

**A REFLECTIVE ACCOUNT: EXPLORING THE NATURE OF WEB-BASED
INSTRUCTIONAL DESIGN BY A PRACTICING TEACHER**

by

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ABSTRACT

Technology has become a fundamental yet dynamic component of modern society, affecting almost every structure within it. However, education has been slow to change relative to the acceptance and use of technology in teaching and learning contexts. This research seeks to begin to bridge this technological chasm by examining what considerations a teacher instructional designer needs to be mindful of when designing a substantial Web-based learning resource. The researcher employs a qualitative methodology through the compilation of field notes and narratives describing the experiences and observations of a classroom teacher employing the ADDIE instructional design model to develop a Web-based learning resource for two high-school level Marketing courses. The researcher has maintained a unique triad of professional roles throughout this project, including teacher, instructional designer, and researcher. The findings of this research emphasize the interrelationships between the three key conceptual areas: reflective practice, instructional design, and Web design.

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1. THE RESEARCH CONTEXT

The world is changing. The industrial age is quickly disappearing over the horizon, giving way to a new information age. Although seemingly every aspect of modern society is and has been revolutionized by the technologies inherent in this information age, education has not yet been as significantly affected (Albirini, 2007). Why is this? One recent argument proposes that education, as a societal construct, has not engaged in the paradigmatic shift required to revolutionize its processes in the way that facilitates a culture of technology similar to that found in the greater society (Albirini, 2007). Instead, educational directives have sought to insert technological efforts into the existing industrial age model of teaching and learning. So the world outside the classroom is changing rapidly, but educators have yet to recognize the need for, let alone initiate the processes of, radical change within the classroom.

“Teaching techniques that have worked for decades may no longer work as well; in some cases they may not work at all” (Pence, 2007, p. 355). One reason suggested for this assertion is the fact that students today have been changing together with the culture of technology that they exist in, but the educational system was not designed for this ‘type’ of student (Prensky, 2001). Prensky labels students of today as ‘Digital Natives’, saying that they all speak the native language of technology. On the other hand, he refers to educators as ‘Digital Immigrants’ in the sense that they need to learn the digital language, and often do so in a way that attempts to incorporate it into preexisting paradigms. For Prensky, the key ailment for education today is the fact that the Digital Natives and the Digital Immigrants are not communicating – they are speaking different languages.

Consider the example of the use of the Internet in teaching and learning situations. The old industrial age paradigm used by educators is characterized by the use of the Web only as a source of content; whereas the information age paradigm defining modern society is characterized as a myriad of communities creating and sharing ideas (Pence, 2007). Educators are encouraged to dispel the industrial-age myth that all teaching and learning must be characterized by: top-down management, teacher control, textbook authority, hierarchy, competitiveness, individualism, structured classroom, linearly structured activities, discipline, lecturing, knowledge banking, uniformity, locality, and face-to-face interactivity. Instead, they are encouraged to adopt the information age characteristics of: democratic learning, decentralized instruction, a reorganization of instructional material, an increased access to multiple information resources, the removal of hierarchies in communication and interaction, enhancing students' collaboration and exploration, and the obliteration of the stringent structure of the classroom (Albirini, 2007). Such radical change may be simply out of reach for the individual classroom teacher, but there are steps that could be taken in the right direction.

First, teachers must recognize that technology itself changes too fast to attempt to 'learn' it in the manner used for other knowledge structures in the industrial age paradigm. Students of today will always have greater technological knowledge than their educators (Prensky, 2007). Instead, teachers are encouraged to collaborate with students regarding the technological skills required, leaving the teacher to do what they do best – design instruction. Second, teachers need to learn about and understand more of the culture their students live in, to learn something of the technologies, but mostly to learn about their students – the object of all of their educational efforts. The remaining discussion in this chapter will present this

culture in some detail, first from a macro-cultural perspective, then from a micro-cultural perspective, and finally from the specific context of this research effort. This will establish the context in which this research endeavor is framed by, and therein set the stage for a discussion of the specific research assumptions, culminating in a description of the prime research question.

Technology in Education – a Macro-Cultural Perspective

To more clearly understand the role of technology in education from a cultural perspective, one must examine the cultural context in which technology and education coexist, both from a macro and micro perspective. Considering first the macro perspective, arguments made by Nicholas Negroponte in *Being Digital* (Negroponte, 1995) and Neil Postman in *Technopoly* (Postman, 1992) are presented as an overview to assertions in support of and in opposition to the growing presence of technology in society as a whole. Although not definitively dichotomous in their opinions of technology and its prevalence in modern society, authors Nicholas Negroponte and Neil Postman do clearly paint opposing pictures of this complicated vista of society. Consider first the more optimistic position ‘in favor’ of technology in society as presented by Nicholas Negroponte.

Nicholas Negroponte was the founder and director of the Media Laboratory at the Massachusetts Institute of Technology. His efforts there are indicative of his drive to realize the application of various novel ideas through information technology. In *Being Digital* (Negroponte, 1995), Negroponte proposes an optimistic view of future society – at least as far as the role that technology will play in it. Most of this book presents something akin to futuristic predictions of what technology, and society through it, might look like in the not too distant future.

He organizes his ideas in this book towards this end into three main sections: “Bits are Bits”, “Interface”, and “Digital Life”. In the first section, “Bits are Bits”, he employs a genetic metaphor to describe future life as foundationally constructed, not by physical atoms, but by digital ‘bits’. The exponential growth in the speed and capacity of technological hardware will culminate in a greater sense of empowerment for consumers of technology. That is, greater capacities for data will permit consumers to select, not only what bits they will receive, but also what form these bits will take (print, audio, video, etc.). Such empowerment is Negroponte’s single most significant assertion, suggesting that a future power shift away from machine and towards the user will occur as technology advances and evolves.

The second section of his book, “Interface”, relates Negroponte’s ideas relative to specifically how technology might be used in the daily lives of consumers. He suggests that the increasing user control over digital information used will create a need for further evolution in the interface between IT appliance and user. Future computers, he postulates, will allow users to interact with them from ‘beyond arm’s length’, through artificial intelligence, voice recognition, user eye tracking, etc.

Section three, “Digital Life”, is one where he proposes a variety of possibilities regarding what our global lives may be like in the future, mostly because of technology. Although this section consists of a variety of ideas, his fundamental theme here is that future technology, and therefore society with it, is less restricted by space and time than previous societies have been. Globalization, cooperative endeavors, decentralized commerce, and educational opportunities that are more flexible to varied learning styles and behaviors, are all descriptors of our future with technology.

It is clear from this collection of ideas that Nicholas Negroponte has optimistic views of future technology and society with it. However, at the end of the book he does present several potential ‘challenges’ that his technological future presents. One of these is the increased potential for the abuse of intellectual property. Another suggests that digital theft, piracy, and privacy issues will become more prevalent. Finally, although he suggests many positive benefits of increased technology use in society, he does admit that it clearly does not have any power to facilitate a resolution to the more complex societal issues such as hunger, and other life or death issues. Notwithstanding these few challenges, Negroponte’s perspective on technology and society is a positive one – one that supports its growth and use in a variety of societal applications. The same cannot be said about Postman’s perspective.

Neil Postman’s perspective on technology in society is somewhat dichotomous. On the one hand, he admits that technology is a ‘friend’, yet the premise upon which his book is based is that technology is actually more of an ‘enemy’ to society. As an observer and critic of media and culture, he has spent much effort studying media and society, therein providing an interesting perspective to these issues.

Several dominant themes are apparent in Postman’s writings in *Technopoly*. The first of these is his argument that culture is subservient to technology (either visible or invisible) – and not the other way around. For this reason, he warns that it is necessary for societal members to be aware of what technology can do, both positively and negatively. This is possible by having ones ‘eyes open’ rather than continuing in blind acceptance. Postman’s view on the impact of technology in society is so wide-spread, that he goes so far as to assert that, “New technologies alter the structure of our interests: the things we think *about*. They

alter the character of our symbols: the things we think *with*. And they alter the nature of community: the arena in which thoughts develop” (Postman, 1992, p. 20).

Another key theme for Postman is his notion of ‘technopoly’. A technopoly, to Postman, is a type of culture that seeks its authorization in technology, finds its satisfaction in technology, and takes its orders from technology. He defines modern Western society as a technopoly, partly because of the constant massive flow of information present in it; and partly because of the disintegration of the historical information control mechanisms (schools, family, religion, politics, and the state). To Postman, “The milieu in which Technopoly flourishes is one in which the tie between information and human purpose as been severed, ie. information appears indiscriminately, directed at no one in particular, in enormous volume, and at high speeds, and disconnected from theory, meaning, or purpose” (Postman, 1992, p. 70). According to Postman, this is the current status of modern Western society.

Finally, Postman argues that there may be some remedy for our technopoly culture. Education, he asserts, is the weapon of choice to lead the battle against this digital enemy. The preparing of ‘loving resistance fighters’ is necessary to restore some sense of meaning and purpose in society – meaning and purpose previously lost to the technopoly. He presents ten attributes defining a ‘loving resistance fighter’, summarized as someone who, “...maintains an epistemological and psychic distance from any technology, so that it always appears somewhat strange, never inevitable, never natural” (Postman, 1992, p. 185). Although he does not suggest that such resistance fighting would stop or even change the culture of technopoly, but he does present his hope that it would at least stimulate some

serious discussion on this issue, with at least the possibility of modifying this cultural direction.

Nicholas Negroponte and Neil Postman, although not direct antagonists in their arguments related to technology and society or culture, they do argue towards different macro level directions, with one key exception. Both authors are clear in their acknowledgement that technology has become a defining element of modern society. This is a key element of this discussion because technology cannot be extrapolated as a distinct defining characteristic. Instead, it must be considered as part of a greater whole – the whole of society. When examining technology as an aspect of education, it must be then considered from a societal or cultural perspective in order to most clearly understand its position and influence.

The above discussion regarding technology and the macro-culture is not alone sufficient to help one understand what role that technology ought to play in education. It is also necessary to focus on more specific aspects of society such as specific micro-cultures. For this reason, the discussion continues with a look at the specific micro-culture that defines the end-users of the instructional design product developed for this research - the ‘net generation’.

Technology in Education – a Micro-Cultural Perspective

Don Tapscott, in his book *Growing Up Digital*, suggests the existence of a culture specific to Net-Geners (Tapscott, 1998) – young people growing up in the ‘net generation’. This unique culture is said to consist of the following ten common themes: fierce independence, emotional and intellectual openness, inclusion (social inclusion rather than exclusion through technology), free expression and strong views, innovation, a preoccupation

with maturity, investigation, immediacy, sensitivity to corporate interest, and authentication and trust. He argues that the youth of today feel empowered by the technology around them, yet he proposes that the ten defining themes of N-Gen culture are in fact products of the technology that operates within the greater culture.

The Net Gen has been further observed as having other defining characteristics. Oblinger & Oblinger (2005) propose that this modern youth culture demonstrates ten characteristics. First, they are digitally literate. Their unprecedented access to technology in a variety of forms has facilitated an intuitive working knowledge of a variety of technological tools. Further, they are visually literate; able to comprehend and make use of a variety of forms of data (text, video, audio) in meaningful ways. Second, these young people are connected. They have seized the networking capabilities of technology, and are maximizing its application. The third characteristic is the immediacy of their expectations. They have become accustomed to sending and receiving information at break-neck speeds. Fourth, Net-Geners are experiential, preferring to learn by doing, rather than being instructed. Next, they are a social culture. “They seek to interact with others, whether in their personal lives, their online presence, or in class” (Oblinger & Oblinger, 2005, p. 2.6).

A sixth common attribute of Net-Geners is their frequent preference for teamwork, whether in work or learning situations. Seventh, many young people today prefer structure over ambiguity. Such youth are achievement oriented, and are thus interested in knowing what it takes to achieve their goals. Next, the Net-Gen individual values engagement and experience, displaying preferences to inductive discovery and interactivity. Ninth, they are adept at, and seemingly more comfortable, with information transfer of a visual and/or kinesthetic nature. This becomes apparent when observing Net-Gen youth displaying higher

levels of comfort with image-rich environments in comparison to text only. Finally, this generation values involvement in things that matter. These young people believe they can make a difference through their involvement in community or societal issues.

Researcher Jason Frand offers a companion list of attributes of the current ‘information-age’ mindset common among the net generation (Oblinger, 2003). Although similar to the previous list of descriptors, it offers a slightly different perspective. Frand purports that ten common attributes of the net generation include the following: computers aren’t technology, the internet is better than TV, reality is no longer real, doing is more important than knowing, learning more closely resembles Nintendo than logic, multitasking is a way of life, typing is preferred to handwriting, staying connected is essential, there is zero tolerance for delays, and the lines between creator and consumer are blurring.

Therefore, one can see that there appears to be common themes woven throughout Net-Gen culture, regardless of from which author they originate from. Technology is one of the most prevalent influences upon young people today, manifestations of which are observable in a variety of contexts and activities. But what does all of this talk of technology and culture really mean, and does any of it translate into improved learning for students?

Technology in Education – Learning Benefits?

The effectiveness of the use of technology in improving student learning has been widely researched, with mixed results (Bielefeldt, 2005; Schacter, 1999). Some theorists have suggested that the application of technology in education facilitates improved student performance provided that it is supportive of and congruent with intended learning objectives (Cradler, McNabb, Freeman, & Burchett, 2002). This opinion has become so pervasive in education that standards have subsequently been developed that establishes a minimum level

of teacher and student proficiency in a variety of technological skills (ISTE, 2000a; ISTE, 2000b). However, it has also been suggested that educators have rushed to implement specific new instructional technologies without the justification of substantive empirical research (Kerr, 2005; Palozzi & Spradin, 2006). Notwithstanding the complexity of this issue, the role of technology in education must, as with other pedagogical and contextual elements, be designed to improve student-learning performance rather than exist simply for its own sake (Wiske, n.d.). Although the plethora of research on the integration of technology in teaching and learning initiatives has not produced definitive results, a number of specific benefits and criticisms of technology use, as well concerns regarding research methodology have been identified.

A number of benefits to student learning arising from the integration of technology into teaching and learning activities have been identified in literature. For example, from a global perspective, a meta-analysis of 42 studies regarding technology use in education suggests positive learning effects from technology, and that “the overall effects of technology on student outcomes may be greater than previously thought.” (Waxman, Lin, & Michko, 2003, p. 15). Other more specific positive learning gains have also been identified in the literature. First, the specific multimedia capabilities of much educational technology encourages improved student learning (Mayer & Moreno, 2003). Second, it has been suggested that constructivist teaching and learning activities are best supported through the use of various technologies (Wilson & Lowry, 2000). The third specific benefit to student learning relates to the multi-sensory delivery aspect of technology and its ability to facilitate a variety of preferred student learning styles (Jordanov, 2001). Fourth, Wilson & Lowry (2000) concluded that Web-based instruction in particular provided students with three key

learning benefits including: access to rich data from the Web, the prevalence of meaningful user interaction with Web content, and the support of student collaboration and cooperation.

The fifth and sixth benefits to student learning arising from technology integration include increased student self-expression and active learning (Apple Computer Inc., 1995), while also stimulating and facilitating critical thinking (Jonassen, 2002). Seventh, encouraging and developing skills of cooperative learning among learners arising from technology use has been reported (Laird & Kuh, 2005). The eighth benefit is the general improvement in students' communication skill development through the use of various technologies (Williams, 2005). Ninth, student understanding of multicultural issues and global diversity is encouraged as technology is used to promote true 'global' learning (Marshall, 2001). The individualized learning capabilities have been suggested as another benefit to student learning as these empower students with more control over their learning (Edmonds & Li, 2005). Finally, it has been argued that technology improves student motivation towards learning by making learning more relevant and exciting (Ringstaff & Kelley, 2002).

