs. machine) when assessing 28 different poetry stanzas (Kurzweil *Turing Test*). Although sixteen respondents is a very small sample and a bit too anecdotal for statistical validity, the lack of unanimous success in the survey does indicate that the line between human and machine is now much less defined.

This same categorization of style, but specifically related to music, is being explored by Artificial Intelligence (AI) researchers such as Charles Ames. According to Ames,

> For the art-music composer, artificial intelligence provides a mechanical extension to human intellect...Indeed, successes already achieved indicate that creativity can be modeled with much greater precision than conventional wisdom once suggested. A number of programs of my own are already producing credible emulations of human-composed music in popular styles, and a program by Kemal Ebcioglu for harmonizing chorales in the style of J. S. Bach has managed on occasion to duplicate Bach's solutions exactly.

Ames goes on to describe some of the theory behind the programming schemata that can produce such music, because, “although one might have a very good idea how a melody in (a) style should *sound*, that's not sufficient understanding to develop a program. One must be able to describe the style in terms meaningful to a computer” (Ames). That translation is what allows a software application to function as a technological collaborator, enabling a human to achieve a level of performativity far beyond what his/her skills, experience, and talent might ordinarily allow.

Kurzweil’s cybernetic poet and the AI musical composition programs of Ames and Ebcioglu stray a bit far from the domain of performance support technology, which, by my definition, requires a human to be supported. The cybernetic poet and the AI software are more indicative of automation (a term invoked by Norman in the earlier quote regarding issues of control). But I include them here to illustrate recent attempts to develop taste algorithms. Are they successful? To many, especially those who couldn’t tell the cybernetic poetry from that of Eliot, the answer is certainly “yes;” although, to others, the jury is still decidedly out.

When Kurzweil discusses “language modeling techniques” and a “recursive poetry generation algorithm,” we can’t help but speculate on a post-human stylistic recursion. Will we reach a point where the very poetry generated by the computer is being used as a stylistic model for future cybernetic poetry, in a sort of technological Ouroboros, a great mechanical serpent continually swallowing its own tail, reducing humanity to an uninvolved bystander? The Heideggerian implications of this question are addressed in more detail in Chapter Five, but for this discussion, the critical point is the recognition of a continual collaborative give-and-take between man and machine. As

Douglas Kahn says, “The relationship of techniques to technologies is…complicated since it is clear that technologies can derive from techniques…and techniques can derive from technologies” (15). Musicians today, especially those working in sampled sounds, are creating music that can only be produced by very specific technology. The technology is molding the technique which, in turn, continues to influence the technology of music production.

Yet, if performance support technology employs formulas to assist in the creation of art, even if those formulas are based on T.S. Eliot or J.S. Bach, perhaps all we’re left with is a computerized Minou Drouet (to reference Barthes), where the formulaic banality of the work is masked by the novelty of who (or what) produced it. It’s possible that, as Adorno stated, “the golden age of taste has dawned at the very moment in which taste no longer exists” (*Fetish Character* 280-281). Adorno, of course, implored us to resist what he called “the cult of the machine…For the machine is an end in itself only under given social conditions—where men are appendages of the machines on which they work. The adaptation to machine music necessarily implies a renunciation of one’s own human feelings and at the same time a fetishism of the machine such that its instrumental character becomes obscured thereby” (*On Popular Music*). To many, the simple fact that a particular piece of music was created by a computer is what makes it interesting, regardless of any artistic merit. Such listeners have fetishized the machine to the detriment of the art. However, some artists today do resist the over-mechanization of the creation process. In *Strange Sounds*, Timothy Taylor quotes an interview with composer and producer Brian Eno from *Wired* magazine, in which:

> Eno described working with some extremely advanced studio technology, concluding that it was ‘a horribly unmusical experience.’ Eno says that he is ‘struck by the insidious, computer-driven tendency to take things out of the domain of muscular activity and put them into the domain of mental activity. This transfer is not paying off. Sure, muscles are unreliable, but they represent several million years of accumulated finesse. Musicians enjoy drawing on that finesse (and audiences respond to its exercise), so when muscular activity is rendered useless, the creative process is frustrated. No wonder artists who can afford the best of anything keep buying ‘retro’ electronics and instruments, and revert to retro media’ (T. Taylor 110).

Whenever a computer presumes to know what you want, there are opportunities for mistakes. Just like the intrinsic support of the Microsoft® Office Assistant, which often pops up offering help when you least want it, the support can sometimes get in the way.

This goes back to the essential issue of control. The more experienced and/or talented the artist, the less he/she wants to abdicate control of the creative process to a machine. Talent is a rare commodity and those who have it are unlikely to dull its edge with assistive technology. Perhaps extending the kiosk culture into the arts eventually leads to an overall cheapening of the value of artistic talent. How many of the scripts generated by the screenwriting software would be movies you would want to see? How much of the computer-mediated music is worth listening to? Will we lose something intrinsically—exclusively—human by layering in compensatory artistic performance support technology? The answer to this question may very well be different for each

person depending upon your own perception of personal artistic talent. Brian Hayes feels that such human-computer collaborations could result in “a triumph of amateurism. Computer-based tools may compensate for the amateur’s lack of skill, but they cannot make up for a failure of taste or judgment” (15). Do we end up with, as the critics of early amateur photography protested, “fried fish pasted onto metal plaques” (Mirzoeff 72)? Roland Barthes astutely observed that the difficulty in mastering Beethoven is related more to the artistry of the music—the code—than in any technical skill required to perform it (*Musica Practica* 152).

Benjamin himself remarks on the rarity of talent in a long note at the end of *The Work of Art in the Age of Mechanical Reproduction*. He quotes at length from Aldous Huxley, who declares that “artistic talent is a very rare phenomenon,” in both the visual and auditory arts. With the increase in the sheer volume of artistic material produced, the result is that

> the gramophone and the radio have created an audience of hearers who consume an amount of hearing-matter that has increased out of all proportion to the increase of population and the consequent natural increase of talented musicians. It follows from all this that in all the arts the output of trash is both absolutely and relatively greater than it was in the past; and that it must remain greater for just so long as the world continues to consume the present inordinate quantities of reading-matter, seeing-matter, and hearing-matter (Huxley/Benjamin).

The production of art of dubious merit is only exacerbated by the rise of performance support technology. A quick internet search will reveal literally millions of homemade songs, podcasts, and other creative expressions available for listening.

Nevertheless, for the novice or untalented, the machine offers access to previously unavailable artistic expression. Perhaps self-service art is the ultimate extreme in egalitarianism, opening the closed, rarified world of art to anyone who wants to join in. Any layman who wants to write or paint or compose or play an instrument can do so successfully. If that results in more people enjoying the creation of and participation in art, is that so bad? Where technology once created distance between amateurs and professionals (Thompson's "wide chasm"), technology is now pulling both sides back together into a homogenous group where at any given moment someone can be either creator or audience (or both). "With digital technology, there is some hope that people—at least those who can afford computers—will begin to make music for themselves again using their computers and cheap, easily available software" (T. Taylor 5). Taylor quotes from a publication aimed at amateur composers of electronica music: "'Forget about talent,' says 'How to Become a Techno God,' a guide to making your own techno music; 'talent just gets in the way'" (164). Whether in music or the visual arts, this attitude is reflective of "a young generation that seems increasingly resistant to the seductions of production values and actively engaged in a 'do-it-yourself' aesthetic…the production of visual imagery is by now so diversified that it collectively signifys [sic] a shift away from the passive consumer trying to invest consumption with meanings towards a consumer-producer" (Mirzoeff 257). Recall, too, Lanham's remark that the programmers of

composition software regard the physical skills of musicianship as “elitist prejudices.” Who needs talent when it’s already programmed into the software?

Even singing ability is a luxury of the past. Experimental software available today allows “anyone with a laptop [to] repurpose any singer’s voice or even bring long-gone virtuosos back to life….You can think of the software as a kind of audio font: musical notation and lyrics can be translated into the chosen voice, then saved for replay, just as a word processor might translate a text into Helvetica or Times New Roman and print it out as many times as you like” (Werde). Other technologies, such as Brain Generated Music (BGM), can convert alpha brain waves into music, requiring the user to do nothing more than *think* to enable her technological collaborator to compose and perform (Kurzweil *Spiritual Machines* 151-152). Thompson was apparently correct when she said that “today…we seem to accept change more easily, and we appear to be more adept at dealing with the endless possibilities that acoustical technology presents” (32). Creativity continues to manifest itself in increasingly surprising ways.

Although he would probably cringe at artistic performance support technology, even Adorno might smirk at some of its cultural consequences. As more and more art is produced by people who were previously unable to do so, traditional distribution channels are being torn asunder. There is simply too much content now. As a result, the seams of the traditional pipelines are popping open under the pressure of volume and artistic expression is finding new, unorthodox ways to reach the public. USA Today recently observed that “new sounds and new bands are emerging from Web cabals, a blow to radio and labels used to setting the agenda… That's causing a democratic shift, as more phenomena filter up and fans elect their own stars rather than accept the dictates of

radio or MTV" (Gundersen). The vast corporate musical apparatus is losing the power to dictate what kinds of popular music the mass consumer should listen to. Media can now be "distributed both locally and globally by activist groups, charities and other small-scale organizations" (Mirzoeff 257). This sentiment is resonating across the media spectrum with the emergence of outlets such as the Current television network, which is founded on the principle that its programming will be produced largely, if not entirely, by amateurs (CNN *TV Network*). As a catalyst for this shift, enabling amateurs to produce art and other media, performance support technology helps to answer some of Adorno's Marxist critiques of the music industry while at the same time validating Benjamin's vision of artistic democracy. If, as Kerry Freedman has written, "all art is political" (52), then the politics of artistic performance support and postmodern technological distribution channels are certainly "democratic." As I wrote in Chapter One, the kiosk culture is "of the people, by the people, and for the people."