Although the above presentation of some of the key benefits to student learning arising from the employment of various technologies, this list is by no means exhaustive. Instead, it represents only some of the specific benefits. However, it is important to note that existing literature has also suggested a number of negative elements arising from the use of technology in teaching and learning activities.

Understanding that much of the research thus far conducted on this issue has resulted in mixed support for technology use in education, it is important to consider that the first criticism often leveled against this use of technology is simply that it does not demonstrate

consistent student learning gains (Paley, 2007). Although there have been some studies that have concluded that using technology for learning actually results in negative learning compared to more traditional teaching methods (Crain, 1994; Hilton & Christenson, 2002), most of the criticisms against technology take a more macro level perspective. For example, Richard Clark makes the argument that, not only is there no identifiable benefit to student learning from technology, but that any number of other teaching vehicles could in fact accomplish the same learning goals (Clark, 1994). Further, the continual emphasis on the deployment of various technologies in education has not resulted in either teacher or student productivity gains or any real transformation in either teaching or learning (Cuban, 2001). Cuban argues that his research has concluded that the presence of technology has had no effect on education, demonstrated by the fact that computers are still used primarily for communication or administrative tasks instead of for learning activities.

Another critic of technology in education is Todd Oppenheimer who, makes the argument for a number of negative consequences of the expanded use of technology in education (Oppenheimer, 1997). In his argument, he also agrees that technology does not provide any learning gains, but he further suggests that technology use actually decreases students' creative and critical thinking abilities. Physical problems such as eye, back, and wrist strain are also directly attributable to increased use of computers in classrooms. He further argues that subjecting young learners to the 'chaos' that is the World Wide Web invites a host of dangers inherent in such an unregulated atmosphere. Oppenheimer argues that students' learning as well as their existence in general is negatively affected by technology in that technology use decreases the child's awareness of the 'real' three dimensional world, while fostering an unnatural acceptance of the 'virtual' two dimensional

cyber world. Oppenheimer's conclusion regarding technology is summed up in his suggestion that the focus on technology in education is akin to teaching students 'tools' rather than teaching them how to use the tools.

The final critique of technology in education is that offered by the Alliance for Childhood in their document entitled *Tech Tonic: Towards a New Literacy of Technology* (Alliance for Childhood, 2004). The overriding theme of this argument against the growth of technology in education and society is the need for acceptance and enactment of a clear vision of what role technology should play in the education and lives of children. Such a vision is represented in their proposed definition of 'technology literacy', stated as, "The mature capacity to participate creatively, critically, and responsibly in making technological choices that serve democratic, ecological sustainability, and a just society." (Alliance for Childhood, 2004, p. 4). Without such a vision, the negative impacts of technology such as the loss of 'childhood' (sense of play, freedom), decreased creativity, increased obesity, decrease in face-to-face relationships, and the avoidance of real human issues will continue to plague children.

The remedy for these technologically-induced ills is represented in a list of ten recommended guiding principles intended to develop a new and more socially conscious technology literacy (Alliance for Childhood, 2004). The first principle is to slow down and honor the developmental needs of children. Second, with respect to adolescents, teach technology as social ethics in action, with technology in a supporting role. Next, it should be emphasized that relationships with the real world come first before technology. The fourth principle asserts that technology is not a destiny, given that its design and use flow from human choices. Fifth, the boundaries of technology use are emphasized in that choice

implies limits, including the option to say ‘no’. Those affected by technological choice deserve a voice in making those choices is the sixth suggested principle; followed by the seventh which is an exhortation to use tools and technologies with mindfulness. The eighth principle exhorts stakeholders to first become technologically literate before teaching technology literacy to students. Next, they urge caution through the precautionary principle – erring on the side of caution when uncertainty exists. Finally, their position focuses on life in general when proposing ultimate respect for the diversity of life in all its forms.

It can be seen that the above discussion regarding the perceived benefits of the use of technology for teaching and learning is indeed contentious, on a variety of levels. However, this is the reality of the technology influenced societal and educational context of modern society. The specific context of this research project operates within this technological society as represented by the previous discussions of technology in the macro-culture, the micro-culture of the Net Generation, and the classroom.

Specific Research Context

The specific research context for this project takes place in a public high school with a student body of approximately 1700 students. The school is one of 41 schools in a school district consisting of some 21,000 students serving a community of approximately 150,000 residents. This particular school district has embraced the integration of technology into education in a variety of ways. One recent initiative has been the iLearn project that has the district providing the free use of notebook computers for each student in the middle school grades. Within the next couple of years, all middle and high school students and their teachers will be provided with a free notebook computer to use for their teaching and learning activities.

More specifically, this research endeavor takes place in a computer-lab classroom. The lab consists of 30 networked personal computers, of approximately 400 available in the school, and are loaded with a variety of productivity software, including: Microsoft Office, Macromedia Web design suite, Internet Explorer, and communications software. Other technological tools available in this room include a digital projector, SmartBoard, TV, and VCR. Although not specifically stored in this classroom, students in this school also have access to digital still and video photographic equipment. Outside of this classroom, students in this school have access to the following other types of specific technologies: computer animation lab, CAD lab, digital video-editing suites, computer-assisted design lab, and various print graphics tools.

The two classes during which this research was undertaken include the Marketing 11 and Marketing 12 classes. These courses run on a linear timetable, where class is held in the computer lab for 1.25 hours every second school day. Students have four classes per day, and the order of the classes rotates each day. This means that classes will occur in various blocks of time, rotating through first, second, third, and fourth periods. Further, the Marketing 11 class had an enrollment of 24 (13 female, 11 male), while the enrollment for Marketing 12 was 17 (6 female, 11 male).

The earlier discussion regarding the nature of the particular Net Generation micro-culture is indicative of characteristics of the students enrolled in Marketing 11 and 12. These students were all typically very comfortable using technology of any sort. For example, the vast majority of them owned and made daily use of cellular phones and digital music players. These students also used the computers in the classroom on a daily basis, and even those two or three students professing to be somewhat unskilled with personal computers used them

without much hesitation. All students in both classes used computers to complete at least part of every student activity in their respective courses. These courses were never about teaching students how to use technology; but rather they were about achieving the prescribed learning outcomes using various technological tools. Overall then, one can regard the students involved with this research project as being indicative of the previously described macro and micro cultures in terms of their attitudes towards and use of technology in their lives.

Research Assumptions

Considering the above discussion regarding the general and specific contexts in which this research project was conducted, there are several specific assumptions that need to be stated. First, it is assumed that the use of technology benefits student learning. This notwithstanding the contradictory arguments made in the literature. Second, it is assumed that students, at least for the most part, enjoy using technology for learning activities. Students still vary significantly in their level of technological skill and comfort level, but are generally engaged with activities employing technology. Even more specifically, students enjoy using the Web for learning activities. Third, teachers may improve their professional craft through the application of known principles of instructional design (ID), discussed in some detail in Chapter 2. Finally, it is assumed that teachers practicing reflective strategies will develop professional insight of their own knowledge and skills not accessible without such reflections. Again, reflective practice is presented in significantly more detail in Chapter 2.

Research Question

The purpose for the wide scope of the earlier discussion regarding technology in society and education is to establish the significance of this context to the specific focus of this research. This research seeks to identify how the perceived technological and learning chasm can be bridged between Digital Natives and Digital Immigrants in one specific area, instructional design. More specifically, this research seeks to identify key elements of the ID process that may inform teachers' practice and facilitate the design of more effective teaching and learning environments for the Digital Natives. The research question may be summarized as, *what considerations does a teacher instructional designer need to be mindful of when designing substantial Web-based learning resources?*

The methodology used in this research has been a qualitative one – specifically, a narrative inquiry into an ID process. The researcher has employed an instructional design model in a reflective manner to develop a Web-based learning resource for two secondary school level Marketing courses. The reflective process is evidenced through the compiling of field notes of observations and experiences throughout this ID process. These field notes represent the raw data gathered during the ID process. Then, once the reflective process of the field notes was complete and the raw research data thus obtained, a written narrative was prepared to summarize the data. The narrative pieces complete the set of gathered data. Throughout this research endeavor the researcher had also maintained a unique triad of professional roles, including not only researcher, but also teacher and instructional designer. Because of this unique approach, this project has been able to identify and emphasize the interrelationships between these three fundamental conceptual areas that frame this research: reflective practice, instructional design, and Web design.

The findings of this research present a number of specific considerations that would be of benefit to teachers engaging in instructional design activities. Several aspects of the value of reflective practice are identified, as is the novel concept of the Critical Pivot as a reflective learning tool. A description of what a Critical Pivot is, and the twelve specific Critical Pivots identified by the researcher are presented in Chapter 4. Finally, several general suggestions are offered to teacher instructional designers interested in engaging in this process of ID in a technological context.

Conclusion

The world is changing – and education needs to change with it. Technology has become a rapidly changing element for society as a whole, as well as for individual citizens. Students of today are digitally literate, yet education still uses technology for industrial age uses rather than information age uses. This research endeavor has sought to provide support for educators interested in bridging the chasm between modern students and modern educational systems. The support comes in the form of research intended to identify what teachers need to know when designing substantial Web-based learning resources. It combines three key conceptual areas (reflective practice, instructional design, and Web design) to accomplish this. The next chapter, Chapter 2: Review of Existing Literature, provides a detailed view of these three conceptual areas. Chapter 3 offers a detailed description of the research methodology used, Chapter 4 includes the narrative summarizing the reflective data collected, and Chapter 5 presents a discussion of the findings.

2. REVIEW OF EXISTING LITERATURE

This research endeavor has sought to identify, through a reflective narrative methodology, what considerations a teacher instructional designer ought to be mindful of when designing and creating Web-based learning resources to be used in the classroom. Inherent in this research question are three distinct, yet commutual conceptual areas: reflective practice, instructional design, and Web design. Each of these three conceptual areas frame this research endeavor, not so much as representing sequential phases of researcher activity; but rather as reciprocally linked conceptual areas of practice that are constantly visited and revisited throughout this project. However, for the sake of clarity, this chapter will present key findings from existing literature separately and distinctly for each of these three conceptual areas.

The first conceptual area presented below is ‘reflective practice’. The discussion begins with a description of the reflective practitioner according to Donald Schön, and then converges on the application of reflective practice for professional teachers. The notion of the reflective teacher is then further developed through a presentation of issues related to the methodology of this research – specifically, issues arising from the ‘teacher as researcher’ and the use of the narrative method. These concepts establish the perspective through which the other two conceptual areas are perceived.

With this perspective in mind, a discussion of the literature surrounding the second key conceptual area of ‘instructional design’ is presented. This begins with a general description of ID, followed by an exposition of the ‘ADDIE’ ID model as being a framework for the development and application of ID practice, not only in a general sense, but also as

the specific ID system used in this research. Finally, issues related to ‘teachers as instructional designers’ are discussed.

The third and final key conceptual area presented in this chapter is the area of ‘Web design for learning’. Given that the medium used for the design and use of the learning resource artifact developed through this research is the Internet, this section presents specific recommendations from the literature regarding effective Web design. This section of the literature review maintains the perspective of the reflective practitioner through the application of the ADDIE model in the creation of a Web-based learning resource. The discussion begins with an overview of Web design for learning, and then proceeds through specific suggestions regarding key Web design elements including planning, organization, orientation, and navigation. Then, even more specific suggestions are offered relative to the layout and design of individual Web pages that are both effective and engaging for student users.

To summarize, the review of existing literature presented below is divided into the three conceptual areas defining this research: reflective practice, instructional design, and Web design. Each area is presented separately, but must be viewed as a unified whole to most clearly understand the nature of this research. The discussion begins with an examination of reflective practice.

The ‘Reflective Practitioner’

Any discussion of professional reflective processes would not be complete without consideration of Schön’s postulates in this regard. Schön (1983, 1987) suggests that professionals, although increasing in numbers, are decreasing in their levels of public professional esteem. According to Schön, this crisis of confidence is argued to be the result

of the inability of professionals to keep up with increasingly complex demands of professional knowledge development. This is due to professional knowledge dissemination practices that are based on the now obsolete ‘technical rationality’ model. Schön describes this as a positivist behavior-based model that is characterized by the following four key epistemological perceptions: knowledge is specialized, firmly bounded, scientific, and standardized. He proposes that the application of technical rationality results in a gap between professional knowledge and the professional demands of complex real-world practice. To Schön, rejoining of the disparate concepts of professional knowledge and practice requires a completely different perspective – one that engages the learner in professional knowledge development, based not on content, but rather on reflective practice. He proposes the model of ‘reflective practitioner’ as a potential remedy.

A reflective practitioner is one who recognizes the value in actively reflecting on professional experiences in an attempt to gain valuable practical and theoretical learning. Schön argues that a reflective practitioner employs two related, yet distinct, methods of reflection. The first he calls ‘reflection-on-action’. Reflection-on-action refers to the active practitioner’s reflection on events after they have occurred. Although still of learning value, Schön suggests that the second reflective method, ‘reflection-in-action’, is of greatest learning value for practitioners. Reflection-in-action is essentially professional problem-solving, and is thus defined as “...a process of reacting to the inconsistencies in a situation by rethinking one’s tacit knowledge and reframing the situation within one’s intuitive understanding in an action experiment that tests possible solutions” (Ferry & Ross-Gordon, 1998, p.2).

Reflection-in-action, although a process of continuous activity, may be cognitively structured as a cyclical process involving five steps. The first step includes a demonstration of what he calls 'knowing-in-action'. This is the practitioner's demonstration of tacit professional knowledge in the form of routine responses to familiar situations. Step two occurs during knowing-in-action, when a practitioner is presented with a 'surprise'. A surprise, either good or bad, is an unexpected occurrence that the practitioner is suddenly faced with, and acts as a trigger for reflective thought and action (Clarke, 1998). Step three is the reflection that is stimulated by the trigger, and then leads directly to step four which is a critical reflection and reframing of the situation at hand. The final step in this process requires that the reframing lead to either a practical resolution for the problem at hand or the identification of yet another trigger to further guide the practical learning process. Through this continual process of reflection-in-action, practitioners bridge the chasm between research and practice, in that, "...when someone reflects-in-action, he becomes a researcher in the practice context" (Schön, 1983, p. 68).

The notion of the reflective practitioner is one that is supported by this project because of a key similarity between the process of reflection-in-action and the process of ID, which will be explained later on in this document. Reflection-in-action, being grounded in a constructivist epistemology (Ferry & Ross-Gordon, 1998), necessitates a continual cycle of trigger-frame-reframe- and plan for future action (Clarke, 1998) as growing tacit knowledge is combined with practical experiences. This process parallels ID methodology in that it too requires a continuous cycle of development-review-and revision based on the experiences of the designer through the instructional design process (Gustafson & Branch, 2002). These parallels between the processes of reflective practice and ID are an effective combination

with the qualitative structure of this project. However, how does the concept of the reflective practitioner extend to that of the reflective teacher?

The Reflective Teacher

Exhorting teachers to become more reflective in their professional practice is not a new concept in education. Although it's been suggested that reflective education has recently become a trend or buzzword in educational contexts (Gil-Garcia & Cintron, 2002), it has in fact been discussed among academics and practitioners for some time. John Dewey, for example, is one of the most widely cited academics having proposed arguments in support of reflective teaching and learning, and his works date back to the 1930s (Dewey, 1933).

Dewey proposed that the most effective education is grounded in three interrelated actions related to experiences: doing, observing the doing, and reflecting on the observations (Swain, 1998). Specifically referring to teachers, he further proposes that teachers ought to be themselves students of education, and through reflection further develop their professional skills and moral dispositions as educators (Pedro, 2006). For Dewey, "...reflection is not an end in itself but a tool or vehicle used in the transformation of raw experience into meaning-filled theory that is grounded in experience, informed by existing theory, and serves the larger purpose of the moral growth of the individual and society" (Rodgers, 2002, p. 863).

Dewey's concept of reflection in teaching is one that is complex, rigorous, intellectual, emotional, and requires time to do effectively. Rodgers (2002) summarizes Dewey's concept of reflection into four key criteria: reflection is a meaning-making process, reflection is a rigorous way of thinking, reflection needs to happen in community, and reflection requires attitudes that value the personal and intellectual growth of oneself and

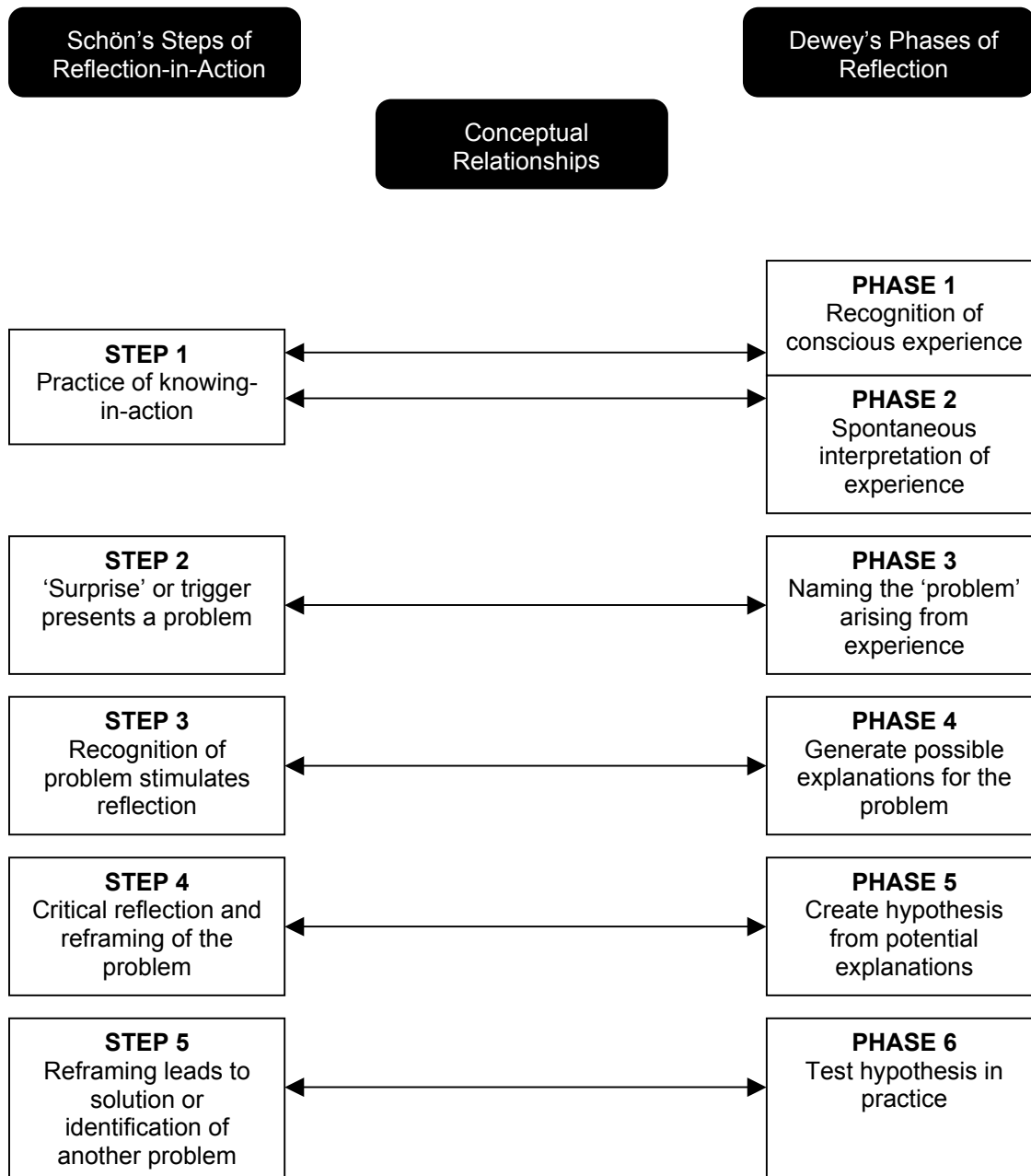
others. First, when arguing that reflection is a meaning-making process, Dewey is characterizing reflection as intentional acts that move the learner from one experience to the next with a deeper understanding of its relationship with and connections to others' experiences and ideas. In this way, experience alone is not enough to illicit learning; the learner must also make meaning out of the experiences, essentially establishing education as a 'verb' rather than a 'noun'.

The second criteria defining reflection for Dewey is its rigorous nature. He characterizes reflection as being an intentional act that reacts to some element of experience that causes cognitive dissonance. That is, he suggests that reflection moves the learner back to a state of cognitive equilibrium when some factor of experience first causes cognitive disequilibrium. Third, Dewey further characterizes reflection as an act that requires community. That is, reflection is most effective when opportunities exist to share thoughts and perceptions with others, and in this way expand and enrich the internal conversation (Costa & Kallick, 2000; Pedro, 2006). Dewey's fourth and final criteria defining reflection proposes that it requires attitudes from the teacher that value personal and intellectual growth of oneself and others. Truly 'professional' teachers are those that value such growth and exhibit the intellectual rigor that reflection requires (Swain, 1998; Walkington, 2005).

Dewey applies these four criteria defining reflection to six sequential phases of reflection through which reflective teachers ought to navigate (Rodgers, 2002). First, an experience of some sort causes the practitioner to feel cognitive disequilibrium. This experience acts as an intellectual trigger and may take a variety of forms, such as encountering a difficult or novel situation (Szesztay, 2004). The second phase follows as the individual spontaneously interprets the experience and begins to attempt to make sense of it.

Third, the individual proceeds to name the ‘problem’ arising out of the experience, essentially more explicitly defining it. Fourth, the reflective teacher then proceeds to generate possible explanations for the defined problem. This phase has the individual reframe the perceived problem to view it from a different perspective and thereby facilitating knowledge acquisition and mediating between theory and practice (Russell & Munby, 1991). The individual generating a hypothesis to resolve the problem, having reframed its context, characterizes phase number five. Finally, phase six involves a testing of the hypothesis from the fifth phase through practical application. It is important to note that, although there are some differences between their conceptions of reflection, there do exist some conceptual relationships between Schön’s stages of reflection-in-action and Dewey’s phases of reflection. Figure 2.1 illustrates each of these.

Figure 2.1 Conceptual Relationships Between Schön's Steps of Reflection-in-Action and Dewey's Phases of Reflection



Whether considering Schön's concept of the reflective practitioner, or Dewey's notion of reflective teaching and learning, the following quote from Swain (1998,) summarizes the construct and value of reflection as a practice for professional teachers:

Reflection, whether written or oral, is a tool for shaping thoughts, ideas, and beliefs, revealing concrete shape for those thoughts, ideas, and beliefs as they emerge. As a human capacity, reflection enables us to evaluate experience, learn from mistakes, repeat successes, revise, and plan. As a component of professional development, reflection allows us to clarify thought and challenge beliefs. As a data source, reflection empowers the researcher to see beyond observable behaviors to the depths of human transformation – to acquire a consciousness of and reverence for continuous growth (p. 28).

Now accepting the value of reflective teaching, consider now the application of this concept to the teacher as researcher.

The Teacher as Researcher

Although some researchers have connected reflective teaching with formal research (Reagan, Case, & Brubacher, 2000), prior to the early 1990's it was extremely uncommon in academia to see research where the teachers were also acting as researchers (Anderson & Herr, 1999). Instead, most published research endeavors focused on educational contexts where the teacher was the object of research, and not the research principal. This was due in large part to the technical rationality perspective taken by academics (Schön, 1983), where research and practice were deemed to exist as distinct elements of existing knowledge structures. However, McFarland (1998) suggests that, not only is the teacher acting as researcher a valuable exercise for education, but also it is specifically relative to reflective

teaching. He argues that the overall purpose of the teacher as researcher is to provide a vehicle for reflection leading to personal and professional change, learning, and renewal.

Notwithstanding its greater acceptance in research arenas now, the teacher-as-researcher approach does present one with important concerns relative to the goals of teaching vis a vis research, ethical implications, validity, and reflexivity. Consider first the goals of both teaching and research. It has been suggested that, even though both activities occur in the realm of 'learning', the pure goal of teaching (helping students to learn) may be incompatible with the pure goal of research (learning through investigation) (Wong, 1995). This concern gives application to Aristotle's proposed distinction between the 'theoretical man' and the 'practical man'. Wong (1995) further asserts that the conflicting purposes of teaching (acting to change students) and research (acting to observe students), may inevitably lead to questions of ethics or professional morality. For example, a teacher/researcher may occasionally be required to make decisions regarding classroom activities that favor either student learning or the research issue. This author proposes a simple resolution to this potential conflict. This being that the approach to this project will conscientiously prioritize the triad of voices in the following sequence: teacher, then instructional designer, and then researcher. In this manner it is possible for this author to avoid professional ethical miscues by giving first priority to the instruction of students, second to the development of the learning resource, and the third to the observation and documentation of the entire process, while still striving to maintain the project's construct validity.

Validity for practitioner research is as significant a factor as in other forms of research. Anderson & Herr (1999) propose five key tests of validity specific to practitioner research that, if carefully applied, aid the researcher in ensuring high levels of validity.

These validity tests include the following: outcome validity, process validity, democratic validity, and dialogic validity. First, outcome validity seeks to measure the extent to which the product of the study actually correlates to the identified issue that ignited the study in the first place. This author intends to address this validity type through a consistent and vigilant focus of all research designs and activities on the issue at hand. The second type of validity test is process validity, which refers to the extent to which the issue is framed and reframed in actions congruent with the research direction. Careful construction of the project's research methodology and the narrative describing it will help to ensure that this author maintains process validity.

The third test of validity, democratic validity, examines the extent to which the researcher includes input from stakeholders involved in the research question. Input for this reflective inquiry came from observations of student interactions with the Web-based learning resource. It was these interactions that the researcher reflected upon to create the data set, and in doing so established democratic validity. Fourth, catalytic validity is that test which considers the extent to which the research process reorients, transforms, or refocuses the energies of participants towards knowledge growth. This test, for this author, is the key test of validity. It is intended that this research process be successful in both informing and altering practice. Dialogic validity is the fifth and final suggested test of validity for practitioner research. This test seeks to determine the extent to which peers are able to support and endorse the research framework and findings. This author will address this test through consistent consultation with academic advisors and research peers.

The final issue to be considered in the practice of teacher as researcher is the maintenance of a continuously reflexive stance. Reflexivity is defined as, "...the ability

proactively to reflect, analyze and self-critically vocalize our own reflections while maintaining a critical awareness of the nature of culture and society around us” (Hillier & Jameson, 2003, p. 26). Reflexivity is a skill to be developed and valued, in as much as it represents a communicable structure and framework for our thinking (Kleinsasser, 2000). To be truly reflexive, one needs to develop the capacity, not only to cognitively separate one’s self from one’s societal context, but also to be aware of personal values and biases that influence our thinking and perceptions through life experiences.

Developing skills of reflexivity require that cognitively purposeful attention be given to the three general elements of reflective thought and action (Silcock, 1994). The first of these is the ego-driven nature of reflection. This takes the perspective that reflection is intentional, and that the reflector is the ultimate agent for his own actions, therein accepting ultimate responsibility for these actions. Element number two is the necessary inclusion of constructive thinking. Reflexivity facilitates a move to changes in cognition and action as challenges stimulate a constructive framing and reframing of learning through experience. Finally, reflexive thought and action require the combining, transforming, and contextualizing within perspectives. This element moves the reflective process away from simple observation; and requires instead that the reflexive practitioner synthesize information in such a manner that new meaning is derived – meaning that demonstrates the evolutionary constructivist nature of learning.

Developing skills of reflexivity for this author will be a challenging process. Much effort will be required to maintain a reflexive posture that is objective, yet recognizes the value and influence that personal values and biases will have on the research process. This author will begin to develop these skills through the constant revisiting of several key

guiding self-questions to guide the journalizing process. Questions may include: What are my expectations in this situation? Why do I have these expectations? How would I feel about my research if my anticipated results were not realized? How can I make myself aware of my own biases, and use them (not ignore them) to make the research richer? Generally speaking, this author intends to become a skilled reflective practitioner exercising the triad of voices, knowing that, "...dynamic reflexivity gives qualitative research its pulse" (Kleinsasser, 2000, p. 155).

The Narrative Method

Early in this discussion this author presented the focus of this research project as being an examination of the process of using the ADDIE ID model as it is experienced by the teacher/instructional designer/researcher. The narrative methodology is an ideal form to be used in this project because its construct is the most suitable for the examination of such qualitative processes.

Narrative research is, "the study of how different humans experience the world around them, and it uses a methodology that allows people to tell the stories of their 'storied lives'" (Gay, Mills, & Airasian, 2006, p. 429). Narrative allows one to see and interpret the unities, continuities, images, and rhythms of experiences and, in this way, becomes both a phenomenon and method of research (Clandinin, 1992). Narrative research is characterized by seven key elements (Gay, Mills, & Airasian, 2006). First, it focuses on the experience of individuals. Second, it is concerned with chronological events experienced by the individual. Third and fourth, data collected through interviews, observations, and the like is synthesized into stories developed through a process of active construction (Behar-Horenstein & Morgan, 1995). Fifth, the reconstructive narrative accounts are influenced by time, place, specific

situation, and cultural context. Sixth, it is a collaborative exercise that includes input from the researcher and participants in the negotiation of the final product. Finally, narrative research is characterized by a consistent revisiting of the question, ‘And then what happened?’

The process of employing the narrative form of research allows the researcher to identify and emphasize the connections between what an individual thinks, knows, and does (Behar-Horenstein & Morgan, 1995). It reveals and communicates the reciprocal relationship between the manners in which thinking shapes behavior and knowing shapes thinking. The sequence of events in the narrative research process are typically: gathering of empirical data through experience, identifying and employing of codes and conventions from which to develop stories focused on the sequence of critical observations, and the reconstruction of observations in the form of a story (Clandinin & Connelly, 1991).

The narrative form of research is an ideal methodology to be used for this project for several reasons. First, given that the goal of the project is to reflectively examine an ID process, the narrative method provides a critical structure that encourages the researcher to maintain a critically reflective posture. It also provides the researcher with the structure to examine thoughts, experiences, and actions in a critical manner. Keeping a personal journal of field notes to document the entire process represents the key vehicle for data gathering, and therein also for concept and data reflection. Another key justification for the use of narrative is the emphasis on the value of the researcher’s thought processes, and not just behavior (Behar-Horenstein & Morgan, 1995). It is anticipated that these thought processes would result in a much richer synthesis and interpretation of data as it unfolds. Further, the narrative form is appropriate for this study simply because of its inherent strength in helping

one to understand the relationships among observed phenomenon. Finally, the reflective narrative research approach is appropriate for this project given the similarity between this structure and the reflective nature of ID itself.

What is Instructional Design?

Reflective practice is an elemental process of instructional design; however, before understanding the relationship between reflective practice and ID, it is first necessary to develop a clear concept of what is meant by the term ‘instructional design’. Although similar in key respects, there does exist some variation among ID theorists as to the precise definition of ID. Crawford (2004) for example, suggests a simple view of ID referring to it as essentially a systematic process that results in an instructional product. Merrill (2001) extends this basic notion of ID as a highly specialized process, referring to it as an ‘engineering activity’. Other theorists argue that the process of ID is a specialized ‘technology’ since known techniques and procedures are applied to yield defined outcomes; yet it is also a ‘craft’ given that designers are often called upon to exhibit high levels of creativity, general knowledge, wisdom, and flexibility (Freeman, 2005; Wilson, 2004). Regardless whether ID is considered a technology process or a craft process, the resulting product is similar.