Perhaps the role of artistic performance support technology isn't to fundamentally change the process of creating art. I don't think it will turn talentless hacks into artist poseurs. By and large, especially over time, audiences can tell the difference. Audiences grow increasingly sophisticated and, despite Theodor Adorno's assertions, I would agree with Nicholas Mirzoeff when he declares that "it is no longer possible to suggest that the mass audience will gullibly consume any product that is offered to it containing a simple formula of entertainment" (255). The true promise of artistic performance support technology lies elsewehere. After composing her song using the FlexiMusic Kids Composer software, my sister-in-law remarked that, while the system only allowed her to create limited "minimalist" music, she definitely saw the value of such a program to

introduce music to children. When playing a composition within the software application, a vertical line travels over the tracks, indicating where in the song the playback is located. My sister-in-law saw this traveling vertical line as an analog for reading musical notation. If such a program were used to introduce a child to the concept of reading music, combined with the positive reinforcement of a technologically-enabled early compositional success, it could quite easily inspire a lifelong love of music. And if such a child blossomed from that early nurturing into tomorrow's Ludwig van Beethoven or George Gershwin or Brian Wilson, that wouldn't be such a bad thing.

Taylor speculated that "perhaps the day will come when our shiny new Packard Bell personal computer will be seen not just as a fancy typewriter or Internet connection, but as a machine that allows people to make their own music instead of buying it" (164). This statement, published not so long ago in 2001, is already horribly dated—and not just due to the reference to the now defunct Packard Bell company— because that day is not only here but becoming an integral thread of our own cultural fabric. With artistic performance support technology, anyone can now go from reader to writer, listener to performer. The "cultural democracy" grows increasingly more democratic every day.

CHAPTER FOUR:
TRENDS IN TRANSPARENCY

> In matters of social justice and of scientific truth alike, the legitimation of...power is based on its optimising the system's performance - efficiency.
> - Jean-François Lyotard, *The Postmodern Condition*, xxiv

What, exactly, is "training?" Typically, when the term training is mentioned, it conjures thoughts of Olympic athletes, of pets learning to obey, or, perhaps, even of toddlers graduating from diapers to more mature personal behavior. Indeed, as defined by most major dictionaries, the term "training" addresses each of these examples. What all three of these, admittedly, diverse examples have in common is the use of repetitive instruction to effect a desired performance outcome.

In that context, as a behaviorist would attest, the performance improvement strategy of repetition is appropriate. After all, a pet or even a toddler will not be able to effect a behavioral change without substantial trial and error and repeated attempts with appropriate stimuli (Thorndike). Likewise, a world-class athlete will only be able to improve personal performance through extensive practice, the results of which are sometimes measurable only in hundredths of a second.

To put training into a workplace context, one generally-accepted definition might be to coach or encourage a specific behavior or performance; to employ specialized instruction or practice to achieve the goal of performing a standardized task or to make the task's performance more proficient. In short, "training" supplies workers with a task's required knowledge, skills, and attitudes via planned instructional interventions (Pepitone). But is the term "training" truly fitting for the vast majority of work-related

instruction provided today? And with the advent of the kiosk culture, where situated instruction is only relevant for temporary events, is “training” (as traditionally envisioned) even suitable?

Is it appropriate to equate improved workplace performance with the same term that’s associated with canine obedience? Today’s educated, skilled, knowledge workers could easily be insulted by that. After all, they are not pets to be controlled. They are intelligent, complex human beings who have unique skills and talents to contribute. Likewise, a comparison to a toddler’s potty development is wholly unsuitable and perhaps even degrading. Thinking that the modern worker can be motivated to perform at his/her highest level solely through repeated behavior and the blunt application of positive and negative feedback is naïve and dangerous. Of course, modern organizations don’t typically treat their employees this way, but the use of the term “training” carries with it baggage of these pejorative associations.

What about the example of athletic preparation? The use of the term training in this context implies a never-ending quest for incremental improvements. Applied to a workplace context, this may seem like a noble ambition. However, it’s simply not realistic for a company to invest in a full-time program of instruction in order to effect a barely measurable improvement. I submit that once the desired workplace performance and/or proficiency has been achieved, within a desired tolerance, any further investment in instruction would result in diminishing returns (Figure 19). The training would cost more than the improvement would yield. So, firms instead focus on more transactional training events and, once acceptable performance has been achieved, only administer additional training when conditions change.

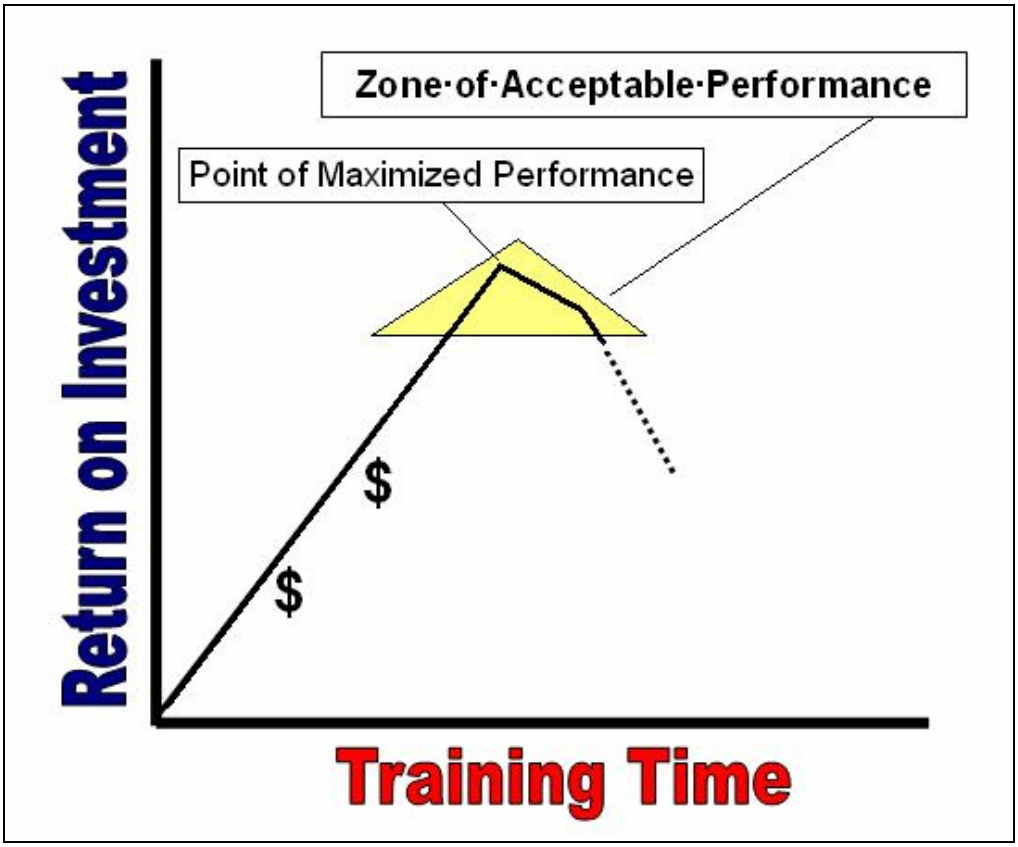

Figure 19: Diminishing Returns Related to Continuous Training Beyond Acceptable Performance

Given the reality of purely transactional training events, the use of the term training as an analog to continuous athletic training is also inappropriate. If an athlete stops training, his/her competitive performance will surely suffer. However, once a typical worker achieves a desired performance through a training event, as long as he/she continues in the activity, he/she should not need additional training for that task.

Perhaps the only context in which the athletic training analogy fits is when the employment task is physical in nature. An example would be the physical performance required of military, law enforcement, or rescue personnel. In such cases, where lives are at stake, the maintenance and even incremental improvement of performance justify the

costs. We would hope that if we ever needed the assistance of a lifeguard, he/she would be in the best physical condition possible, which can only be achieved through continuous athletic training.

Certainly it can be argued that our mental and dexterous capabilities would benefit from an athletic training model, with repetition combined with increasing levels of difficulty. This is true. However, as previously stated, unless the resulting performance could mean the difference between life or death, the investment in achieving anything except required performance is not a good corporate business decision. It simply costs too much. In short, it is inefficient.

An Aesthetic of Efficiency

Efficiency is one of the key drivers for both worker training and, even more acutely, for consumer-focused self-service. It is also a particularly "modern" phenomenon. Either a result or a cause (depending upon your perspective) of the Industrial Revolution, efficiency can trace its roots back to the concept of utilitarianism, as postulated by 19th Century philosopher Jeremy Bentham. Utilitarianism contends that an action is only considered right if it conforms to the principle of utility. To Bentham, utility is "that property in any object, whereby it tends to produce benefit, advantage, pleasure, good, or happiness...or...to prevent the happening of mischief, pain, evil, or unhappiness" (3). To a utilitarian, all actions should result in the optimal outcome.

You can see how such a concept might be embraced by the capitalist business community, who would define "optimal" in terms of maximized profit. Perhaps no one

embraced it quite as aggressively as Frederick W. Taylor, the generally-recognized "father of scientific management, efficiency and systems engineering" (Fox). Taylor sought to optimize industrial efficiency through the application of scientific management principles. By conducting detailed time analysis studies and applying their findings to operational business environments, he almost single-handedly pulled the US economy out of a worker-centric paradigm of skilled artisans and into a system-centric model of prescribed tasks and delineated responsibilities (F. Taylor).

Taylor's work epitomizes the U.S. Efficiency Movement of the late Eighteenth and early Nineteenth Centuries. This movement expanded beyond the industrial assembly line and seeped into all areas of modern society. In essence, "efficiency became a style that was celebrated throughout modern American culture" (Thompson 157). Emily Thompson alludes to this widespread dissemination of the efficiency movement in terms of aesthetics.

> The concept of efficiency itself was transformed in the 1920s in ways that invested it with an even greater cultural significance. Efficiency not only stood for the economical and moral values of productivity and prosperity, but now further constituted an aesthetic style that represented everything modern. This stylistic turn allowed the concept of efficiency to migrate into fields far removed from its technical origins in the management of industrial labor (Thompson 156-157).