The application of ID processes results in a product intended to promote learning among the intended users. These educational products may be global, representing entire systems of learning, or they may be highly specific, such as a single lesson plan or learning aid (Molenda, Reigeluth, & Nelson, 2003). Whatever form these products may take, their creation is intended to facilitate the acquisition of some knowledge or skill (Merrill, 2001)

that is both effective for the learners as well as appealing to them (Gustafson & Branch, 2002).

The field of instructional design, whether viewed as a practice or a general field of theory (Molenda, Reigeluth, & Nelson, 2003), is further defined through the influence of a variety of conceptual disciplines. For instance, Morrison, Ross, and Kemp (2007) frame ID as the systematic process of designing instruction based on learning theories, information technology, systems theory, educational research, and management methods. Other theorists suggest additional influences on ID such as: behavioral psychology and communications theory (Rowley, 2005); as well as cognitive science, philosophy, and anthropology (Molenda, Reigeluth, & Nelson, 2003). Considering the variety of influences on its form and function, ID is clearly a hybridized interdisciplinary area of theory and practice.

When considered together, the three key elements of ID already discussed (process, product, and influences) represent the definition of ID for use in this project. In the context of this research, ID is thus defined as *the systematic yet creative process of designing instruction that is both effective for, and appealing to, learners based upon existing theories inherent in a teaching and learning context.*

Frameworks of ID

Although this definition provides a foundation for understanding the nature of ID, it is best understood in terms of specific conceptual and practical frameworks suggested by instructional design theorists. One such conceptual framework is Merrill's 'First Principles of Instruction' (Merrill, 2002) that outlines a set of five principles framing instructional design, regardless of what model or application is used. Figure 2.2 illustrates these five principles of effective instruction. The first principle in this framework relates to the

problem-centered nature of ID suggesting that learning is promoted when learners are engaged in solving real-world instructional problems. For Merrill, a problem such as this is represented as a whole-task activity where instruction is designed to engage students in four distinct levels of whole task instruction: problem identification, tasks required to solve the problem, operations that comprise the tasks, and the actions that comprise the operations.

The second of Merrill's First Principles refers to the activation phase of instruction and suggests that learning is promoted when relevant previous experience is activated. Effective ID should either encourage student recall of previous learning, or provide new hands-on learning experiences.

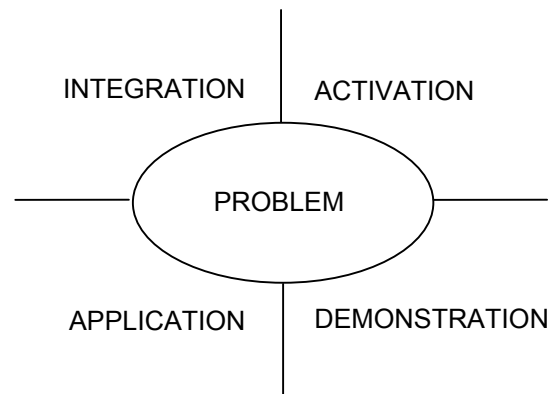
The third of Merrill's principles is entrenched in the demonstration phase of instruction and suggests that learning is promoted when the instruction demonstrates what is to be learned rather than merely telling information about what is to be learned. That is, ID should include portrayals of examples and methodologies rather than simply provide information about them.

Merrill's fourth principle is rooted in the application phase of instruction and argues that learning is promoted when learners are required to use their new knowledge or skill to solve problems. In this way, learners ought to be encouraged to apply new learning to real-world problems rather than on recall-type activities.

Finally, the fifth principle relates to the integration phase of learning and argues that learning is promoted when learners are encouraged to integrate their new knowledge or skill into their everyday life. Learners are most able to integrate (transfer) learning into regular life practice through a reflective process where they are essentially able to observe their own

learning. Merrill's suggested principles present a view of ID that is based on specific processes addressing both what to teach and how to teach (Merrill, 2001).

Figure 2.2 Merrill's First Principles of Instruction



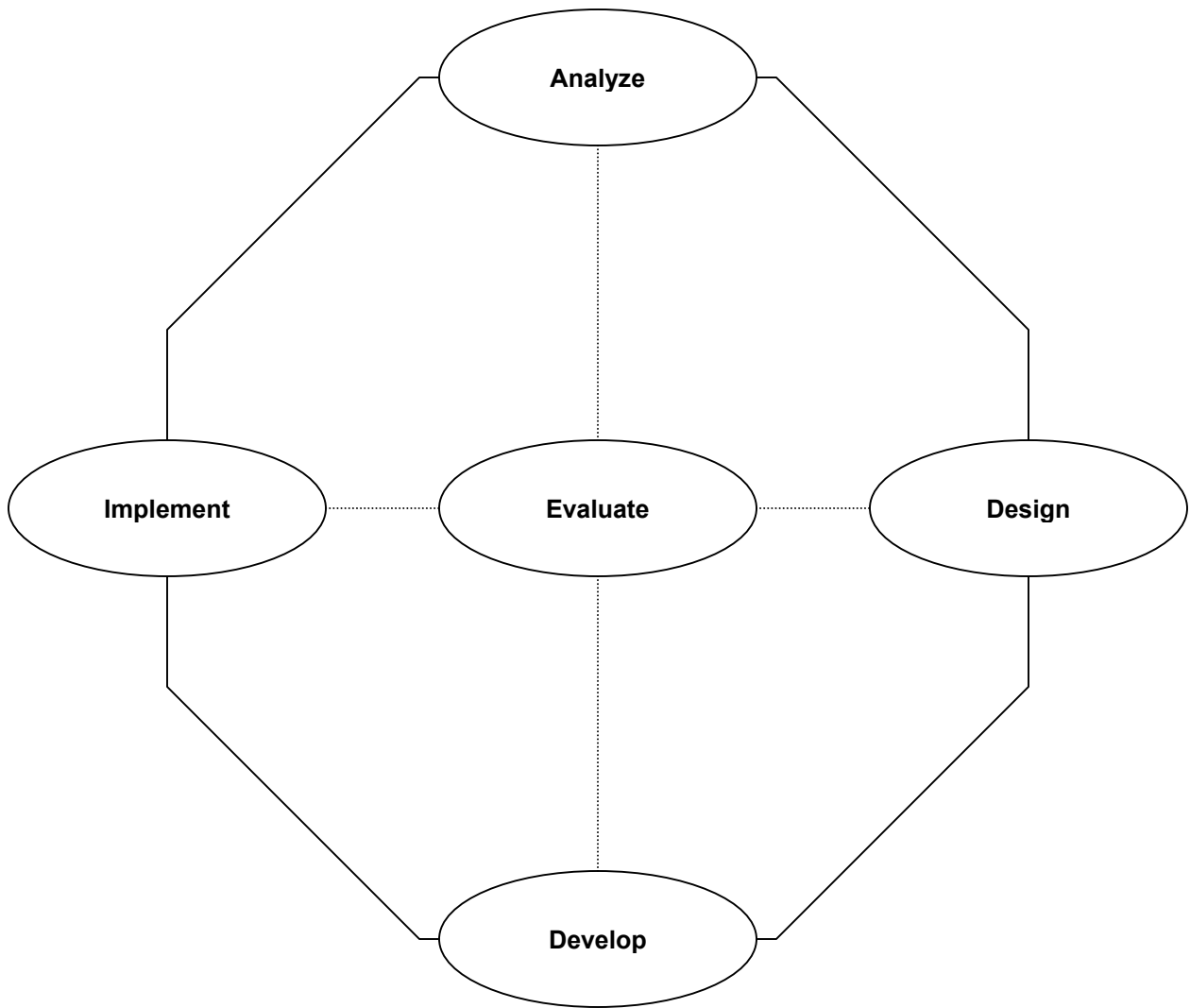
Instructional Design Models

Another structure used to describe the nature and processes defining instructional design is that it is model-driven. Given that ID can be a convoluted and complex activity, models have been designed to aid the designer in more clearly understanding the whole process and to more efficiently practice within it (Gustafson & Branch, 2002). For instructional designers, models are effective in ensuring that progress is being made; not in a sequential recipe-like fashion, but in a manner where the model represents a compass or cognitive tool for the designer (Botturi, 2006). Literally dozens of different models have been developed and espoused since ID became a field of study and practice (Gustafson & Branch, 2002). Each of these models has merit when used in specific learning contexts and for the specific learning goals they were designed for. However, it is not the intent of this discussion to present each, or any, of these specific models. Instead, this discourse will outline the model-within-a-model that this research and most other ID models are based on – the ADDIE model.

The ADDIE model, although still referred to in some ID literature as a model, is not in fact an ID model. Instead, it is “...merely a colloquial label for systematic approach to instructional development” (Morrison, Ross, & Kemp, 2007, p. 13). ADDIE is a label that refers to a family of ID models that share common elements in some fashion (Molenda, Reigeluth, & Nelson, 2003; Morrison, Ross, & Kemp, 2007). However, rather than become mired in semantic arguments regarding whether ADDIE is a model or not, this discussion will take a position similar to Gustafson and Branch (2002) identifying ADDIE as a ‘generic’ model of instructional design. But what exactly is ‘ADDIE’?

The ADDIE model of instructional design is an approach that is framed by the following five interrelated phases or elements of activity that guide the practice of designers: analysis, design, development, implementation, and evaluation (Gustafson & Branch, 2002). Figure 2.3 below illustrates the relationship between these five elements. The first element, *analysis*, refers to the analysis of the instructional setting and the learners, including the identification of specific learner needs and instructional goals. Second, the *design* element includes the design of specifications for an effective learning context as well as the design of products and processes to achieve learning goals. Third, the *development* element refers to the construction of all relevant learner and management artifacts. The fourth element, *implementation*, involves the implementation of the developed learning artifacts and systems within the intended learning context. Finally, the *evaluation* element includes both formative and summative evaluation of the learning products and systems developed and implemented. Each of these five fundamental elements of the ADDIE model do not necessarily follow a sequential pattern; but instead inform one another in a design system where the outputs of one element will become the inputs of another element (Gustafson & Branch, 2007).

Figure 2.3 Core Elements of the ADDIE instructional design model.



The ADDIE model is an effective application of ID theory to this research project because of its inherent flexibility; however, some ID theorists argue that the use of any theory-based ID model is not consistent with the practice of expert designers (Rowley, 2005). For example, many early ID models illustrate the instructional design process as a linear one-way progression, and thus do not accurately represent the richness and reality of the interactive teaching and learning process (Gustafson & Branch, 1997; Kenny, Zhang, Schwier, & Campbell, 2005). Further, best practices and research results are often reduced to a model, and in this way restrict the effectiveness of designers who need a more broad base of knowledge to facilitate a perception of the design problem from a variety of angles (Wilson, 2004). Finally, Rowley (2005) argues that theory-based ID models are prescriptive, replacing the designer's knowledge base of design instead of enhancing and supporting it. All things considered, "...it seems that despite being widely used in the education of future instructional designers, ID models tend to only inspire practice, without really informing it – the model gets adapted to each specific project and situation" (Botturi, 2006, p. 2).

Rowley (2005) further asserts that, rather than strict adherence to a design model, expert designers report a number of other factors influencing the successful design of effective instruction. For example, they tend to follow a combination of linear and non-linear design processes while maintaining an opportunistic (flexible) approach to adjusting designs as deemed necessary. Expert designers use rapid prototypes early and often throughout the design process. They also strive to maintain a balanced perspective throughout a project, often shifting between macro and micro points of view. Expert designers also report the practice of continually building and enhancing their own design knowledge through

reflective learning. Finally, they tend to use proven instructional strategies such as well-targeted ID tasks, relying on their own previous experience as to ‘what works’.

Notwithstanding the strengths and weaknesses of models in the practice of instructional design, the ADDIE model is useful, at least as far as it represents a comprehensive view of ID. In a global sense, ADDIE elements have even been adopted to the definition of ID itself, suggesting that it “...encompasses the analysis of learning and performance problems, and the design, development, implementation, evaluation, and management of instructional and noninstructional processes and resources intended to improve learning and performance in a variety of settings” (Reiser, 2007, p. 7). The ADDIE model thus provides an effective skeleton framework for the instructional design activities being undertaken in this project. However, one must also consider, not only the nature of instructional design, but also the context of the design activities represented in this project. In particular, what considerations arise when the teacher is also the instructional designer?

Teacher as Instructional Designer

The focus of this research endeavor is not only the general practice of ID, but is rather the practice of ID specifically for professional classroom teachers. Therefore, it is important to present some of the existing literature specific to ID for classroom teachers. It would seem that, given the previous discussion regarding the nature of ID, there are numerous similarities between the practice of ID and the practice of classroom teachers. So much so, that it has even been suggested that teachers are in fact instructional designers (Harris, 2001; Wiggins & McTighe, 1998). However, other ID theorists dispute this claim and instead argue that, in a pure sense, teachers are not instructional designers (Morrison, Ross, & Kemp, 2007), yet the quality of their designed instruction may be improved through the knowledge and

application of known ID principles (Harris, 2001; Morrison, Ross, & Kemp, 2007) towards either the creation of original learning resources or the adaptation of existing commercial learning resources.

However, the unique content of the teacher acting as the instructional designer requires the application of three criteria to ensure that the designed instruction is both effective and engaging for students (Cennamo & Kalk, 2005). First, designed instruction must ensure that there exists a consistent alignment between prescribed learning outcomes, activities, and assessments of instruction. Second, the instruction must be designed with the characteristics and needs of the target learners in mind, considering that, “The most significant element in developing instruction is to understand the learners” (Cennamo & Kalk, 2005, p. 22). Finally, it is imperative to the teacher designer to be vigilant in continuously evaluating and revising instructional products and processes as the result of the learner’s response to the instruction.

Applying criteria such as these may take a variety of forms, such as the use of an existing ID model. However, teacher designers typically do not perceive nor use ID models in the same way as other designers. Teachers are often not aware of specific ID models and, if they are, they often perceive these models as providing a general road map for ID instead of a prescriptive process to be closely followed (Gustafson & Branch, 2002). A reason for this is the perception among classroom teachers that typical ID models are too mechanistic, and thus dehumanizing to the teaching and learning process (Gustafson & Branch, 2002). Therefore, even though there have been ID models developed that are ‘teacher friendly’ (Gustafson & Branch, 2002), practicing teachers typically apply specific ID principles and processes depending on the specific teaching and learning context instead of the whole scale

adoption of an existing model (Morrison, Ross, & Kemp, 2007). Rogers (2002) further emphasizes the impracticality of ID model adoption for teacher designers when he states, "...formal design models and practices are not exactly practical for teachers who must follow a state-mandated curriculum, translate the curriculum into a course, design their own materials, teach the course, and assess student achievement and the effectiveness of the course" (p. 5).

Regardless of whether teacher designers employ an ID model or simply individual elements of a model, a number of challenges have been identified regarding the practice of teachers designing instruction. One of these challenges relates to the often-recommended team-based approach to professional instructional design. That is, ID is frequently recommended to occur in a team setting representative of the variety of specific skills and knowledge required for effective learning construction (Botturi, 2006). Teachers often do not have the opportunity to collaborate given the individualistic nature of their domain. Another challenge suggests that teachers simply do not have sufficient time to engage meaningfully in ID, both because their professional time is already so limited (Gustafson & Branch, 2002) and also because the pace of ID is often slower than the pace of actual instruction (Rowley, 2005). A third challenge is the limited financial reserves available to teachers interested in ID (Rowley, 2005). Fourth, teachers often do not have access to, or simply don't use, the professional literature and resources required for effective ID to occur (Gustafson & Branch, 2002; Rowley, 2005). Finally, given that teachers often teach specific courses only once a year, they are not able to complete rigorous and comprehensive assessments of the effectiveness of their ID efforts (Gustafson & Branch, 2002). Notwithstanding these challenges, "By learning more about instructional design, teachers

should become better equipped to either create high-quality, student-centered lessons or adapt commercial materials to fit their course needs” (Morrison, Ross, & Kemp, 2007, p. 5).