Thus began the particularly Western obsession with efficiency, which continues today. In this construct, "efficient" equals "good." As the mechanism whereby we can improve our societal efficiency, technology has been the driving force behind our race to become

faster, better, and more accurate in all things. Nowhere is this more evident than in the case of performance support technology. As we've seen, when successfully implemented, the result of implementing performance support technology strategies is that the general populace is able to replace the skilled workforce with an equal level of transactional task performativity, thereby rendering entire professions redundant. If business has taught us anything, it's that redundancy is summarily eliminated.

Business redundancy is anathema to Lyotard's "principle of optimal performance: maximizing output (the information or modifications obtained) and minimizing input (the energy expended in the process). Technology is therefore a game pertaining not to the true, the just, or the beautiful, etc., but to efficiency: a technical 'move' is 'good' when it does better and/or expends less energy than another" (Lyotard *Postmodern Condition* 44). Thus, it's no surprise to see businesses moving from an employee-training paradigm to an *in-situ* consumer performance model. It's simply more efficient. As stated in Chapter One, we are not only now self-sufficient, we are now self-*efficient*.

Yet, at what cost have we embraced a societal aesthetic of efficiency? There are plenty of critics who feel as Sven Birkerts does, that we are making a Faustian deal with the devil: our souls in exchange for maximized efficiency.

> The devil no longer moves about on cloven hooves, reeking of brimstone. He is an affable, efficient fellow. He claims to want to help us all along to a brighter, easier future, and his sales pitch is very smooth. I was, as the old song goes, almost persuaded. I saw what it could be like, our toil and misery replaced by a vivid, pleasant dream. Fingers tap keys, oceans of fact and sensation get downloaded, are dissolved through the nervous

> system. Bottomless wells of data are accessed and manipulated, everything flowing at circuit speed. Gone the rock in the field, the broken hoe, the grueling distances (Birkerts 229).

Birkerts specifically mentions ATMs in his critique of contemporary wired society and contends that the technologically mediated efficiency that we pursue unrelentingly has a cost. Again, as discussed in the previous chapter, to Birkerts and his like-minded colleagues, this is a question about the abdication of our humanity due to our dependence upon technology.

> No one is stepping forth to suggest that there might be something at stake, that the headlong race to wire ourselves might, in accordance with gain-loss formulae that apply in every sphere of human endeavor like the laws of physics, threaten or diminish us in some way. To me the wager is intuitively clear: we gain access and efficiency at the expense of subjective self-awareness (Birkerts 220).

How efficient must we be? What was life like before e-mail and instant messaging? According to such critics, it seems that while technology has indeed allowed us to do more much more quickly, all it has really done is force us to fill our days with ever more tasks. Task speed means we have time for more tasks. We see this mindset in action every day, in our own lives and in those around us. Driving is no longer about simply traveling from Point A to Point B; now it's also an opportunity to talk on a cell phone, text message a friend, listen to digital music or satellite radio, play a DVD movie for the kids in the backseat, and a host of other concurrent tasks. The aesthetic of efficiency dictates that we fill every waking hour with maximum productivity, not just in work, but

in leisure as well, to the point where Birkerts has observed that “just sitting in the park while our kids play on the swings feels like truancy” (quoted in Fox).

However, is Birkerts merely a Luddite? After all, shouldn’t we always try to do things better? Shouldn’t humanity strive to improve? Satisfaction leads to complacency, which is a death knell for any company in a capitalist system. Thus, we can see why the kiosk culture is so pervasive. Its ascendancy is consistent with the aesthetic of efficiency that began more than a hundred years ago. The same aesthetic that led Frederick Taylor to systematize workplace tasks also led Charles Saunders to design his Piggly Wiggly store so that customers must collect their own merchandise, and today leads airlines to implement financial penalties for checking in for a flight in any way other than at a self-service kiosk or via the web.

Taken to an extreme, scholars such as Steven Katz have suggested that an unchecked “ethic of expediency” has resulted in human atrocities such as the Nazi Holocaust. With technology as the mechanism for achieving maximum efficiency, the system becomes the primary moral compass, replacing conventionally-accepted notions of morality. Katz observes that

> of course, technology is the embodiment of pure expediency. Thus, “the spiritual element,” the *ethos* of technology, is expediency: rationality, efficiency, speed, productivity, power…Both science and technology are “a good” not only because they are a rational means for accomplishing a task and/or achieving leisure and thus happiness (the virtues heard most when referring to scientific and technological progress), but because they are ethical ends in themselves as well…In Nazi Germany, where gold

> fillings were extracted from the teeth of the victims of the gas chambers and melted down and the hair of victims was used "in the war effort," we see the ethic of expediency taken to extremes (266).

I'm not suggesting that the desire to achieve maximum task efficiency within a self-service transaction will eventually result in a horror analogous to the Holocaust. Yet, unchecked, this ethic of expediency/aesthetic of efficiency can lead to capitalistic abuses. The frustration that so many people feel when attempting to navigate through an automated telephone answering system is a very small example of what might be considered consumer abuse. The service workforce displaced by the ascendancy of the kiosk culture would certainly argue that transforming a business' customers into uncompensated workers is a clear form of insidious abuse laid at the altar of efficiency.

With both the positive and negative aspects associated with the concept of efficiency as a context, it's worthwhile now to turn back to the question that began this chapter: what is training?

Education vs. Training = Knowledge vs. Skills

When an employee first encounters a new work environment, typically he/she will receive some sort of training. These training interventions can be as simple as an on-the-job session with a more experienced colleague to a multi-year plan of professional development, such as can be found in the upper echelons of the military and corporate industry. But is this an effective strategy? Does it work?

As David Grebow has written: “If training works so well, why aren’t we all performing like top guns? After taking that costly and time consuming training, why aren’t we ready to sell that product, or deliver that value added service? Why aren’t we ready?” (Grebow) Perhaps one explanation for general training ineffectiveness is that training metrics are not always directly aligned with business metrics (Kirkpatrick’s Levels 3 and 4, to different degrees). In addition, too often training is structured as a one-way transfer of knowledge from an expert to a novice, with the focus placed on the trainer rather than the trainee. The performance that needs to be improved is that of the worker (or, as already been established, the end user/consumer). It stands to reason that the trainee’s performance should be the instructional focus. We should transfer the concept of training delivery out of the trainer-directed model and into a worker-supported model. The logical extension of this line of reasoning, of course, puts training delivery directly into a consumer-supported model, resulting in the kiosk culture.

So, if, as the beginning of this chapter agues, we should no longer use the term “training” to describe adult workplace instruction, what should we call it? Although we may be entering a post-training era, we will always need to facilitate learning. What should we call this instruction? The answer to this question depends upon the type of instruction being administered. In most cases, workplace training falls into two separate categories: *knowledge* and *skills*.

Knowledge

It's important to recognize the distinction between understanding and behavior. You may read a book and understand how a jet aircraft functions and even know all the details of the cockpit displays; however, understanding the concepts of aviation and instrumentation does not mean that you will actually be able to fly an airplane, complete with the muscular demands of holding the stick or wheel, interpreting data, and physically responding. The knowledge is completely separate from the behavior. Given the aforementioned definition of "training" as being a behavior modifier, the term "training" is an inadequate descriptor for pure knowledge acquisition that may or may not have practical application. Donald Norman writes of two different types of knowledge:

> knowledge *of* and knowledge *how*. Knowledge *of*—what psychologists call declarative knowledge—includes the knowledge of facts and rules…Knowledge *how*—what psychologists call procedural knowledge—is the knowledge that enables a person to perform music, to stop a car smoothly with a flat tire on an icy road, to return a serve in tennis (*Design* 57).

Martyn Wild alludes to the same concept with differing vernacular when he states "a knowledge base consists of both descriptive and heuristic components—descriptive knowledge is the shared knowledge of experts and practitioners that is usually found in text books, while the heuristic component includes the knowledge of good practice and judgment constructed over years of experience" (10). Both of these types of knowledge, while important in the context of performance, don't require any action on the part of the

"knower." Knowing how to ride a bicycle (balance, pedal, steer) has no direct impact on someone's ability to actually do it. Knowledge may help shorten the time to proficiency, but it can never be a substitute.

Janice Redish has written about a specific type of applied knowledge called "reading to learn to do" that builds upon previous research of "reading to learn" and "reading to do." Such a traditional division between learning and doing falls squarely into the knowledge vs. skills construct. Redish describes employee performance support, especially the spectrum of support's external and extrinsic categories, when she writes, "In the workplace, many documents, from memos to reports to manuals, are used at the moment they are read to serve an immediate need. Busy readers don't generally study documents. Instead, they scan them to find the critical information and to act on that information" (*Techniques* 19). However, Redish has articulated a middle ground called "reading to learn to do" (*Reading*), which is analogous to the mediating role that performance support technology plays between learning and doing (knowledge and skills). Again, recall Marc Rosenberg's statement that electronic performance support is intended to obliterate the line between learning and work, where the performance will reside in the situation.

Via traditional "training," a company's workers gain knowledge about a variety of topics such as the history of the organization, corporate goals and mission, the importance of diversity, sexual harassment awareness, and perhaps even job-specific knowledge (e.g., dealing with difficult customers). With knowledge-based instruction, the emphasis is on cognitive recall, perhaps even addressing higher-order activities such as application, analysis, and synthesis (Bloom). Knowledge-based instruction does not

require the learner to physically do anything. Perhaps a good rule of thumb for categorizing instruction is: *if the learner can demonstrate understanding without resorting to any physical activity, then it is knowledge-based.* For example, a loan processing agent might be asked to read a manual on identifying credit risks. Then that learner's understanding could be assessed by asking her to apply the knowledge to three different loan applications. Suppose the loan agent was physically disabled and incapable of manually handling the applications, either in printed form or on a computer screen. She could still look at each one and describe the credit risk. For the purposes of assessing knowledge, she will have satisfied the learning objective—she understood loan risks and applied the knowledge. Whether she is able to physically sort the forms is irrelevant to whether she learned the material. The only physical activities required to assess comprehension are eye movement and speech, neither of which could reasonably be considered a "skill" in this context.