Implied in this discussion of instructional design is the notion of communication, given that ID is a process that results in some type of educational product to be used as a communication medium with students to facilitate learning. But what is ‘communication’? Harold Lasswell defines communication as, “Who said what through what channel to whom with what effect” (Koontz, Li, & Compore, 2006, p.7). According to Marshall McLuhan (1994), the medium of communication used is not distinct from the message of the content; but rather, “...the medium is the message” (p.7). That is, “...characteristic of all media means that the ‘content’ of any medium is always another medium” (McLuhan, 1994, p.8). Hence, the medium used in the process of communication becomes a fundamental influence on the communication process and the resulting products. For this reason it is imperative that consideration be given to the communication medium used for this research – not from the perspective of it being a distinct element of the ID process, but rather that it further defines the educational ‘message’ resulting from this process.

Web Design for Learning

Given that the Internet is the communication medium chosen for the ID product developed through this project, it is important to examine what existing literature has to offer relative to Web design for learning. One of the first findings in this literature is quite simply that there has not been much research conducted that tests specific elements of Web design for learning (Skaalid, 2001); but instead, much of the available literature identifies global Web design principles and then applies them to a teaching and learning context. It is not the intention of this section of the literature review to provide a detailed account of all of the

recommended principles for general Web site design. Instead, key elements of Web design planning and practices as they apply to this research project are presented below.

The overall process used in the design and construction of a Web site, educational or other, involves consideration of the following six key sequential steps: site definition and planning, information architecture, site design, site construction, site marketing, and tracking, evaluation, and maintenance of the site (Lynch & Horton, 2002). These six steps in the Web design process may be further condensed into the following four Web design elements: planning, organization, orientation, and navigation. Further, inherent in each of these four elements are specific recommendations regarding Web page layout and design to most effectively facilitate the communication intentions for which they're designed. The remainder of this discussion will present key aspects of Web design for learning from existing literature in terms of these five categories.

Web Design for Learning - Planning

The first, and arguably the most important, step in designing effective Web sites for learning is planning. Here the designer must attend to carefully defining the site in terms of its intended goals and then outlining its framework in terms of an overall plan for design and use. Site planning in this phase consists of defining the site goals, identifying and defining the target audience, and determining the content required. The importance of the planning process cannot be overstated, considering that, "Careful planning and a clear purpose are the keys to success in building Web sites" (Lynch & Horton, 2002, p.1). A site focus that is unclear to the user will result in significant decreases in its effectiveness and usability once implemented (MacGregor & Lou, 2005).

A key component of the planning process is the identification and definition of its targeted users. The users of a Web site may include the general Internet population or simply a smaller subset of the general population. The attributes, needs, and abilities of the target audience must be carefully examined during the planning phase, remembering that Web design "...is not just about fonts, colors, pretty pictures, animated gifs, it is much more about a thorough analysis and structuring of the action needs and the information needs of the user" (Cato, 2001, p.68). In this way, the planning process is made complete – not only is the site designed in terms of its driving goals, but it is also designed to be effective for the specific audience for whom it is being designed.

Web Design for Learning - Organization

The second key element of effective Web design for learning is the organization of the site. Web site organization refers to the way that individual Web pages are arranged within a site (Latham, 1998). Organizing information for application to a Web site typically follows five key steps (Lynch & Horton, 2002). First, it is necessary to divide the content to be included into logical units. Second, determine which units have greater levels of importance than others and, in doing so; establish a hierarchy of the units. The third step requires that the relationships among the hierarchical units be sketched out. That is, how will the units be ordered and linked to one another? The fourth step is to construct the site as planned through step three, while the final step is suggested as being an evaluation of the site structure and aesthetics.

Adhering to these five fundamental steps of site organization, Web designers often employ one of a variety of commonly used site structures. Two of these structures, the *linear* organizational structure and the *web* organizational structure, are commonly used in

educational Web sites. A Web site with a linear structure is one where individual pages are linked in a manner that presents the information in a linear sequence (Latham, 1998). This type of structure results in the greatest level of teacher control, and is typically applied to instructional activities following a more behaviorist learning theory approach. Conversely, a site structured as a web resembles a spider's web, where users may link from any page in the site to almost any other page in the same site. This type of site structure more readily facilitates guided discovery instruction, following a more constructivist approach to learning (Hobbs, 2002). Both of these site structures have advantages and disadvantages, yet it is most likely that educational Web sites will include some application of both of these in the site design. The key for which structure to use and when, once again depends on the site's users as, "The fundamental organizing principle in Web site design is meeting users' needs" (Lynch & Horton, 2002, p.20).

Another particularly important aspect of organizing for learning Web sites is specifically how the information is organized. *Chunking* is the term often used in the literature identifying the need for designers to separate or 'chunk' content in ways that are most effective for the targeted users (Lynch & Horton, 2002; MacGregor & Lou, 2005; Skaalid, 2001). Chunking is important for Web sites because it is very difficult for users to read long narratives on their computer monitor. Instead, content should be divided and presented to users as simple and concise segments linked to related content in a manner supportive of the site goals (Lynch & Horton, 2002). Using chunking to establish the framework for the content and the relationships between chunks may be made even more efficient for the designer through the use of a site map. This visual aid presents each page of

a given site and diagrams its relationship to the other pages providing a useful aid for the designer and, ultimately, the user.

Web Design for Learning – Orientation

Designing effective Web sites requires careful attention to providing users with a clear orientation as to their ‘location’ within a site, regardless of which page is being viewed. That is, the nature of a hypermedia context is such that users may visit random Web pages within a site, becoming disoriented as to their location within the site unless structures are in place to inform them of their location. The design of the Web site as a whole and the design of individual Web pages within the site are two points of impact where designers may improve site orientation for users, remembering that consistency throughout the site is a key consideration for designers attempting to maximize user orientation (Matthew & Doherty-Poierier, 2000).

There are two specific ways that the site design could facilitate user orientation. One of these is the inclusion of a home or start page for the site (Lynch & Horton, 2002). This page provides a starting point and guide for the users’ foray into the site, often including elements such as site identification, context-related content, and navigational menus. Another site structure facilitating user orientation is the inclusion of a site map or site guide (Latham, 1998). This tool provides a visual outline of all of the pages within the site, including the links between them, and is often made accessible to users as a link from the home page.

On the other hand, there are also specific recommendations regarding web page design that also facilitate user orientation. One such recommendation is the careful design of Web page headers and footers (Lynch & Horton, 2002). A header is a consistent signature

appearing at the top of each Web page. These may include any or all of a signature graphic, title, or color-coding, and are intended to provide users with knowledge regarding the relative location and context of the page being viewed. Conversely, the page footer appears at the bottom of each page, and is designed to reinforce key information from the header or key links from the navigational menu. A second suggestion for page design is the use of consistent page layouts among the various sections of the site (Latham, 1998). That is, all of the pages within the site should have a distinct look or style (Cato, 2001); and all of the pages within a site section should also have a consistent page layout. This helps the user to know what site is being visited as well as what section of the site is being currently viewed. Third, the consistent application of color to identify site sections is extremely useful in ensuring that users are aware of their positioning within the site (Latham, 1998). For example, if a Web designer employed the color yellow to denote only the ‘student activities’ section of a Web site, then students would be more likely to recognize their site position in this section if they were viewing a yellow Web page. Finally, Skaalid (2001) proposes that every page within a site should contain the following user orientation information: site information, links to home page, links to related pages, and a consistent placement of navigational aids such as menus.

Web Design for Learning – Navigation

Consideration of the orientation element of effective Web site design naturally leads to the consideration of the issue of navigation. Navigation within a Web site is often referred to as the ‘usability’ of the site, and describes the ease through which a user would navigate the various pages of the site to both find information desired and access this same information. Speaking generally, Web sites should be constructed in such a manner that

navigation through them should be intuitive, simple, and consistent (Latham, 1998).

Intuitively designed sites are ones that encourage almost ‘thoughtless’ navigation for users.

That is, users should not need to puzzle over what links are and where they go, but should intuitively be able to proceed through pages without much (any?) instruction. A simple Web site is just that – simple. In other words, the structure of the site should be simple for the user to learn and use, so the designer needs to be careful to omit any content or graphics that, although visually appealing, are inconsistent with the site goals and user needs. Finally, a consistent Web site is one that employs a similar graphic layout and navigational aids throughout the site. If there is even one page within a site that is different than the rest, a user visiting that page will become disoriented and restricted in their ability to navigate the site effectively.

Existing literature also suggests several specific design considerations to facilitate user navigation. First, a Web site should be constructed free of ‘dead links’ (Latham, 1998). Dead links are hyperlinks that lead to a page without any navigational options. For example, a link that opens a new browser window without any navigational options is a dead link (U.S. Department of Health and Human Services, 2006). Dead links could be avoided by designing pages that make full use of ‘back’ and ‘forward’ browser buttons, or add ‘next page’ and ‘previous page’ hyperlinks to relevant pages (Lynch & Horton, 2002). Second, any hyperlinks to Web sites external to the currently visited site should include a message to the user to use the ‘Back’ button to return to the current page (Latham, 1998). Third, do not use hyperlinks leading to another location on the same Web page unless the page is very long. When it is absolutely necessary to have a long Web page, then the designer should include a ‘Contents’ section near the top of the page with reciprocal hyperlinks to the

sections that follow (U.S. Department of Health and Human Services, 2006). Links such as these will allow the user to jump to the desired section quickly and without the need to scroll through masses of content not required.

A fourth specific navigational aid is the inclusion of ‘breadcrumbs’ for users (U.S. Department of Health and Human Services, 2006). Breadcrumbs, in the Web design context, refers to the inclusion of a tree of sequential navigational links that represents the path the user has taken through the site thus far. When included on a Web page, breadcrumbs provide direct links to each sequential page visited, providing the user with options of navigating directly to any of the most recently visited pages. Finally, it has been suggested in the literature that navigational menus are most effective for users when placed on the left side of a Web page (U.S. Department of Health & Human Services, 2006).

When considered together, it can be perceived that the nature of the navigational guidelines is inextricably interrelated to the other design considerations within a Web site. The use of Web sites, as evidenced by their usability, is reciprocally influenced by each of the elements combined to create their form and function. One such element is the design of the specific pages comprising the Web site.

Web Design for Learning – Page Design

Effective Web page design supports the previously discussed key Web design elements of planning, organization, orientation, and navigation, yet specific Web page design is made more effective through the application of graphic design principles. Graphic design is essentially ‘visual information management’, where the tools of page layout, typography, and illustration guide the readers through the information on the page (Lynch & Horton, 2002). The value of graphic design in designing effective and efficient communication with

readers using the medium of the Internet cannot be overstated. That is, “The spatial organization of graphics and text on the Web page can engage readers with graphic impact, direct their attention, prioritize the information they see, and make their interactions with your Web site more enjoyable and efficient” (Lynch & Horton, 2002, p. 44). With this in mind, the following discussion presents some of the key guidelines for effective graphic design specific to the creation of Web pages.

The first guideline for effective Web page design is a concept that frames all of the other design guidelines. This concept is simply a reminder that all individual Web page design considerations must comply with the specific objectives of the site as a whole. In other words, ‘form follows function’ (Cato, 2001). No individual page within a Web site should be considered apart from the site as a whole; but should rather support and enhance the communication goals of the whole site.

A second guideline for effective Web page design is essentially a set of guidelines that includes specific suggestions regarding the layout of a Web page. First, the layout should establish a visual hierarchy among the page elements (Lynch & Horton, 2002). Text, graphics, and white space (space not containing any visual information) should all be strategically placed on the page to lead the readers’ eyes and emphasize the relative importance of each element in a balanced and consistent manner. Further, knowing that readers pay closest attention to items at the top of a page, designers should place the most important information in this area (Latham, 1998). Another specific suggestion is to use white space to create visual contrast (Latham, 1998), without confusing the reader with the use of too much of this empty space (Skaalid, 2001). Finally, proximity is encouraged as a page layout consideration. This refers to the placement of related page elements physically

close to one another to confirm their relationship and establish consistency of communication.

The third specific set of guidelines for Web page design revolves around the typography used on a page. First, designers are encouraged to use fonts designed for the Web (such as Verdana) because of their ease of reading from computer screens (Skaalid, 2001), while avoiding all uppercase words because they are more difficult to read (Latham, 1998). Second, text blocks are most legible to readers when they are presented in a left-justified alignment (Lynch & Horton, 2002) with a line length (or text block width) of no more than four inches (Latham, 1998). Third, the most effective color combination for text blocks is a black font color on a white background (Matthew & Dohery-Poierier, 2000). Fourth, the use of various typographical tools for emphasis, such as: italics, bold, underline, colored text, capitalization, and spacing, are all effective as communication devices; but the designer must take care to use them consistently and avoid overuse (U.S. Department of Health & Human Services, 2006). Finally, the use of cascading style sheets is encouraged to both maintain a consistent typeface design, and to facilitate ease of reading for the users (Horton, 2006).

The fourth set of guidelines for Web page design is the considerations relative to illustrations included on a page. Illustrations, or graphic representations, are one of the most used (and overused) elements of Web page design, and may include specific forms such as: static images, animations, audio clips, video clips, and illustrations. Although the inclusion of graphics into a Web page is much easier than with the print medium, and the fact that its use is beneficial to the comprehension of users (MacGregor & Lou, 2005), it is imperative for the designer to refrain from graphical overuse. Graphics, as with other page elements,

must be designed to support learning instead of impair learning through distraction (Hobbs, 2002). Further, designers need to be careful when designing multimedia elements to ensure that the types of media used will enhance and not impair the comprehension of intended communication (Mayer & Moreno, 2003). All things considered, graphical elements are effective for Web pages as long as they are designed and included for a reason, and that their file size is not too large to impair users' perceptions of their usefulness (U.S. Department of Health & Human Services, 2006).

The fifth and final general set of guidelines for Web page design refers to the size of each constructed page. The literature does not present any clear guidelines for the optimum Web page length (Latham, 1998); but it has been suggested that optimum page length is the product of balancing efforts of the following form factors: relation between page and screen size, content, whether user is expected to browse or print document, and the bandwidth available to users (Lynch & Horton, 2002). Generally speaking, Web pages should be shorter for home pages, pages to be browsed or read online, and pages with very large graphics (Lynch & Horton, 2002). If the content requires long pages, then they should be separated into chunks of data representing no more than two pages when printed, and a pdf version of the entire section should be made available to users (Latham, 1998).

Conclusion

This chapter has presented key findings from existing literature regarding the three key conceptual areas of this research project. These three areas include reflective practice, instructional design, and Web design. Although specific literature relative to each concept areas was presented separately, they must be considered as mutually dependent attributes of a unified whole – this 'whole' being the research activity represented through this project. The

specific nature of the research methodology used and the specific context in which it was applied is outlined in the next chapter, 'Research Methodology'.

3. RESEARCH METHODOLOGY

The research effort represented in this document seeks to identify those considerations practicing classroom teachers need to be mindful of when engaging in instructional design of a substantial Web-based learning resource. To address this, the research approach is a qualitative one that reflectively notes the experiences and observations of a teacher engaged in the process of instructional design towards the creation of a Web-based primary learning resource for two high school level Marketing courses. Throughout this reflective process, the researcher has maintained a triad of three key roles: teacher, instructional designer, and researcher. The discussion presented in this chapter describes in more detail the structures and processes of the research methodology used.

Research Structure - General

Consider first a general overview of the research structure. The researcher initiated a process of instructional design employing the ADDIE ID model to create an effective Web-based primary learning resource to be used for Marketing 11 and 12 classroom-learning activities. Such a learning resource was developed to facilitate more effective student learning within the context of information age education. During this ID process, data was gathered in the form of field notes documenting the experiences and observations of ID as they occurred. The field notes represent the raw data gathered and were compiled from the outset of the ID process and continued through the development and implementation of the second units of study, representing approximately 20% of each of the courses as planned. Once the field notes were complete, they were then translated into a narrative form describing the ID experiences that have occurred in a more comprehensive manner. The narrative represents the completion of the data gathering. Once all of this data had been

gathered and compiled, the researcher then critically analyzed it in terms of the stated research question.

Figure 3.1 below illustrates the general timeline and sequence of the ID, field note compilation, and narrative and analysis writing that took place over a ten-month (40 week) period of time. First, the instructional design activities took place over a period of ten months (40 weeks), beginning from the outset of the ID planning, and then continued until the entire learning resource had been created and implemented in the classroom. Second, the field notes were prepared over a span of 3.5 months (fourteen weeks) beginning from the outset of the ID project and continuing until the second of ten units had been constructed and implemented in the classroom. Finally, the narrative and analysis were prepared over an eight-week period between weeks 25 to 32. Chapter 4 contains the data gathered, both in terms of the field notes and the narratives, and the analysis of the data as it was compiled.

Figure 3.1: Timeline for ID, field notes, and narrative

Month	1	2	3	4	5	6	7	8	9	10
ID										
Field Notes										
Narrative & Analysis										

Research Structure – Qualitative (Narrative Method)

Fundamental to the methodology used in this research is its qualitative structure. The qualitative method is the most effective methodology to address the research question given its reflective nature. Specifically, qualitative research “seeks to probe deeply into the research setting to obtain in-depth understandings about the way things are, why they are that way, and how the participants in the context perceive them” (Gay, Mills, & Airasian, 2006, p. 14). Therefore, the application of the qualitative method to the research question allows a deeper understanding of the processes inherent in the ID experience for teachers. The specific qualitative approach used to address the research question is a narrative.

Narrative research is “the study of how different humans experience the world around them” (Gay, Mills, Airasian, 2006, p. 14). Included in the practice of the narrative method are the following four fundamental concepts: experience, time, personal knowledge, and reflection and deliberation (Clandinin & Connelly, 1991). Each of these fundamental conceptual areas is demonstrated through the narrative method used in this research, and is described below.

Consider first the concept of ‘experience’. The narrative included in this research inquiry has outlined the experiences of the researcher during the ID process in a manner similar to Dewey’s notion of the inextricable combination of education, experience, and life. This idea of Dewey’s is a foundational element of this research and is worth emphasizing. This narrative tells the story of the researcher’s experiences during the ID process relative to the research question. Second, definitively linked to the concept of experience is the concept of ‘time’. Time becomes apparent as the researcher became aware of and documented experiences as they occurred ‘in’ time, but also ‘through’ time (Lanzara, 1991). Specifically,

the researcher at specific points ‘in’ time gathered the data that represents the experiences of ID at that time. The narrative also demonstrates data collected ‘through’ time given that experiences were documented from the outset of the ID process and continued through the implementation of approximately 20% of the learning artifact – a period of time representing approximately 3.5 months (fourteen weeks). Further, the field notes, and then the narrative, were prepared in essentially a chronological order, being recorded on a weekly basis.

Third, the concept of ‘personal knowledge’ refers to the unique framework of existing constructed knowledge that the researcher brings to the narrative context. The perspective applied to the recognition and interpretation of the ID experiences reflects such personal knowledge. The content of the data in the narrative was influenced by the personal knowledge of the researcher in a variety of conceptual areas. Although it is not practical to describe in any detail the individual, social, cultural, and personal historical characteristics of the researcher to gain comprehensive insight into how and why the reflections noted were deemed noteworthy, it is of benefit to provide some basic biographical data regarding the researcher.

The researcher is a high school Business Education teacher with 14 years of public school teaching experience. Prior to beginning a career in Education, the researcher had ten years of experience in the private sector in various business management capacities. Further, the researcher’s education includes a Bachelor of Education degree with a major in Business Education, a Graduate Diploma (Educational Technology), and will have earned a Master of Arts (Teaching & Learning) upon completion of this research project. This work experience and formal education combination has oriented the researcher towards student learning activities that are highly relevant, creative, and practical, with a distinct problem-solving

focus. The researcher uses technology everyday with students taught – not with the purpose of teaching them how to use technology, but rather with the purpose of integrating technology into almost every type of learning activity undertaken with them. Finally, the researcher's approach to teaching is very hands-on, with the majority of each class time spent having students be physically engaged with learning tasks. This brief biographical sketch will help the reader to more clearly understand the perspective taken by this researcher as affected by the researcher's 'personal knowledge'.

The fourth fundamental conceptual area of the narrative inquiry is 'reflection & deliberation'. The 'reflection' element of a narrative implies a preparation for the future (Clandinin & Connelly, 1991). The narrative in this research project demonstrates a preparation for the future as reflections discussed are all directed towards future ID activities of teachers. That is, the reflections noted in this research provide support for the teacher instructional designer towards improving the quality of future ID activities. The 'deliberation' element of the narrative method implies a consideration of the past (Clandinin & Connelly, 1991). Deliberating as a component of a narrative thus refers to a cognitive process whereby events that have already occurred are noted and critically analyzed. The narrative in this research applies this concept in that each reflective event included in it describes an event that has already happened, therein implying a view back to the past. According to Clandinin & Connelly (1991), the combined effects of both reflection and deliberation result in the narrative method being both 'practical' (resulting from the reflection of experience) and 'theoretical' (the uncertainty arising from experience and thoughts of what might have been). Thus, it can be seen that the narrative method of qualitative research

is an effective inquiry method for the research question driving this project. Having said this, specifically how did the reflective process within this narrative actually occur?

Reflection, in a general sense, refers to a cognitive consideration of experiences in an attempt to make sense of them, and thereby maximize meaning from them. Costa & Kallick (2000) extend this view to include the identification of seven different types of cognitive processes of reflection. These processes include the following: drawing cognitive and emotional information from various stimuli; linking new information to previous learning; comparing intended with actual results; searching for connections and causal factors; acting on and processing inputs by analyzing, synthesizing, and evaluating; applying learning to new contexts; and metacognitive dialogues about the reflective process. These cognitive processes are precisely the types of processes used by the researcher during the narrative inquiry.

Using cognitive processes of reflection such as those above stimulated a variety of learning events for the researcher. These events are documented in the form of field notes, where the researcher would mentally note events that were occurring, and would prepare weekly sets of field notes as time permitted. These field notes represent the raw data gathered. Although, this entire research endeavor has had a reflective focus, the simple act of writing field notes regarding ID experiences in fact stimulated further reflection, similar to what reflective theorists have suggested (Gil-Garcia & Cintron, 2002). These further reflections come in the form of the narratives that were prepared regarding the field notes, and in this way complete the data that was gathered. At the same time as the narratives were being prepared, the researcher critically analyzed the now complete set of data in terms of the research question.

Conclusion

This research inquiry has sought to identify what teacher instructional designers need to be mindful of when designing Web-based learning resources. The research methodology used was a qualitative one employing the narrative method. The narrative methodology was chosen because its reflective structure most effectively facilitates the reflective nature of this research inquiry. The researcher developed the learning resource using ADDIE ID model, during which time raw data was collected in the form of reflective field notes were compiled describing the experiences. This raw gathered data was enhanced through further reflections of the completed field notes culminating in a narrative describing the experiences, and together with the field notes, represents the completed data set for this research. This completed set of gathered data forms the basis for the conclusions drawn in relation to the research question. The next chapter, Chapter 4, presents the gathered data, both field notes and narratives, as well as some critical analyses of the data.

4. RESEARCH DATA & ANALYSIS

The goal of this research project has been to unearth what considerations a teacher working in the role of an instructional designer needs to be mindful of when designing learning resources. The method used was a qualitative one examining the ID process from a teacher's perspective. Specifically, the researcher undertook to reflectively design, develop, and implement a Web-based learning resource following the ADDIE instructional design model. The reflective process used involved three key steps of reflective practice. First, the researcher reflected on observations and experiences of the ID process and documented these in the form of field notes. These field notes represent the raw data gathered for this project. Second, the researcher then reflected on the field notes to create short narratives that more comprehensively described the specific observations. These narratives, together with the field notes, represent the complete set of data obtained through this research. The third and final reflective step occurred as the researcher reflected on the completed data set to critically analyze it from a personal ID learning perspective. Throughout this project the researcher has maintained a unique triad of roles, including teacher, instructional designer, and researcher. This chapter thus contains the research data, both in raw form as field notes and the more thorough accompanying narratives, as well as the researcher's analysis of the data.

There are several key considerations to be aware of when reading this chapter, the first of which is the structure used to present it. The structure of the presentation of the data and its analysis in this chapter is a dialectical one that is intended to demonstrate the reflective ID process in terms of the connections between key learning events throughout the process. To illustrate these connections, the discourse includes a data set composed of the field notes, narrative, and resulting analysis for each sequentially occurring observation. The

data (including both field notes and related narrative) are written in first-person. On the other hand, the analysis of the data is written in third-person and follows each data set box.

Other key considerations of this chapter include the scope and sequence of the data and analysis. First, The scope of the research data and analysis described below includes a substantial portion of the designed learning resource artifact. The following discourse begins at the very outset of the Web-based ID project – the point in time when the researcher committed to the work and began to formulate ideas and plans. The reflective practice then extends through the design, development, and implementation phases of the ID artifact; culminating at the point in time when the student users had completed two of ten units using the Web resource. This includes a scope of study representing approximately 20% of the entire course as planned.

Second, the structure of the data and analysis presentation is a chronological one. That is, although specific date and time references have not been provided, each data set and accompanying narrative are sequentially presented in the order in which they were the designer's reality, and are labeled as occurring in a specific week during the 14-week ID process. Further structure is provided for the data presentation through its categorization as one of three sequentially occurring phases of ID activity. The first is the pre-development phase. This phase represents the designer's planning and cognitive efforts before actually beginning to construct the site. Phase two is the design and development phase where Web site construction began. Finally, the third phase is the implementation phase – the period of time during which the students used the developed resource.

Critical Pivots

Although this entire chapter represents a plethora of learning experiences that the researcher has had during the reflective ID process, the researcher has adopted a personalized method of highlighting key ID learning events as they have occurred. These key learning events were times when the researcher became aware of personal ID learning in a substantial form. Becoming aware of personal knowledge deficiencies, being stimulated to refocus ID efforts in this project, and feeling challenged to stop and reexamine ID efforts from a 360-degree cognitive panorama are a few examples of what the researcher perceived as key learning events during the ID process. To identify and label each of these key personal learning events, the researcher has coined the term ‘Critical Pivot’. Critical Pivots are the points in time during this ID project when the researcher experienced, for whatever reason, elevated levels of cognitive dissonance, and was thus subsequently stimulated to take some form of proactive or reactive action.

To more clearly understand the significance of the concept of a Critical Pivot, consider an analogy of a basketball player. When a basketball player is in possession of the ball, they will dribble the ball while moving closer to their ultimate goal – the opposing net. If the player encounters a member of the opposing team, or perceives that the field of play has become too convoluted to proceed along the planned trajectory, they may then stop and hold the ball. During this stoppage of forward movement they will continue to scan the court, while keeping one foot firmly planted on the floor. By keeping one foot pivoted, the player is able to critically examine the play area (all 360 degrees of it) and then select the best move before proceeding. This is a Critical Pivot. Key events were, for this researcher, like a basketball field of play event that caused one to stop (cease to move in the ID direction

currently moving in), pivot (stand firm), critically examine the developments in the field of play, and then select what was perceived to be the best move before continuing. Critical Pivots represent key aspects of the data analysis, and are thus identified and discussed as they occur throughout the ID process as represented in this chapter's data.

Now having a clearer understanding regarding the structure, scope, sequence, and content of the data and data analysis contained in this chapter, the presentation of these begins with the pre-development phase of the instructional design process.

Predevelopment - Getting Started

Data Set 1 (Week 1 of 14)

Field Notes 1

- What am I doing?
- Web site goals?
 - facilitate learning for Marketing 11 & 12 relative to PLOs
 - to be the primary learning resource for both courses – 'e-textbook'?
 - must be engaging and useful for students – not boring
 - easy for me to update
- How do I 'wrap my head' around this thing?

Researcher's Considerations 1

Once committed to the general idea of this project, it seemed imperative to me that the first step I take is to establish a clear vision of 'what' I was attempting to create. This vision took the form of a mental prototype of the course Web site, representing the articulation of several key goals defining the project. The first overall goal of this learning resource development project was to effectively facilitate student learning specific to the

prescribed learning outcomes of both Marketing 11 and Marketing 12. That is, the learning tool that I was intending to create must, first and foremost, be useful for student learning relative to the two courses for which it was designed. My second overall goal is closely related to the first. I envisioned that this Web site would serve as the primary learning resource for these two courses – an ‘e-textbook’ of sorts. I did not intend to design a stand-alone Web-based course; but rather an electronic resource that would facilitate my intended blended learning approach – one that combined face-to-face instruction with computer-based instruction. Goal number three for this site was that it would be both engaging and simple for students to use. I hoped that students would be motivated to use the site from content, context, and navigation perspectives. Finally, I had hoped that the site would be designed in a manner that facilitated constant updating. In this way my students would have access to concepts and learning activities that were current – a key feature of a subject area inextricably bound to dynamic media.

Embarking on the process of developing a cognitive framework for what this Web site was intended to be; I immediately became aware of just how challenging this project would be. The sheer size of this project was admittedly overwhelming. I began to struggle with, not only how to begin such a mammoth task, but also how I would balance its time demands within my professional and personal life. Although I was becoming more cognizant of just what I was committing myself to, I nevertheless felt compelled to continue.

Analysis of Data Set 1

The data in Data Set 1 highlights a key perception that the designer had during this initial ID activity. This perception included feelings of intense cognitive designer anxiety resulting from both the size of the ID task at hand and the lack of ID knowledge and

experience that the designer had. These feelings stimulated the first Critical Pivot. **Critical Pivot 1 emphasizes that, right from the outset of an ID project, a designer needs to articulate a cognitive vision for the intended learning resource as well as the process of instructional design through which it would be developed.** The first step in articulating this vision was to frame the initial planning efforts in simple what, why, when, where, who, and how questions. Such an exercise in establishing the initial ID planning framework by separating the large ‘whole’ into smaller ‘parts’ as represented by the above questions provided the designer with a reprieve from cognitive overload and facilitated a continuation of the planning process.

Data Set 2 (Week 1 of 14)

Field Notes 2

- Why am I doing this?
 - provides more current resources for my students
 - interest in and curiosity about ID → I want to know what instructional designers actually do
 - convinced that technology facilitates improved student learning
 - my classroom (computer lab) makes it ‘easy’ to integrate technology and Internet use
 - financial benefits – no textbooks required
- When am I doing this?
 - start now – needs to be functioning for September
 - need to have content in place before students need it
- Where am I going to do/use this?