In many ways, knowledge-based instruction is a model for traditional K-12 and post-secondary education. The world's classrooms are filled with students who acquire knowledge through teacher lectures and reading. Even in situations where a physical skill is required, the student's assessment is knowledge-based, not performance based. For example, a student may be asked to dissect a frog during a biology class. However, the student will be tested on his/her resulting understanding of the frog's anatomy, not his/her skill wielding a scalpel.

Given this close association between the traditional educational model and knowledge-based workplace learning, the term "education" would be more appropriate than "training" when applied to industrial instruction. In the aforementioned examples of

company history and sexual harassment policies, the mode of instruction is often the same instructor-led, lecture-based classroom format as a sixth-grade math class. The tests are likely similar, too, assessing cognitive recall and not addressing anything that could remotely be considered a "skill." Even when such instruction is delivered via self-paced e-learning, the learning objectives and assessments are the same. The medium has just been replaced. This knowledge-based instruction need not be limited to formal learning events, such as classes, videos, or e-learning programs. An organization's workforce could be (and often is) educated through other formal and informal means. An e-mail from a colleague in accounting, an overheard conversation in the breakroom, and a forwarded voice mail can all be effective mechanisms to deliver important job-critical knowledge. Looking specifically at official management information mechanisms, standard corporate communications strategies can be extremely effective/efficient in delivering knowledge to the workforce.

An announcement that a new product is being developed, a merger is being pursued, or that layoffs are planned is just as valid knowledge to a worker's daily routine as understanding the supply chain process or applying sexual harassment policies. Education in this context is the transmission of previously unknown information to a learner; in other words, knowledge acquisition.

When viewed in this light, we glimpse our first clue as to how current training departments can maintain their relevance in the post-training organization: by defining their value broadly. When all information is classified as knowledge, then the educational experts who deliver that information are vital components of the organizational apparatus. This means a potential blending of the traditional internal communications and

training functions. Certainly, established training functions such as instructional design, understanding of learning styles, and media selection decisions would be well suited to any knowledge-based message. The goals of understanding, retention, and application remain the same whether the information addresses process improvement methodology or the time and location of the upcoming company picnic.

Today's modern white-collar employees are called "knowledge workers" for a reason. There is a continual need for the acquisition and application of new knowledge. The traditional role of a training department should not diminish in a post-training world. In fact, placed within a larger context of "Education," that role should even expand. Knowledge, in fact, is becoming increasingly important in the skills-based consumer interactions at the center of the kiosk culture. Already we see a single ticket representative overseeing a bank of airport kiosks, a single cashier overseeing eight self-scanning cash registers. Today's cashiers, bank tellers, and airline ticket agents are metamorphosing from workers whose value lies in their ability to interact with specific technological systems into consultants who provide critical knowledge and troubleshooting. A single ticket representative can now handle an entire bank of airline e-ticket kiosks, stepping in only to answer questions and address the small percentage of customer requirements not addressed via the kiosk experience. There may be fewer of these new consultative workers, but their value lies in a foundation of knowledge, not skills.

Consider that in 1985 there were 60,000 bank Automated Teller Machines (ATMs) and 485,000 bank tellers. By 2002, those figures increased to 352,000 ATMs and 527,000 bank tellers (Fishman *New Machine* 92). This represents a 587% growth in

the number of ATMs during that period contrasted with growth of only 8% for bank tellers. The bank teller profession was not eliminated by the introduction of self-service technology. However, those positions continue to decrease in number and evolve into more consultative, knowledge-based responsibilities. They have become part of what James Paul Gee refers to as "the 'new capitalism' (a capitalism based more on knowledge than on industrial assembly lines)" (190).

Knowledge will always have value. Lyotard's postmodern perspective contends that "knowledge is and will be produced in order to be sold" (*Postmodern Condition* 4). Lyotard speculates on "'payment knowledge' and 'investment knowledge'—in other words, between units of knowledge exchanged in a daily maintenance framework (the reconstitution of the workforce, 'survival') versus funds of knowledge dedicated to optimizing the performance of a project" (6). In the context of workforce training, this equates into more traditional "educational" offerings: policies, procedures, human interactions, processes, etc. There will always be demand for this type of instruction. Yet for those who currently make their living teaching people how to use technology (e.g., classes on Microsoft® Excel), their careers are threatened by transparent performance support technology.

If we are to truly suggest replacing the term "training" with a division between "knowledge" and "skills," and if knowledge acquisition is equivalent to "education," then we must next ask what to call "skills?" What is the application of knowledge in the service of a task? The answer, of course, is "performance."

Skills

If knowledge acquisition can be described by the term “education,” then skills are defined exclusively by “performance.” Can the worker perform a skill to an acceptable standard or not? How that goal is accomplished is irrelevant, whether by traditional training or via embedded technological support (or some combination thereof). Whatever strategy offers stakeholders the greatest return will be the one implemented. The most *efficient* solution will be the victor. As we observe in the growth of the kiosk culture, technologically mediated self-service can be extremely efficient.

If an individual trainer’s primary responsibility is to teach people how to use other technology, such as a course on using computer word processing software, then those jobs are in the same jeopardy as travel agents and cashiers—and, in earlier times, elevator operators. If the goal is to have a particular human use a piece of technology with an acceptable level of performance, then typically that goal can now be more efficiently accomplished via performance support technology rather than via direct human mediation. Therein lies the essential threat of the post-training era to the training community. The training department’s relevancy to deliver anything except pure knowledge-based information (“education”) is in serious peril.

How can training professionals continue to contribute to direct human performance in an era where technology has supplanted them? The answer offers another clue regarding how to maintain post-training importance: by defining the trainer’s role in terms of performance improvement—whether worker performance or end user/consumer performance. Traditional training functions such as human factors awareness, interface

design, and psychomotor task assessment can all be applied in a general performance support context. Instructional design is relevant in any learning environment (James P. Gee's "semiotic domain"), whether that is a classroom or a situated self-service transaction.

Corporate training departments are often faulted with being a budgetary expense, as opposed to a business investment with a measurable return. They are habitually accused of not being aligned to business performance metrics, relying instead on attendance, seat time totals, Level 1 surveys, and abstracted Level 2 post-tests. If all a training department does is provide knowledge-based education or ineffective skills instruction, then that criticism may be valid. But if a training department defines itself with a performance improvement mission, then the means by which humans improve *business performance* become fluid. Incorporating performance support strategies directly into technological design, so as to achieve the same or even improved performance outcomes—without resorting to compensatory, abstracted training—would certainly serve organizational stakeholders (management, shareholders, taxpayers, etc.).

The role of the trainer and instructional designer will need to change to that of a *performance consultant*. Rather than resist transparency, training departments should transform themselves into performance departments and focus their efforts on operational business impacts. While the "performance consultant" term is a current industry buzzword, its legitimate implementation has been minimal. Traditional training functions have typically simply been rebranded with the popular new label. The true performance consulting paradigm, of course, assumes that performance consultants will need to be involved in the very earliest stages of business analysis and product/program design

planning. It will no longer be standard procedure for an operations department to come to a training group with a request to "fix" something that doesn't currently work. Performance support transparency (and, subsequently, improved business performance) will only be realized if performance support considerations are integrated into all aspects of the organization. This will require a significant commitment from executive leadership.

> In a 2004 Accenture High Performance Workforce study 70 percent of executives rated improving worker productivity as a top HR priority, but only 6 percent said they were satisfied with progress at their organizations. As a result, companies face a new imperative to improve employee productivity by taking a business-operations-centric approach to workforce performance and talent management. (Sparta 48)

A true performance consultant must adopt a business-operations-centric approach. The landscape is shifting. Corporate leaders are increasingly adopting consumer-focused self-service technologies. As this transition matures, the training community must be prepared to contribute on a more fundamental *business performance* level.

Living in a Post-Training World

Undoubtedly, the most effective approach for sustained, exceptional performance is a combination of knowledge and skills improvement strategies. On the whole, education enhances performance. Although not absolutely necessary for the physical requirements of piloting an aircraft, a comprehensive understanding of Newtonian

physics and weather principles certainly increases your value as a pilot. With that knowledge you can adjust your behavior to compensate for unforeseen circumstances, maximizing the capabilities of the airplane, and ensuring its safe operation.

However, if forced to choose between knowledge and performance, executive management would generally choose performance. It makes sense. It is more efficient. Assuming you could only have one of the following, which is preferable for ensuring business results?

- A worker who knows why he is supposed to press a certain button at a certain time during a shop floor procedure, as well as how the machine that the button enables works, but is unable to actually press the button properly.
- A worker who has no idea why he is supposed to press a certain button at a certain time, nor how the machine works, but never fails to press the button at precisely the right moment.

This intentionally simplistic example is meant to highlight the executive mindset when considering post-training employee development. As long as the performance is acceptable, do the means matter? Unquestionably, any rational manager would want a combination of the two workers—one who not only performs the task but also understands why he does it and how the task fits into the larger corporate picture. Such a worker would personify the position of Brown et. al., in their contention that “knowledge is situated, being in part a product of the activity, context, and culture in which it is developed and used” (32).

What performance support technology offers the business manager is the ability to create this combined worker, now increasingly embodied in the end-user/consumer. Transparent technological support enables the educated (knowledgeable) employee to achieve the desired performance, despite his skills deficiency. Perhaps a light comes on when the button is to be pressed, accompanied by an audio tone. The worker will always know when to perform the task.

The training professional should take note of the fact that this worker's performance is achieved without any formal skills instruction. Like an airline e-ticket kiosk and its simple, intuitive design, the performance support is embedded within the system and compensates for the worker's performance gap. The only role in this scenario for a traditional training department is in providing the knowledge-based education of the button's purpose and the machine's design; and this could potentially be delivered technologically via self-paced e-learning, further removing traditional instructor-based training personnel from the process.