- me → build site using my notebook computer
- students → use site in class – home use?
- Who...
 - is building the site?
 - me → support from thesis advisor and teaching peer
 - is using the site?
 - my students – characteristics?
 - skilled technology users
 - learn new technology skills quickly
 - like hands-on/authentic learning activities

Researcher's Considerations 2

Given that I had earlier articulated ‘what’ I was hoping to create when I identified my goals for this Web site, my attention then turned towards other framing questions. The first of these was the ‘why’ question; or simply, ‘Why was I doing this?’ Why would I, a teacher with limited instructional design experience, embark on such a mammoth project when print learning resources already exist for these courses? There are several justifications for my intentions. First, as a teacher I desire for my students to have access to the most current information available for the courses that I teach. Media-rich subject areas such as Marketing lose much of their inherent legitimacy for students when, as is the case with many print resources, examples and applications of concepts are often too out of date for students to identify with. Second, as a student of instructional design theory with limited ID experience, I am keenly interested in determining what professional instructional designers actually do. I perceived that the best way to do this was to learn through experience what

processes are involved in the application of the ADDIE instructional design model towards the design and development of a substantial learning resource. A third justification for this project is my professional belief that the integration of technology into teaching and learning practices facilitates improvements in student learning. This, coupled with the fact that my courses are all conducted in a computer lab, made it a natural fit that my students would use computers (and other technologies) on a daily basis. Finally, I perceived that the development and use of such a learning resource would have financial benefits to the school I work in. For example, the development of this site negates the need for the school to spend learning resources money to purchase learning resources for either of these courses, saving the school approximately \$5000 every four to five year textbook replacement cycle. Thus it can be seen that my justifications for this project are quite varied, ranging from the altruistic and theoretical to the personal and pragmatic.

Moving beyond the ‘what’ and ‘why’, I then needed to frame the ‘when’ and ‘where’ aspects of my idea. With respect to when, the timing of this project was dictated by my teaching timetable for this school year. Specifically, this was the first time that these courses were offered at my school, so it made sense to me to develop these resources now – right at the outset of the course introduction. Knowing that these courses were linear (run all year – 10 months), I would have more time to develop the site as the course progressed – even if it meant having components ready for students just as they were ready to use them. The question of ‘where’ relative to this project was a two-fold consideration: where the students would use it, and where I would create it. I had envisioned that students would mostly use the site while physically in my classroom, although the nature of the World Wide Web is such that they could access the site from any Internet access point. On the other hand, I had

planned to create the files defining the site on my own personal laptop computer to enable me to work on the site from essentially any physical location.

Proceeding now to the question of ‘who’ – I again felt the need to frame two distinct ‘who’ questions, one defining who the site designer was, and the other is the matter of ‘for whom’ is the site being developed. Consider first the matter of who is involved in creating this Web site. Right from the initial birth of the notion of the design and development of this learning resource I had determined that I would undertake the ultimate responsibility for the entire project. That is, I would design and develop the entire site myself. In order to accomplish this, it was necessary to create cognitive cohesion between three distinct roles that I would fulfill: teacher, instructional designer, and researcher. It is significant to emphasize that, even though I am the primary designer, there are several individuals whom I’ve consulted regarding various aspects of its evolution. Two of these key individuals included my thesis advisor, who has provided practical design guidance in crafting the structure of the project; while a teaching peer also provided invaluable advice regarding specific Web design elements.

The second element of the ‘who’ question I perceived as being one of the most critical – this being the description of the users of this learning resource, my students. I did not conduct any formal research into the attributes of my students prior to beginning the design and development process. Rather, I have relied on my teaching experiences with high-school-age business education students in a computer-lab instructional setting to extrapolate several key characteristics of this user population. It has been my experience that these types of students typically demonstrate a high level of comfort and skill in using computer-based technology. These students rarely require technical support, except during

the introduction of a new and specialized technological tool (new software, for example).

However, even in situations where new tools are introduced, these students learn them very quickly, presumably because they are able to quickly integrate new technological skills into their existing substantial technological skill structure. Another key observed characteristic of my students is that they are highly engaged when they are provided with a variety of learning activity types that resemble authentic work applications. Finally, I have noticed that senior-high business students enjoy learning by doing, rather than learning only by hearing or reading (as is often the case in other discipline areas). These learners appear to appreciate and benefit from spending most of every class ‘doing’, rather than listening or reading. Overall then, my teaching experiences have led me to the creation of the assumption that my vision for this Web-based learning resource would be both well received by my students and be a tool beneficial to their learning.

By this time in the conceptualization process I recognized that I had been asking many questions. Specifically, I had been asking myself many questions, and I began to wonder why. The more that I reflected on this interesting development, the more that I realized that this interrogative self-talk had become my unintentionally adopted vehicle of reflection.

Analysis of Data Set 2

Reflecting on the realization that the designer had been employing a method of self-questioning to guide the ID planning process became Critical Pivot 2. **Critical Pivot 2 is the recognition that reflective instructional designers need to create or adopt some form of actual reflective practice.** The designer in this case did not intend to adopt the self-interrogative method of reflection that was used, but once it was identified its effectiveness

was obvious. The design and posing of guiding self-questions allowed the designer to remain on a productive ID pathway and helped to maximize the reflective potential of each ID experience. Although it is unclear whether this self-interrogation is a proven effective method of reflection; what is clear is the importance of reflective designers to adopt some form of reflective practice during their ID activities.

Moving forward from this Critical Pivot and having established a relatively clear cognitive prototype of the developing learning resource, at least in terms of the ‘five W’s’, the designer then needed to begin to conceptualize ‘how’ this feat was going to be accomplished. Needing to employ a framework of some sort to begin this task, the designer opted to divide the initial conceptualization of developing a method or plan of attack into two distinct yet related conceptual areas: instructional design (ID), and Web-site design.

Pre-development - Instructional Design

Data Set 3 (Week 2 of 14)

Field Notes 3

- ID method: ADDIE (analysis, design, development, implementation, evaluation)
- ‘analysis’: learners (done) – learning goals (not done)
- learning goals: from prescribed learning outcomes → translate into ‘units’
- units: divide into ‘learning topics’ – need to address learning outcomes but also be engaging for students
- learning topics – format:
 - introduction → sets stage for topic/content – connects with previous learning
 - objectives → adapted from IRP and written to identify intended learning – directly address learning from activities

- content → provides background knowledge – intended to be brief (students may not be able to read from screen for long – also, too much time spent reading takes away from time on task for practical work) – content to be written by me if no suitable Web resource found
- activities → intended for students to explore, review, and apply content to achieve learning outcomes
- summary → provides closure for section and sets stage for next topic

Researcher's Considerations 3

The approach to instructional design employed throughout this project was the application of the ADDIE model. Although the five phases of the ADDIE model (analysis, design, development, implementation, evaluation) are often perceived as occurring sequentially, I found that during my ID efforts in this pre-development phase I actually alternated back and forth between ‘analysis’ and ‘design’ activities. I began this phase with a thoughtful analysis of the intended learning outcomes for both courses (British Columbia Ministry of Education, 1998). Given that these general learning goals represented the fundamental learning that students were expected to demonstrate through each courses’ learning activities, these learning outcomes became my basic vision of what my students’ learning might look like at the end of each course. From this austere frame representing general learning, I then began to devise more specific conceptual categories – each of which evolved into key topic areas that I identified as units. The adaptation of the learning outcomes into a content framework of conceptual units represented one of the first ‘design’ works in this project. Table 4.1 below outlines the units devised for each course.

Table 4.1: Units of Study for Marketing 11 & 12

Marketing 11	Marketing 12
1. What is Marketing?	1. What is Marketing?
2. Consumer Behavior	2. Consumer Behavior
3. Advertising (Print Ads)	3. Advertising (Web Ads)
4. Promotion (Retail Focus)	4. Promotion (Global Focus)
5. Music in Marketing	5. Music in Marketing
6. Advertising (Radio Ads)	6. Advertising (TV Ads)
7. Price (Retail Focus)	7. Price (Global Focus)
8. Product (Logos & Slogans)	8. Product (Logos & Slogans)
9. Place (Retail Store Design)	9. Place (Distribution)
10. Non-traditional Marketing	10. Future of Global Marketing

The content and sequence of each of these units represented, not only the goal of meeting learning outcomes, but also was intended to engage students while also being sensitive to expected ebbs and flows of school activity throughout the school year. My final consideration of ID during this pre-development phase was the specific topics, and the resulting activities, that would comprise each of the units. For example, Table 4.2 below presents the first subdivision of Unit 1 into its component topics. These specific learning topics, once they are all designed, will represent the culmination of my vision for what my students' learning will look like by the end of the course.

Table 4.2: Topics of Study for Unit 1 ('What is Marketing?')

Topic	Activity Title
1-1: Introduction	Introduction to Marketing
1-2: The Marketing Mix	Marketing Mixology
1-3: Marketing Environment	External Influences
1-4: Marketing Research	Diggin' for Data

If the creation of an ideal vision of what my students' learning would look like was the first ID hurdle that I had to navigate over during this phase, then the second one was the question of what component parts would comprise the site pages. The design of the site as a whole is discussed in a later section, but here I present what I selected to include in the primary unit and sub-unit pages. Each unit was listed as a component of a table displaying all current and past units. This was designed to facilitate easy navigation for students, both when accessing current activities, as well as accessing previous learning artifacts. Figure 4.1 illustrates this table format. Each unit was then further divided into smaller conceptual areas referred to as topics. These topic pages identified more specific areas of intended learning and included the following consistent elements: introduction, objectives, recommended resources, content, and activities. A sample of a portion of one of these topic pages is presented in Figure 4.2.

Figure 4.1: Screen shot of table structure for units and activities.



advertising

and business promotion



ADV 11 - Course Plan

home

ADV 11

ADV 12

cool stuff

attic


Unit 1 - What is 'marketing'?	
TOPIC	ACTIVITIES
Course Outline	Course Outline (html) (pdf)
1-1: Introduction	Introduction to Marketing (html) (pdf)
1-2: The Marketing Mix	Marketing Mixology (html) (pdf)
1-3: Marketing Environment	External Influences (html) (pdf)
1-4: Marketing Research	Diggin' for Data (html) (pdf)
Unit 2 - Consumer Behavior & Market Segmentation	
TOPIC	ACTIVITIES
2-1: Consumer Decision-making Process	How Consumers Make Buying Decisions (html) (pdf)
2-2: Influences on Consumer Behavior	What Makes Consumers Buy - Really? (html) (pdf)
2-3: Market Segmentation	Divide and Conquer (html) (pdf)
Unit 3 - Advertising (print ads)	
TOPIC	ACTIVITIES
3-1: What is Advertising?	Messages & Media (html) (pdf)
3-2: Print Ads & Graphic Design	Planning Your Print Ads (html) (pdf)







Figure 4.2: Sample of topic page

	<h2 style="text-align: center;">advertising - business promotion II</h2> <h3 style="text-align: center;">1-1: Introduction to Marketing</h3>
introduction	<p>Whether we recognize it or not, marketing is a part of our everyday lives. Any organization (business, charity, government, club, etc.) participates in a variety of marketing activities. But what exactly is 'marketing'? This first part of Unit 1 will seek to answer this question and provide the foundation for the remainder of the course.</p>
objectives	<p>By the end of this section, you should be able to...</p> <ul style="list-style-type: none"> ◆ define 'marketing'. ◆ describe the typical marketing process. ◆ identify the socially responsible marketing efforts of existing organizations. ◆ identify the similarities in the marketing activities of for-profit and not-for-profit organizations.
suggested resources	<p>The following resources will be helpful for this section:</p> <ul style="list-style-type: none"> ◆ <i>Marketing</i> from Wikipedia ◆ <i>Principles Part 1: About Marketing</i> from KnowThis ◆ <i>Dictionary of Marketing Terms</i> from American Marketing Association
what is marketing?	<p>Businesses and other organizations are constantly vying for attention, whether they're trying to 'sell' a product, service, or idea. Marketing is the name given to such activities. Specifically, marketing is defined as, "an organizational function and a set of processes for creating, communicating and delivering value to customers and for managing customer relationships in ways that benefit the organization and its stakeholders" (American Marketing Association).</p> <p>Marketing activities that organizations undertake are extremely varied, but they're all similar in</p>

The introduction was presented with a dual purpose: introducing the theme of current learning and encouraging scaffolding upon previous learning. Objectives for each topic area were written as interpretations of course PLO's and were created to present to students an image of what learning regarding this topic might look like. The next section, recommended resources, included Web-based resources that would provide students with further opportunities for concept review and application. The content section that followed consisted of the knowledge that I deemed important for this topic. It consisted of links to external sites containing data that I had sourced for the topic and/or content that I wrote. Finally, each topic was to include a number of student learning activities intended for students to identify, construct, and demonstrate knowledge of the topic area through practical application and exploration. Assessment of student learning was identified in each activity, and varied in form and value. Having now sketched out the pre-development framework for ID, I then proceeded to plan the details of the Web design for this site.

Pre-development - Web Design

Data Set 4 (Week 2 of 14)

Field Notes 4

- Who was I designing this site for? My students – so...
 - what should the site 'look' like?
 - what should the site 'feel' like?
 - site must be both educationally sound and engaging – it's all about the students!
- What software should I use for the site construction?

Researcher's Considerations 4

The second key consideration during the pre-development phase of this site involved the planning relative to the actual Web-site design. Prior to this project I had designed and created a total of only two Web sites – neither one being nearly as large as the potential final size of this site. However, even as I began to become aware of the enormous size of this current endeavor, I was confident that I was capable of achieving my design-for-learning goals if I developed some type of guiding framework. The guiding framework that I elected to use again involved a reflective process of posing key questions to myself. This time, the questions included: For whom was I designing this site? What should the site ‘look’ like? What should the site ‘feel’ like when used? And, what software tools should I use to accomplish the site goals?

The first guiding questions I used for the Web design, ‘for whom was I designing this site?’ has already been approached earlier in this narrative. However, I once again found myself carefully considering my perceptions of the attributes of my students (the users of this learning resource); this time not in terms of ID, but rather in terms of Web design. If I intended for my students to use and learn from this learning tool, then I clearly needed to design the Web site to be both engaging and educationally effective. Remembering that ‘it’s all about the students’, I recognized that what my students will see and how they would interact with the site are key elements of its effectiveness. It became apparent to me that the attributes of the users of this learning resource are influencing every single aspect of its design.

Analysis of Data Set 4

The researcher's reflections regarding the influence of learner characteristics on the design of the artifact resulted in the identification of Critical Pivot 3. **Critical Pivot 3 represents the realization that all efforts towards the design of a learning resource must be grounded in the characteristics of the targeted learners.** In order for this learning artifact to achieve its goal of educational effectiveness, every aspect of its design and construction must be perceived and evaluated through the lens of its students. This means that the designer needs to attempt to view, not only the ID processes, but also the Web design efforts from the perspective of its users. Once the designer has recognized and accepted the fundamental need to filter all design efforts through the lens of the student users, it was then possible to apply this perspective to the design of the Web site.

Data Set 5 (Week 2 of 14)

Field Notes 5

- basic site design goals:
 - simple – table format – don't want 'flashy' site (distracts from site purpose)
 - consistent – develop templates and design guidelines to keep look and feel consistent
 - clean look – uncluttered
- color ideas:
 - bright, but not overpowering or distracting
 - white background – simple clean look and facilitates ease of reading
 - primary design colors: orange, blue, green (derived from color wheel – colors are a triad of complementary colors)

- corporate logos and links
 - look ‘cool’
 - add marketing feel to page
 - add authenticity – links allow students to explore effective marketing in action
- Web site depth and breadth
 - depth: use ‘shallow’ structure → no more than three levels deep from course start page
 - breadth: will become quite ‘wide’ as content is developed
- navigation: each topic page opens in new window – main window stays open

Researcher’s Considerations 5

What did I want my students to see, and not see, on each of the pages? Although this site-specific issue seems simple enough, I admittedly underestimated the time and effort that was going to be required to create a design framework that I perceived would be both useful and appealing to my students. From a visual design perspective I had wanted the site to appeal to my Marketing students in terms of its visual simplicity, clean look, and slightly quirky color palette. Site design elements such as colors used, page layout, site depth and breadth, and the interface design were all designed with this simple look in mind. For example, consider my thought processes regarding color selection. I had wanted the primary colors of the site to be bright and fresh, reflecting (hopefully) the fresh approach I’d intended to take with this course and its learning activities. Orange was my primary color, both because it represented a bright and friendly aura, and because it also happened to be my favorite color. Not being an experienced graphic designer, I did not know where to search for colors to complement the bright orange. However, by using a color wheel, I discovered

that the bright orange hue that I had started with was part of a triad of complementary colors that also included a bright green and a deep blue shade. These three colors became the primary accent colors for the site. To facilitate ease of reading, I chose a white page background with simple black text.