The evolution of performance support transparency can be traced via a hypothetical retail example. Recall the example in Chapter One of an overworked convenience store manager. With annual employee turnover as high as 163.5%, the store manager must conduct the same one-on-one instruction on the operation of just the point of sale (POS) cash register literally dozens of times each year (not to mention all of the other training that must be provided). For such a manager, situated performance support, mediated by technology, is much more than a mere luxury. It is essential to business survival. This manager might have experienced all of the following in a career, related to

the training of customer service employees on how to use the POS cash register system for consumer transactions:

1. Informal one-on-one, on-the-job training (OJT), complicated by high industry turnover
2. External classroom-based training, also complicated by high industry turnover and employee time away from direct work to attend instructional sessions
3. Self-paced e-learning curricula that automate the instruction of the equipment, but still remove the employee from direct work
4. Intuitively-designed POS equipment that minimizes the amount of instruction necessary in order to effectively use it
5. Intuitively-designed POS equipment that puts the entire transaction process directly into the hands of the customer, minimizing the need for conventional customer service cashiers and eliminating POS training requirements altogether.

This is the current state of the industry as it relates to pay-at-the-pump technology. The same story can be told in other industries, as well. The efficiency-driven kiosk culture has expanded exponentially with the improved sophistication of increasingly transparent performance support technology.

So, where are we now? Clearly we have not yet achieved total transparency. However, we have recently begun consistent application of the higher order notions of performance support, as summarized in Figure 20.

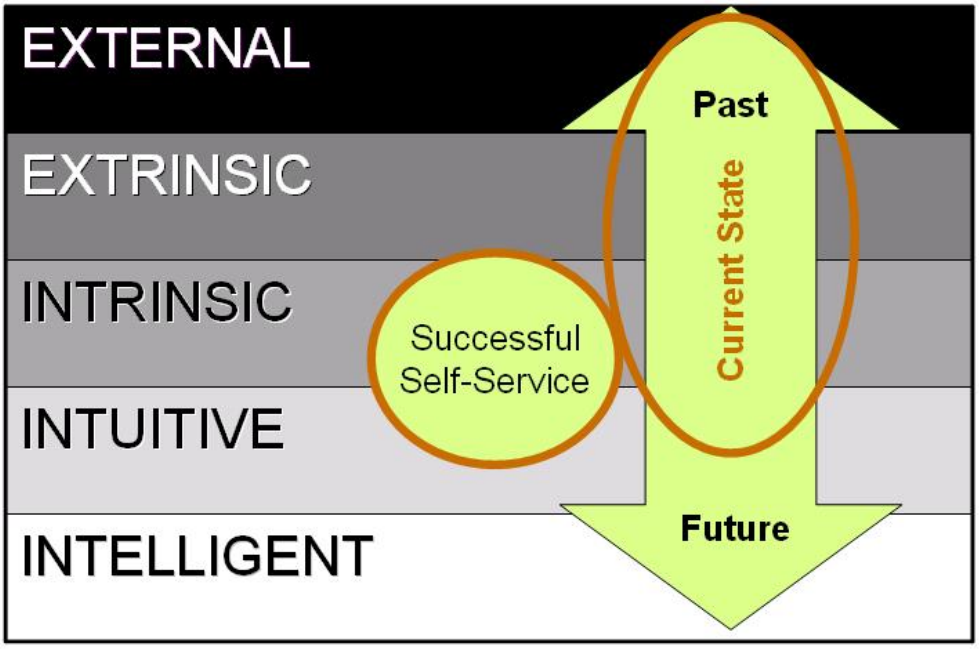

Figure 20. Current Status of Performance Support Technology Within the Spectrum of Support

We have not yet realized the absolute transparency of intelligent support, as defined by the spectrum of support, yet we have staked out frontier territory in the intuitive category. And, of course, we also cling to support in the lower level categories for a variety of reasons, including cost, convenience, tradition, or even as the most appropriate solution in a given context.

As we push further into the possibilities of intuitive and intelligent support, we may find that the skills that are necessary to support are increasingly cognitive. What I mean by this is that the ability to remember, to critique, to mentally process, may ultimately be considered a *skill* in the vein of driving a car or playing a musical instrument. While driving a car or playing an instrument might require memory and mental processing, such activities are component skills in and of themselves, similar to

physical finger movements and foot position. Some people can move their fingers better than others. Some people can remember things better than others. Each skill can be practiced and improved ("trained," if you will).

As more and more of the postmodern, technological workforce becomes "knowledge workers," a term originally coined by Peter Drucker in 1959 (*Landmarks of Tomorrow*), it's worthwhile to explore just how these knowledge workers will be supported in their cognitive skills by performance support technology. How can technology help us think better? Jonassen and Reeves refer to such support as the domain of "cognitive tools," which are "technologies, tangible or intangible, that enhance the cognitive powers of human beings during thinking, problem solving and learning. Written language, mathematical notation, and most recently, the universal computer are examples of cognitive tools" (Jonassen and Reeves 693). Ong references a similar concept in his description of oral cultures and their use of memory aids. Bringing the discussion back to electronically mediated cognitive tools, Martyn Wild has referred to the concept as an intellectual partner, echoing the marketing rhetoric of the screenwriting software discussed in the previous chapter.

> There is a sense in which the use of applications software as cognitive tools takes us beyond the intended uses of such software, so that they can be seen to be functional outside of their original design. This is also true of performance support systems (PSSs)—as application software, these can be used by students as cognitive tools to express and extend their thinking in a complex domain. However, unlike most applications software, PSSs are task specific; they also possess a series of functions and resources to

> simultaneously engage and support the user in both the performance of the task and learning about this task--and in this sense, their use blurs the distinction between task performance and task or domain learning. It is in this view, that PSSs can be conceptualised as offering cognitive apprenticeship to the user (Wild 9).

As described in Chapter One, Wild applied the concept of a cognitive tool in an electronic performance support system for teachers. He claimed that the PSS permitted novice teachers to achieve a similar performance as seasoned experts. The skills required of a successful teacher have much more to do with cognition than with physical action.

Another example of how a piece of support technology can assist a knowledge worker is found in the telecommunications industry. In 1997, CIO Magazine bestowed an Enterprise Value Award to Bell Atlantic (now part of Verizon) for its Sales Service Negotiation System (SSNS) (Field). The SSNS is a computer software application designed to assist Bell Atlantic's telephonic sales consultants in their knowledge-based duties. Here's how it works: when a residential or small business customer calls the phone company to establish new service, the answering consultant engages him/her in quasi-casual conversation. In addition to the necessary questions related to the service address and listing name, the consultant also asks seemingly friendly questions while the order is being processed. Do you have any kids? How old are they? Do you work out of the house? Does your spouse work? Do you have a computer? While the caller answers, the consultant clicks check boxes on the SSNS computer screen corresponding to the customer's attributes. In this regard, the SSNS application functions as a memory aid, prompting the consultant through the quasi-casual questions.

However, the system does much more when it becomes a cognitive processing aid. Before the call is ended, the SSNS system analyzes the caller's attributes (as recorded by the consultant) and then responds with a list of appropriate "value-added" services in which the customer may be interested. If the caller works at home, he/she could use a second line or the Ident-a-Ring feature where a single phone can receive calls from two separate numbers (one personal and one for work) with unique rings. Perhaps call forwarding or three-way calling would help manage availability and business conferencing. If the caller has teen-aged children, perhaps call waiting would be helpful. Or Caller ID. Each new service sold to a customer equates to significant corporate revenue. In essence, the human knowledge worker delegates his/her cognitive processing to the electronic SSNS application. The software analyzes the attributes, recommends appropriate services, and provides logical rationale for those recommendations.

Microsoft is working on a support application that takes the Paper Clip Assistant to a new level. Called BusyBody, the new software package uses a variety of modalities to proactively determine the "cost of interruption" when managing the multitude of concurrent tasks most modern knowledge workers must face every day. By counting mouse clicks, capturing the number of computer software windows open, recognizing the time of day, using microphones to determine if you are on the phone, among other tactics, BusyBody makes proactive decisions about whether or not to interrupt you with an incoming e-mail or text message. After a period of questioning, the system eventually "learns" how you want to manage your workflow and tasking. Just like *TiVo*® *Suggestions,* the system can be trained to understand your individual preferences, maximizing your cognitive efficiency. As observed by Stephen Johnson, "the end result

is precisely the kind of nuanced learning that humans do all the time" (S. Johnson *Emerging*). It is technological cognitive support for knowledge workers.

Steven Johnson also offers some insights about electronic knowledge assistance in his description of new computer software that helps to make cognitive connections for us. In an article for the New York Times, he describes software applications that help a human write articles and essays by searching a database of notes and references on a personal computer. Much like the SSNS program, Johnson's software analyzes a collection of disparate data and makes a proactive (intuitive) suggestion for associations and cognitive connections. Referencing the vision described in Vannevar Bush's classic essay *As We May Think*, Johnson observes that "these programs all work in slightly different ways, but they share two remarkable properties: the ability to interpret the meaning of text documents; and the ability to filter through thousands of documents in the time it takes to have a sip of coffee." This is the very epitome of performance support technology for the knowledge worker. Yet, we cannot escape the very same questions of authorial integrity that were discussed in the previous chapter regarding artistic performance support. Johnson muses about the source of the sometimes creative associations that inform his work.

> Now, strictly speaking, who is responsible for that initial idea? Was it me or the software? It sounds like a facetious question, but I mean it seriously…I'm not at all confident I would have made the initial connection without the help of the software. The idea was a true collaboration, two very different kinds of intelligence playing off each other, one carbon based, the other silicon. (*Tool for Thought*)

If the idea is good, as Richard Lanham said, "'who' has created the goodness" (12)? Johnson's introspection is counterpoint to the collaborative screenwriting software discussed in the previous chapter, which has no ethical qualms about authorial integrity. Like a business enterprise, the purchasers of collaborative screenwriting software likely only care about the outcome—the performance.

In retrospect, the use and application of electronic performance support systems for employee skills training could be viewed as a harbinger of consumer-oriented self service technologies such as ATMs and self-checkout registers. Similarly, the use and application of cognitive assistance technology, as embodied by applications like SSNS and Johnson's collaborative writing software, for knowledge workers could portend a wider distribution in society at large. Speech recognition software is being developed for automated phone answering systems that recognizes customer frustrations (including profane exclamations) and quickly routes the caller to a human attendant (McLeod). In another example, researchers at the Massachusetts Institute of Technology are working on a cell phone software application that analyzes "speech patterns and voice tones to rate people – on a scale of 0 to 100 percent – on how engaged they are in a conversation" (CNN *Bored*). They refer to it as the "Jerk-O-Meter." In these cases we are delegating our very human perception to technology.

Cognitive support is even showing up at our local fast food drive-thru. A predictive technology called HyperActive Bob has been implemented in a handful of fast food restaurants throughout the United States. The system uses rooftop cameras and sophisticated software to determine not just order volume but also specific menu choices. If a minivan is waiting in line, the system will make a proactive judgment about how

much food the driver will likely order and relay production instructions to the kitchen. Furthermore, the system will also determine, based upon the type of car waiting in line, if the driver is likely to order a chicken sandwich, a hamburger, or a salad. In one restaurant where the system has been tested, the manager claims that waste has been reduced by 50% and drive-thru wait times have been cut by 25 to 40 seconds per customer (MSNBC). Welcome to the 21st Century postmodern aesthetic of efficiency.

Business "Performance" in a Post-Training World

The ascendancy of the kiosk culture forces an exceptionally acute self analysis onto today's corporations. They must each ask themselves, to paraphrase Theodore Levitt, "what business are we in?" In 1960, Levitt wrote an article for the *Harvard Business Review* in which he posed the famous question, "What business are you in?" He posited that had the railroad industry defined themselves as being in the *transportation* business as opposed to the *railroad* business, they could have continued to grow. But they did not and one could argue that their essential self-definition contributed to their diminished relevancy in today's transportation landscape. Many of today's businesses are facing similar challenges as a result of the kiosk culture's self-service paradigm. What will become of travel agents? How will they survive the threat of the kiosk culture? Is it even possible?

While it appears simplistic on the surface, the answer to the question of "what business are we in" can mean the difference between success and failure. For example, the Eastman Kodak company recently faced this very dilemma. Known primarily as a

film company, Kodak risked becoming irrelevant with the emergence of self-service digital imaging technology. What is a film company to do when faced with the realization that consumers no longer need film at all?

> Kodak and other film companies now sell digital cameras, specifically designed to allow computer manipulation of the image. For decades Kodak relied on selling film as prosthetic memory, encapsulated in their slogan: 'It's a Kodak moment.' Now their executives argue that 'photographs aren't just memories anymore. They are information.' Digital cameras are now competitive in price, if not yet in quality, with traditional film cameras (Mirzoeff 89).

Kodak recognized that film was merely a means to a performance end: capturing an image. If they were in the *image capturing* business, as opposed to the more narrow *film* business, the mechanism by which that outcome is achieved becomes fluid. So Kodak has now redefined itself as an "infoimaging" company. As the Kodak website states: "At Kodak, we have the resources and tools to help you envision the possibilities – and potential – offered through image science and information technology" (Kodak). There is no mention of "film" in Kodak's new self-definition nor in their corporate vision.

It seems to me that companies that define themselves as a means to a transactional end will fare better than those who define themselves more narrowly as the developer of a particular technology or skill set. Technology and its concomitant skill sets are far too dynamic in today's ever-changing postmodern world to maintain indefinite relevance. A film company can only last so long, until the next replacement for film emerges. Yet an imaging company keeps the means fluid to accomplish the same transactional goal of

visually capturing a memory. The corporate self-definition allows the entity to evolve and, if not prosper, at least survive.

Kodak's redefinition of its mission is symptomatic of the performance support paradox. The company is putting the ability to perform the task (capture an image) directly into the hands of the end user. An unfortunate result of this evolution may very well be that, just like the profession of typesetters in the face of electronic word processing, the profession of the film processing technician disappears. However, while the technician employee who operates the film developing equipment may be eliminated, thus eliminating any need for training that employee, the human *remains* at the center of the system. In this case, Kodak is now supporting the *end user/consumer* to achieve a transactional goal. Digital Kodak software allows for far more sophisticated self-service image processing than can be offered by the technician at the corner drug store. In time, the film processing technician will very likely join the ranks of the elevator operator and the typesetter (and possibly the travel agent).

Some may justifiably argue against the ethics of the kiosk culture, particularly those workers displaced by their former customers. However, the ethics can be argued from either side. The displaced worker understandably resents management decisions to implement a consumer self-service model. However, that same management is accountable to a corps of stockholders who have invested their hard-earned money into the company with the expectation that the management will use all legal means to maximize their returns. Not implementing a self-service model could mean forfeiting market share to a competitor and jeopardizing those investors' funds (and possibly even the company's solvency). According to *The Economist*, online self service in the

telecommunications industry can reduce the cost of a single transaction from $7.00 to as little as $0.10. With the financial stakes so high, business leaders have no choice but to consider the implications of a self-service paradigm.

Arguing the ethics of the self-service trend is like discussing whether or not the tide should come in. The financial implications of businesses tapping into the kiosk culture are too compelling to prevent or deny the inexorable rising of the water. Instead, as described earlier in this chapter, workers, and especially corporate training departments, should recognize this trend and, like the former cashier who now acts as a lone service consultant for six self-service registers, redefine themselves and their responsibilities in terms of “knowledge,” not “skills.” Skills are the domain of performance, which is now increasingly achieved via performance support technology.

CHAPTER FIVE:
THE FUTURE OF THE KIOSK CULTURE

> The pervasiveness of self-serve technology represents a cultural sea change, one that has crept up on us, like a real-life version of all those science-fiction films and movies featuring evil machines that take over so gradually that no one notices them until it's too late.
>
> -- Michael McLeod, *Autobuyography*

> Many advances have been made in our understanding of the hardware and software of information processing systems, but one major gap remains: the inclusion of the human operator into the system analysis. The behavior of an information processing system is not a product of the design specifications: it is a product of the interaction between the human and the system. The designer must consider the properties of all the system components – including the humans – as well as their interactions.
>
> -- Donald Norman, *Human Error and the Design of Computer Systems*

As human beings increasingly delegate both physical skills and mental cognition to technology in the face of the expanding kiosk culture, we are left to wonder: just where in the self-service construct does the organic human fit? While the answer may depend upon the context of each individual self-service implementation, there is a potentially dangerous slippery slope that ends in humanity's secondary status to technology. Martin Heidegger famously wrote about this "Question Concerning Technology." In his essay, Heidegger suggests that a threat inherent in technology is the reduction of humanity to a "standing reserve" to be used in technological service. Even Donald Norman acknowledges this inherent risk. He echoes a surprisingly alienated Marxist perspective when he observes that one "problem is that the person becomes a servant of the system, no longer able to control or influence what is happening. This is the essence of the assembly line: it depersonalizes the job, it takes away control, it provides, at best, a passive or third-person experience" (*Design* 197). This is performance support

technology turned upside down, where the person supports the technology rather than the technology supporting the person.

In 1874, Alexander Graham Bell and Clarence Blake constructed a device called the “ear phonautograph,” which captured ephemeral audio such as the human voice in a series of etchings on smoked glass. While the machine was historically important because it visually represented auditory vibrations, it was also notable for a grotesque design that predated Heidegger’s most dire visions. As the mechanism for capturing sound, Bell and Blake used “an excised human ear attached by thumbscrews to a wooden chassis” (Sterne 33). In this case, human beings were literally a “standing reserve,” sacrificing a cadaver’s body part to become a component of a machine: humanity reduced to inventory.

By using performance support technology, whether in a consumer or workplace context, are we being assimilated into a posthuman, cyborg future? Mirzoeff bluntly asks: “in the disorienting world of global culture and electronic technology, what is the human self and what are its borders?” (198) Whenever we use a piece of performance support technology to help us complete a task, remember something, or speed us unnaturally along to premature proficiency, we are using a technological prosthetic to extend human capability. As Freud said, man has

> become a kind of prosthetic God. When he puts on his auxiliary organs he is truly magnificent; but those organs have not grown on to him and they still give him much trouble at times…Future ages will bring with them new and probably unimaginably great advances in this field of civilization and will increase man's likeness to God still more (39).

We are no longer bound by human limitations. With technological support, especially computer support, our accomplishments have already surpassed Freud's hyperactive imagination. But, recalling Heidegger's "standing reserve," who is serving whom? Are we driving the car (Freud's "prosthetic legs") or do we merely exist as the contents for the car to transport? Timothy Taylor asks the question thusly: "To what extent does today's technology diminish human agency? On a larger level, to what extent does technology have the capacity to turn human history into its own history?" (201) In the context of the kiosk culture, we can legitimately ask if we are using a self-checkout register for our own reasons or if we are being used by more powerful agencies in the service of the technology. The answer isn't as simple as it may seem. As already discussed, the rise of the kiosk culture is due to a "powerful nexus of influence," consisting of various sociotechnical actors. Each actor in the network naturally has an agenda for primacy. Mark Taylor speaks to this ambivalence. When discussing

> Freud's prosthetic metaphor, it is no longer possible to be certain whether the machine is the prosthesis of the person or the person is the prosthesis of the machine. As the line between the human and the mechanical becomes obscure, man, in fact, seems to have become "a kind of prosthetic God" (305).

Using common definitions of the term "cyborg," a kiosk interaction could certainly qualify. A label originally created by NASA engineers Manfred Clynes and Nathan Kline in 1960 by combining the terms "cybernetic" and "organism," it has since been adopted by scholars and popular culture alike. Donna Haraway, one of the best-known posthuman theorists, defines a cyborg as "a cybernetic organism, a hybrid of

machine and organism, a creature of social reality, as well as a creature of fiction" (7). Chris Gray claims a similar description for cyborg as "a self-regulating organism that combines the natural and artificial together in one system" (2). Victoria O'Donnell offers the following, consistent with Haraway and Gray:

> The cyborg is a hybrid of machine and organism, a coupling between an electronic or mechanical apparatus and a human being, both a creature of social reality as well as a creature of fiction. Both the signs of the human and the signs of the machine mark the dual nature of the cyborg that is neither purely human nor purely machine. The cyborg is dualistically human and artificial. The cyborg sets the natural body in opposition to the technologically recrafted body and may reform how we think about the social and cultural body including its gender and race (534).

When looked at broadly in this cyborg context, you can see how a case can made that every self-service transaction is an *in situ* cyborg event. The self service ("cybernetic") technology activates when the human being ("organism") inserts him/herself into the transactional process. When the human "plugs into" the mechanical system, the cyborg is born to complete the task. The situated cyborg ceases to exist at the conclusion of the transaction and the human moves on to create another temporary posthuman creature elsewhere.

This cyborg entity created by kiosk and human is, at its essence, a relationship. "The theoretical conception of the cyborg is that it is a metaphor for the relationships between humans and machines in which we both value and fear the power of technology" (O'Donnell 564). The relationship between the organic and the cybernetic determines the

combined cyborg's competence. Performance support technology in a self-service application mediates this relationship, acting as a contextual "party host," introducing one to the other, translating and assisting, performing the role of the interface as described by Stephen Johnson in Chapter One.

Of course, a Heidegerrian threat inherent in a cyborg construct is that humanity will become an afterthought to technology. Human beings, by delegating skills and cognition to machines, will lose essential abilities from lack of use and atrophy. However, there is a provocative flip-side to this fear: what if we're better off without certain abilities? Norman posits precisely this, when he writes that machines can

> enhance human skills sufficiently so that a job that was not possible before, or was possible only for the most highly skilled performers, becomes available to many. Don't these so-called advances also cause us to lose valuable mental skills? Each technological advance that provides a mental aid also brings along critics who decry the loss of the human skill that has been made less valuable. Fine, I say: if the skill is easily automated, it wasn't essential (*Design* 193).

Norman goes on to specifically describe the spell-checking feature inherent in most computer word processing programs, an example of the spectrum of support's intrinsic category of support.

> Do I fear that I will lose my ability to spell as a result of overreliance on this technological crutch? What ability? Actually my spelling is improving through the use of this spelling corrector that continually points out my errors and suggests the correction, but won't make a change unless I

> approve. It is certainly a lot more patient than my teachers used to be. And it is always there when I need it, day or night. So I get continual feedback about my errors, plus useful advice…In general, I welcome any technological advance that reduces my need for mental work but still gives me the control and enjoyment of the task. That way I can exert my mental efforts on the core of the task, the thing to be remembered, the purpose of the arithmetic or the music. I want to use my mental powers for the important things, not fritter them away on the mechanics (*Design* 193).

This is a Darwinian view of technology (without the negative connotations of Mirzoeff's Darwinian analysis of the digital divide included in Chapter One). With the help of technology, humanity is evolving beyond mere "mechanics" to more "important things." In this context, technology is not to be feared, but, rather, used for the betterment of mankind. While this may be a naive perspective, it doesn't make the sentiment any less virtuous.

Really, what choice do we have? It just isn't realistic to simply resist technology and encourage others to actively resist it, as Sven Birkerts and his colleagues advocate. Very few of Ong's primary oral cultures still remain and the idea of rejecting technology wholesale to return to such a state is preposterous. In our modern, techno-centric world, the best we can hope for is to control technology and its agencies, put them to good use, and, yes, perhaps even help mankind improve. Ong himself observed the dawning of a renewed era of orality: a technologically-mediated "secondary orality." Just as it is unrealistic to adopt an extreme technologically deterministic perspective, it is equally

unrealistic to stick our collective heads in the sand and declare ourselves Luddites. Besides, Gray observed that

> the Luddites…were not against all machines. In fact, their struggle against the weaving machines that made factory cloth production possible were in defense of an earlier generation of machines that had allowed the growth of a thriving cottage industry that produced the same goods. Tools are here to stay, machines are here to stay. The real issue is which tools, which machines, which cyborgs we will have in our society and which will be excluded or never created (6).

Self service technology may indeed be here to stay. But that doesn't mean that we as the organic half of the cyborg should accept a role secondary to the cybernetic half. As performance support technology's reason for existence, the machine must support the human.

Considering the Kiosk Culture

So, is performance support technology really capable of helping us in truly meaningful ways, beyond the simple convenience of an ATM transaction? Yes…and no. Certainly smart car technology, both as currently implemented and as envisaged for future automobiles, drastically improves driving safety, preventing accidents and saving lives. We are also less vulnerable to car thieves. Police departments from Los Angeles to Miami are testing a car-mounted digital license plate reader that automatically reads and processes up to 240 license plates per minute in a continual hunt for stolen vehicles.

Using intuitive camera/software technology (akin to the HyperActive Bob drive-thru system), the systems have significantly increased the number of stolen cars identified and recovered—a job formerly done manually by patrolling officers. During one test in Los Angeles, police identified 17 stolen cars in a shopping mall parking lot in just a few days, resulting in six arrests. We can understand how this is another example of postmodern, performance-support-enabled efficiency when we consider that patrol officers currently receive a special award if they can catch six car thieves in an entire year (Downs). As discussed in Chapter Three, a case can be made by some that artistic performance support is beneficial for humanity, allowing more of us to reach for loftier artistic heights. And certainly, the numerous advances in medical technology have very tangible benefits for all of us.

Yet, while this may all be true, at its core the kiosk culture is still about efficiency. This is as true now as it was for Charles Saunders when he designed the self-service structure of his first Piggly Wiggly store. And this efficiency had as much of an impact on the service employees of Saunders' store as it does on the displaced airline ticket representatives, gas station attendants, and film processing technicians of today. We can see a very familiar example in our collective telephonic past. Just a generation or two ago, the only way to make a telephone call was to contact an operator, who placed the call for you. The average telephone user was unable to use the telephone without the direct mediation of this operator. However, with the introduction of a self-service paradigm to telephony, the operator profession did not disappear—like today's bank tellers, it transformed into a knowledge-based consultative role.

With any technological influence as widespread as self-service, there will surely be cultural implications. Like the tide coming in, self-service telephony was an unstoppable development, due in large part to the societal pressures of the time. Carolyn Marvin remarks on these pressures in the following passage:

> Despite energetic efforts to limit nonsubscriber use by threatening to remove instruments, by installing pay telephones, and by issuing tickets to nonsubscribers, to be surrendered to rightful subscribers call by call, emerging networks of telephone sociability undermined every effort to make the telephone restrictive and inegalitarian (107).

In this case the unanticipated social aspect of telephone usage made its universal accessibility certain. The cultural democracy both afforded and supported by the telephone was more powerful than the forces aligned to resist it. Brian Winston contends that under the "law of radical suppression," all revolutionary technologies must endure an extended period of societal resistance, that what may seem like a sudden acceptance was actually a long-germinating movement that has finally emerged from its chrysalis. Despite attempts to suppress the new technology of telephony, its radical impact could not be suppressed. Like the failed attempts (discussed in Chapter Three) of the cultural elite in the late nineteenth and early twentieth centuries to limit photography to only certain segments of society, the cultural pressures during the same period regarding telephony created a powerful nexus of influence that led to its eventual democratization. It could not be denied.

Telephony was and remains a key driver of technological innovation, including innovation directly related to the kiosk culture. The self-service kiosk culture manifested

itself in the world of telecommunications as early the middle of the twentieth century, when we abandoned switchboard operators for self-service point-to-point connections. Now we have evolved from an operator-mediated experience to a self-service experience to today's technology-mediated experience, even if we aren't directly aware of the transparent technological support helping us.

For example, Capital One Corporation, a major provider of consumer credit cards, has developed an automated call center answering system that supports consumers in their desire to reach the right information (or person) in the shortest amount of time. The company knows that approximately ninety percent of all incoming consumer calls fall into one of ten categories. After analyzing call patterns, Capital One then implemented a complex software and hardware system that (like the predictive HyperActive Bob technology) actually predicts the reason for your call before the company even answers the phone, and then instantly routes you to the appropriate information or representative.

Your incoming phone number is all Capital One needs in order to recognize you, review data about your account (did you just receive a promotional mailer; a notice about an overdue payment; a replacement card?), analyze the data, route your call, and identify additional products or services you might be likely to purchase. This is all accomplished in one-tenth of a second, before the phone can even be answered, before the phone even rings. Amazingly, the accuracy rate of the system is up to 70%. Even more amazingly, customers are happier:

> A phone call that might have taken 20 or 30 seconds, or even a minute, now lasts just 10 seconds. Everybody wins…And the system just keeps getting smarter. Do you routinely call from your boyfriend's phone—the

> number for which is not on file at Capital One? Eventually the computer will figure out that his number should be associated with your account. If you call to close your account, you'll encounter a subtle measure of what Capital One thinks of your business—because the system will do a real-time analysis of your value as a customer. People worth keeping are routed to a live agent…People whom Capital One is not unhappy to be rid of are routed to a voice-response unit and allowed to close their account using their Touch-Tone phone. Meanwhile, more capabilities are in development. For example: The system will learn what language each customer prefers to do business in and then route calls accordingly (Fishman *Marketing* 204).

This is a concrete example of Norman's invisible computer of the future. As telephony has been transformed by transparent performance support technology, so too are other industries being transformed, including retail, financial services, restaurants, hospitality, human resources, photography, healthcare, gaming, and travel. Nowhere is this transformation as dramatic as in the airline industry. According to Northwest Airlines, in 2001 20% of their passengers checked themselves in. In 2003, 70% of passengers checked themselves in (Fishman, *New Machine* 92), with that number only growing. Northwest already offers self-service kiosks in more locations than any other airline with 934 kiosks in 198 airports worldwide (SmartTravelNews). The airline EasyJet achieved a first in June 2004 when all passengers on a single flight checked in via kiosk (Goodwin).

So what is the future of the kiosk culture? Where is it going? The kiosk industry maintains a fairly objective watch on individual self-service developments (Figure 21), tracking application development maturity along the Gartner Group's hype cycle model, which consists of the following categories: Technology Trigger, Peak of Inflated Expectations, Trough of Disillusionment, Slope of Enlightenment, and Plateau of Productivity. By examining this data, we can see that technologies such as ATMs have achieved a "Plateau of Productivity" while assisted shopping and patient self-service have just emerged on the self-service radar screen. We can predict the next major developments in specific self-service applications by examining the hype cycle.

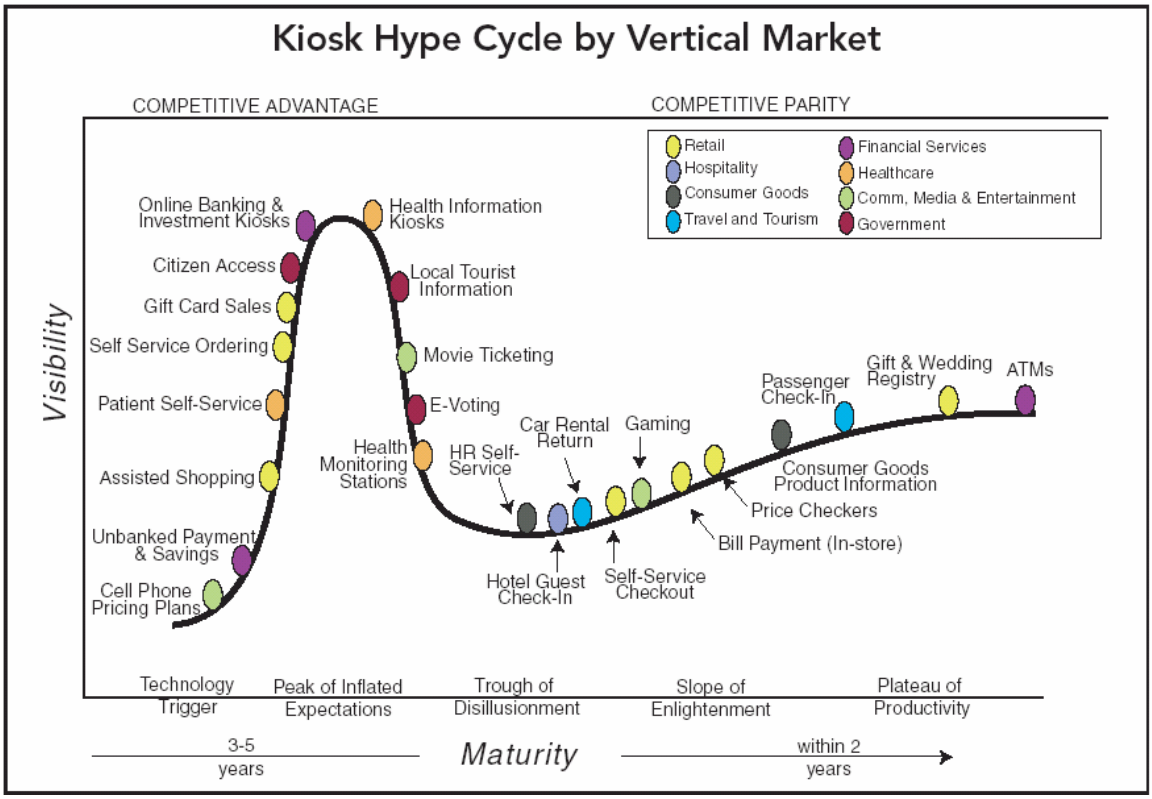

Figure 21. Kiosk Hype Cycle
Source: Gartner, 2005
Used with permission.

Stepping back a bit, looking at the broader self-service environment as addressed in this dissertation, an area where the kiosk culture seems poised to explore is augmented reality. Generally speaking, augmented reality, or AR, is a technology that "allows the user to see the real world, with virtual objects superimposed upon or composited with the real world. Therefore, AR supplements reality, rather than completely replacing it. Ideally, it would appear to the user that the virtual and real objects coexisted in the same space" (Azuma 356). Rudimentary AR is currently being applied in a variety of disciplines, including medicine, entertainment, and manufacturing. The military is investing heavily in AR research. Where the military is currently testing aircraft pilot helmets that display targeting, ordnance inventory, flight, and other data directly onto helmet visors, it's a short leap to see how that technology could be applied to average consumer automobiles with safety, mileage, speed, and other data projected directly onto the interior of a vehicle's windshield. We haven't yet scratched the surface of AR capability. By adding or removing objects from the actual physical environment, by seeing through walls, by guaranteeing wayfinding/navigation, by enhancing sensory perception, by embedding processing directly into the organic body (in a true cyborg vision; the MIT Media Lab has entire internal organization dedicated to wearable computers), plus any number of other potential applications as yet unimagined, augmented reality has the potential to revolutionize the concept of performance support technology. How that will impact the self service kiosk culture remains to be seen, but history has taught us that when technology enables us to do things we previously needed trained humans to do, we will overwhelmingly migrate to the self-service option.

However, while certain professions (elevator operators, typesetters, film processing technicians) may disappear due to this continual sociotechnical evolution, thus eliminating the need to train workers in those professions, the post-training era does mean that it will be a no-training era. Post-training refers only to human-machine interaction. As performance support technology becomes increasingly transparent and focused on supporting the end-user rather than the employee, we will continue to need less and less instruction on how to use technology. Yet, as discussed in Chapter Four, there will always be a need to educate (yes, even "train") people in a host of knowledge and relationship areas. Formal instructional strategies will still be employed. Workers will still need education on knowledge-based topics such as organizational history, product specifications, procedures, and processes. They will still need regular contact with other humans in order to learn how to interact with customers, co-workers, superiors, and subordinates. This is best accomplished in a traditional classroom setting where role playing and discussion can be properly employed. Such instruction should always have a place in the global corporate culture.

It's also important to recognize that performance support technology is far from a performance panacea. A few areas where electronic performance support is likely not the most effective solution are "ethics, customer service, leadership, time management, sales, product knowledge, and many management-supervisory skills" (Tracey). According to Tracey, the types of activities that *are* most appropriate for an electronic performance support system are those that exhibit observable physical or verbal behavior, contain tasks for which there is a known right/preferred way to perform, where the content is stable, where the procedure is sequential, when tasks are particularly complex and

difficult to remember, when performers are not closely supervised, and when performance mistakes are unacceptably costly to finances, equipment, or human safety. These selection factors related to performance support technology should remain applicable—perhaps even more so—in a post-training era.

Additionally, even when performance support technology can compensate for a novice's lack of ability, there are plenty of instances in which we should still require training. Electronic training, especially in the form of simulations, will still be necessary for proficiency improvement in technological skills, particularly where safety is concerned. For instance, although transparency may be achieved in aviation—allowing a novice to successfully pilot an airplane with no previous instruction—we should hope that a certain level of proficiency be required of learners through extensive simulation-based training before being handed the controls of a passenger jet.

The reason why such training is still critical in a post-training environment is the same reason that we need not fret too much about the techno-centric threats of the kiosk culture. Unlike automation, which is implemented precisely to eliminate humanity from a process, self-service by definition retains humanity as the epicenter of its process model. While the two may share a similar technological lineage, performance support technology is most definitely not automation. Performance support technology must have someone to support. Recall the elevator example from Chapter One: while a self-service paradigm may have eliminated the elevator operator profession, the human passenger is still the key actor in the sociotechnical network. Without the human, the elevator is no more than an inert mechanical box. In an existential context, as a *raison d'etre*, the elevator needs the human more than the human needs the elevator.

Conclusion

Ultimately, as with any technological development, we will each have to make our own meanings for the kiosk culture and its societal impact. Is it good? Is it bad? How will performance support technology and the self-service paradigm it enables change and be changed by society at-large? Marshall McLuhan presciently observed in 1964 that:

> The message of any medium or technology is the change of scale or pace or pattern that it introduces into human affairs. The railway did not introduce movement or transportation or wheel or road into human society, but it accelerated and enlarged the scale of previous human functions, creating new kinds of cities and new kinds of work and leisure. This happened whether the railway functioned in a tropical or northern environment, and is quite independent of the freight or content of the railway medium. The airplane, on the other hand, by accelerating the rate of transportation, tends to dissolve the railway form of city, politics, and association, quite independently of what the airplane is used for (8).

The proliferation of self-service technology, enabled by transparent performance support, is no different from McLuhan's transportation example. It is stretching from coast to coast, across oceans and languages—moving through business, medicine, and the arts—irrevocably altering our collective cultures as it travels. As James Carey wrote, "Culture as a system of construed meanings changes in relation to other cultural objects such as technologies and economic practices" (11). The kiosk culture changes and is changed by the wider cultural world.

The kiosk culture has already been assimilated into our daily lives. We no longer think twice when withdrawing money from an ATM, ordering a book on an internet site, or pumping our own gas—except in New Jersey and Oregon, where self-service gas stations are still illegal. But they may not remain illegal forever. The "powerful nexus of influence" has finally reached them. On April 27, 2006, New Jersey governor Jon Corzine announced a proposed pilot program to experiment with self-service gas stations along the NJ Turnpike, ostensibly as a reaction to record-high gasoline prices (McAlpin). The proposal was met with passionate supporters and detractors on both sides of the political aisle and was eventually defeated under intense political pressure. However, the very fact that New Jersey has even considered loosening its anti-self service gas laws points to the impact of the kiosk culture. And, if the New Jersey pilot program is ever resurrected, I suspect that it is only a matter of time before the rising tide of the kiosk culture washes beyond the confines of garden state, eventually overtaking the shores of Oregon, which would be the last state to prohibit self-service gas stations.

After all, as Timothy Taylor writes: "Technology, however awe inspiring or anxiety producing it may seem to be upon its introduction to the realm of human social life, quickly becomes part of social life, naturalized into quotidian normality as it helps people do things they have always done: communicate, create, labor, remember, [and] experience pleasure" (206). Performance support technology and self-service applications are no different. They have been absorbed into our quotidian existence like McLuhan's airplanes, leaving us to examine not only how that occurred but why, and forcing us to define just what it means for each of us. Whether employee or consumer, artist or dilettante, technophile or dystopian, determinist or volunteerist, displaced worker or

corporate stockholder, the kiosk culture effects the daily rhythms of our lives, and will continue to do so as we progress further into the postmodern global society of the 21st Century.

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