Another pre-development consideration for this site was the page layout. I chose to adopt a table format for all of the pages because of its simple look and ease of use. The table format facilitates ease of use for my students by providing a clear and easy to follow structure, instead of an overly ‘flashy’ one usually found on entertainment Web sites. Using tables also allowed me to develop page templates that ensured the site looked consistent as well as made it much easier to add new pages. Site navigation buttons would be located on the left side of main pages with content presented in the center. The right side of the main pages would contain a variety of corporate logos linked to their respective company Web sites. I included these logos as a design element that also provided ‘real life’ examples of companies engaged in interesting advertising. All in all, my pre-development page layout goal was to keep the pages simple and easy to use, both for my students and for myself.

Planning the depth and breadth of the entire site was my next activity. Here, I elected to keep the site very ‘shallow’, while allowing the breadth to continually expand as the site developed. By shallow I mean to suggest that, from the course start page, I did not want to have students proceed more than three links deep into the site. Otherwise, they might become disoriented in their site navigation. The site would eventually become quite wide as new content was added; however, I intended to manage this by using the units and subsections as content organizers, thus giving the site a more manageable breadth perception. These notions of the intended depth and breadth of the site were all determined when I

produced a simple flowchart-type sketch of my site structure ideas and determined that, at least ‘on paper’, they should work. Figure 4.3 demonstrates the breadth and depth of the site for the first two planned units of study for Marketing 11.

Figure 4.3: Sample of depth and breadth of Web site (Units 1 & 2 from Marketing 11)



The final Web-design set of decisions that I made in the pre-development phase related to the interface of each page. Admittedly, as I planned the site design, I did not know much about Web-site usability, yet I knew that it was important. With this limited knowledge I sketched the site as having main page navigation buttons on each main page. This was intended to facilitate student navigation between the main pages (Home, Advertising 11 course page, Advertising 12 course page, Cool Stuff, and Attic) using the internal links and 'Back' button. On the other hand, I wanted students to perceive topic pages (lesson topics) as 'stand-alone' artifacts. To accommodate the creation of this perception I chose to sketch these as opening in new windows. Ultimately, my goals for this site in terms of its interface were, again, to keep the site both simple and usable.

Design & Development Phase

Data Set 6 (Week 3 of 14)

Field Notes 6

- site construction = development
- why am I spending so much time in 'design' activities even after I've started to dig in to 'development' activities?

Researcher's Considerations 6

The point in time when I moved to the 'design & development' phase from the 'pre-development' phase was when I started Macromedia Dreamweaver and began building the site I had been planning and sketching for some time. During this time I was engaged in three types of activities simultaneously. I was learning how to use the software, I was applying these software skills to the creation of my planned Web pages, and I was editing or refining my ID designs. However, the further I delved into the actual development of the

site, the more I recognized that I was expending as much or more cognitive effort on my design ideas as I was on the actual site constructions. Beginning to work on the site construction (development) did not result in any less effort being spent on design activities. Why is this?

Analysis of Data Set 6

The designer at this point in the ID process identified Critical Pivot 4. **Critical Pivot 4 is the recognition that the ‘design’ and ‘development’ phases of the ADDIE model being using are not distinct ID constructs; but are instead closely related components of a single process.** That is, as the designer purposefully translated designs from the pre-development phase into constructed Web pages in this phase, it became apparent that the designer was engaging in ‘design’ and ‘development’ aspects of the ADDIE model, not in a linear progression, but rather in a somewhat circular direction. Each decision that the designer faced in this process was clearly not an isolated event soon to be forgotten; but was rather an event that itself shaped further events. The designer thus perceived ‘design’ and ‘development’ phases as interrelated ID activities, or perhaps even as two perspectives on the same activity – two different sides of the same coin.

Moving to the design & development phase from the pre-development phase was essentially a move from the ‘plan’ to ‘action’, or from the cognitive to the physical. However, the designer began to perceive that each phase was more a different manifestation of similar ideas through interdependent processes than a distinct phase completed and then discarded. Planning and action became one and the same at this point in the ID process. Revisiting planning concepts from the pre-development phase became a natural extension of the physical efforts to construct this learning resource. Therefore, rather than discuss how

each planning element was implemented in the Web site, the following discussion will outline some of the key elements the designer encountered in the design and development phase, revisiting some, but not all, of the previously stated planning experiences.

Design & Development: Instructional Design

Data Set 7 (Week 3 of 14)

Field Notes 7

- content development: PLOs → units → learning topics
- learning topics development: two methods used
 - PLOs → content → activities
 - PLOs → activities → content
- scaffolds – try to link new content to previous content and previous knowledge
- include ‘fun’ units – eg. ‘music in marketing’
- content is based on IRPs, but style and activities are starting to reflect what I like to do with students – is this good/bad/indifferent?

Researcher’s Considerations 7

Earlier in this narrative I identified one of the primary goals of the Web site as being the facilitation of student learning in accordance with the prescribed learning outcomes (PLOs) outlined by the integrated resource package (IRP) for Marketing 11 and 12. My first instructional design task in the design and development phase was to revisit the curriculum document and ensure that my initial plans were in fact parallel to the published PLOs. Given that the IRPs for these courses are presented using ubiquitous language, it was necessary for me to both interpret their content as well as translate them into learning scaffolds. The broad nature of the curricular expectations afforded me the latitude to design learning activities that

not only met learning outcomes, but were also of interest to my students. For example, among the planned units I included ones that focused on the design and development of four key types of advertising media (print, radio, Web-based, and video), as well as a unit focusing on the role of music in marketing. These were included, not just to achieve specific learning outcomes, but also to provide engaging and enjoyable authentic learning experiences for my students.

Creating learning scaffolds from the foundational curriculum outline involved the sourcing and creation of both content and activities. Building from the scope and sequence of intended learning sketched out during the pre-development phase, I began to formulate content and activities; sometimes first establishing content and then activities, and other times designing activities which themselves revealed content. Either method was predicated on the goal of helping students demonstrate targeted learning outcomes. The further that I proceeded into the realm of the design of both content and learning activities, the more that I became aware of the true extent of my actions as a teacher instructional designer.

Analysis of Data Set 7

The act of reflecting on the nature and construct of the learning activities being created in this learning resource resulted in the designer identifying the fifth Critical Pivot. **Critical Pivot 5 is the designer's revelation that acting in the dual roles of teacher and instructional designer was adding a richer dimension to the ID process compared to a situation where the designer is creating learning situations for a distant audience.** The key element here was that the learning experiences being designed would not be external to the designer, but would instead be experienced by the designer at the same time as by the learners. This added a personal, albeit subjective, element to the tone of ID. For example,

the designer's personality, teaching and learning preferences, and personal convictions related to epistemology and pedagogy was beginning to become apparent on the design activities. It was found that the designer was designing learning experiences to be both educationally sound for the students as well as 'enjoyable' for the designer to be engaged in with the students. Herein lies evidence of the personal imprint that each instructional designer or educator leaves on students via the inclusion (and omission) of specific intentionally constructed learning experiences. Being respectful of the influences of being both teacher and instructional designer, the designer then proceeded to refocus design efforts in the design and development phase.

Data Set 8 (Week 3 of 14)

Field Notes 8

- topic pages – be careful to use language appropriate for high school students – not too complex, yet not too simple
- vocabulary – need to address vocabulary specific to marketing – two step process:
 - new terms identified in topic pages as 'boldface' terms and accompanied by definition
 - review and evaluate vocabulary learning with vocabulary quiz at the end of the unit
- ordering system for units and topic pages – what type to use?
 - options considered:
 - option 1: number units (eg. 1, 2, etc.) and number topic pages subordately (eg. 1-1, 1-2, etc.) within each unit

- option 2: name units (eg. What is marketing?) and number topic pages in succession (eg. 1, 2, 3, etc.)
- option 1 chosen for now – not sure if this is the best method – is there a method that is ‘least’ confusing for students?

Researcher’s Considerations 8

Continuing to develop the pages of the site I recognized the need to address a number of specific ID issues as they arose. One of these was the need to pay close attention to the language through which I was communicating. Given that I had myself been engaged in graduate-level academic writing for several years, I found that my early use of writing language on the Web pages was more appropriate for a graduate-level academic context than it was for a high school level classroom context. I had to consciously write (and often rewrite) sentences on Web pages to ensure that it would be clearly understood by my students. This proved to be yet another example of how I needed to continually focus my design and development efforts on the attributes of my high school audience.

My attention towards the language I used in the creation of Web content extended then to questions of how I would address the unique terms and concepts inherent in the Marketing field of practice. Marketing, as a field of practice or a field of study, is defined by its own collection of unique terms and concepts. I elected to present and reinforce these concepts in two ways. First, I emphasized these terms on the Web pages by using a bold typeface for them, and also included a definition for each new term. Second, I then reinforced the terms by having students study for, and then write a brief written quiz on these terms at the end of the unit. Overall then, the language that I communicated to students

through, whether general writing or the identification of key terms, was a key planning and application consideration during the early design and development phase.

The next item for consideration was the system of ordering and labeling the units and sub-units. I chose what I thought would be a simple ordering method, where each unit was numbered, and each sub-unit was sub-numbered. For example, the first unit was ‘Unit 1’, and was comprised of subsections 1-1, 1-2, 1-3, and 1-4. Student activities in each subsection were ordered alphabetically. That is, activities in section 1-1 were identified as 1-1a, 1-1b, and 1-1c. Although this simple ordered system seemed as if it would be effective, I admit to not being entirely satisfied with it. I was questioning whether it might be confusing during use – especially when we were ‘between sections’ (starting new sections while some students were still completing the previous section). The more I reflected on developing an ordering structure for this site, the more that I experienced heightened levels of design indecision. Why was I becoming so concerned with such a relatively trivial design consideration?

Analysis of Data Set 8

The designer’s growing level of indecision relative to the numbering of the units and topic pages hastened the identification of Critical Pivot 6. **Critical Pivot 6 is the realization that ID efforts are directly influenced by the intended useful life of the learning resource being created.** The designer intended for this resource to be enduring, having a useful life of at least several years, so every design decision being made was influenced by the hope that it would be useful, not just in the short term, but for several years to come. Therefore, it was necessary to create an organizational structure that would be more long-term focused as opposed to one for a learning artifact that would be disposed of after one or

two uses. The designer recognized that the amount of design effort being expended on this seemingly trivial element reinforced the intention that this learning resource be enduring – used, edited, and reused many times.

Data Set 9 (Week 3 of 14)

Field Notes 9

- references/copyrights – have included links for external references, but no references page for sources used in my writing – need to establish ‘References’ page
- lesson plans – chose not to post on Web site because it might discourage student attendance (ie. if lesson plans, content, resources, and activities are all online then the course begins to look like CBL) – also, by discouraging the drift towards CBL the course maintains more of the ‘human’ element of the teaching/learning process
- although I’m working on ‘instructional’ design, it’s starting to look much like ‘Web’ design

Researcher’s Considerations 9

As I developed the finished content for the first unit I realized that I had not fully planned for the existence of a specific references section. Each unit and its activities included a number of identified direct links to external Web sites used for the content they provided. However, the content that I wrote did not specifically reference any sources. It became clear to me that I needed to develop a system and framework for referencing, not only to address legal copyright issues, but also to appease my own ethical concerns on this issue. I elected to employ a very simple system of references to remedy this. Any content that was prepared using a source not directly linked on the Web page was followed by a

numerical superscript hyperlink that opened up a new window containing the References page.

Yet another decision that I consciously made during this phase related to content I chose to omit from the site. That is, I purposefully omitted posting lesson plans for specific class dates on the Web site. The main reason why I took this approach was to avoid having this site evolve into a ‘stand-alone’ or CBL (Computer-Based Learning) course. The site already contained most of the course content and student activities, but if I included daily lesson plans then students may be less inclined to attend class. I wanted to encourage, not discourage, student attendance to maintain the human element of our teaching/learning experiences. After all, I was developing this site to act as a primary learning resource for use within my class context, and not as a stand-alone distance-learning type course.

My experiences with ID during the design and development phase were varied and enlightening. The narrative has thus far described some of my experiences relative to ID during this phase. However, before I begin to discuss my experiences with the other key element of this phase, Web design, it is important to understand that the procedural lines between ID and Web design were starting to blur. That is, as I proceeded further and further into this project, I began to perceive that many Web design decisions that I made were also ID decisions; and conversely, many ID decisions that I made were also Web design decisions.

Analysis of Data Set 9

Entering into Web design activities after having spent some effort in ID, the designer discovered the nature of the relationship between ID and Web design in this project. This became Critical Pivot number seven. **Critical Pivot 7 in this reflective instructional design**

odyssey relates to the perception of the relationship between ID and the medium for which it's being used – specifically, the ‘reciprocal’ nature of the relationship. That is, the closer an instructional designer gets to the goal of a finished learning artifact, the more difficult it becomes to separate ID efforts from those directed at the medium being designed for. In the case of this ID project, the deeper the designer delved into the ID process, the closer the relationship between ID and Web design became. ID decisions directly affected Web design decisions, and vice versa. Therefore, given the interdependent relationship between ID and Web design in this project, the following section describing the specific Web design activities during this phase cannot be considered alone; rather, they must be considered in the context of the ID processes that amplify them.

Design & Development - Web-Site Design

The Web design considerations that framed the development phase of this site were, as with the ID considerations, ones that involved a revisiting of the decisions made during the pre-development phase, with one key difference. During this phase construction began on the first site prototype. Here it was discovered that Web design, although inextricably entwined with ID, presented challenges that were often quite different than what had been experienced during the ID process. What follows below is a discussion regarding some of the Web design observations that have not yet been presented in the ID section.

Data Set 10 (Week 4 of 14)

Field Notes 10

- Web design – what does a ‘good’ educational Web site look like?
 - no clear answers – but good great design principles from three great resources (Cato, 2001, Horton, 2006, and Lynch & Horton, 2002).

- learning software – very time-consuming to learn software at same time as trying to apply it to design of site – beginning to think that ‘doing everything myself’ for this Web site was a bad idea – no wonder so many ID resources refer to ID ‘teams’ where one or more team members are responsible only for Web design
- learning software – use manuals, Web sites, tutorials built in to software, and peer support for learning – I guess I’m using a ‘just in time’ training method
- Web browsers – I’m building the site using Firefox as my default browser – not a good idea – school’s computers all use IE so I’m having sporadic formatting issues – pages don’t look the same on school computers as they do on mine
- designing the learning resource, building the site, and learning all of this stuff is very time-consuming!

Researcher’s Considerations 10

The first example of my learning relative to Web design was attempting to ascertain specifically what a ‘good’ educational Web site should look and feel like. Although I had planned the site architecture quite thoroughly during the previous phase, I found that I was still having difficulty establishing exactly what ‘good’ Web design includes. As a result, I made frequent reference to Web design resources such as those prepared by Lynch & Horton (2002), Horton (2006), and Cato (2001). Once I had become aware of principles of effective Web design from these resources, I was then able to translate and apply these principles into constructed Web page elements. Although learning even basic principles of Web design was challenging at first, it was much less daunting a task than that of learning and using the appropriate Web design software tools.

I mentioned earlier that I had elected to use Macromedia Dreamweaver and Fireworks because they were readily available to me, and also because they are widely considered to be premium tools for the WYSIWYG (‘what-you-see-is-what-you-get’) Web developer. The challenge that I faced now was, to not only effectively use these tools, but also to learn how to use them at the same time. I opted to learn these programs on a ‘just-in-time’ basis – learning the software functions to accomplish my design goals at the time that I needed to apply them to the site construction. Learning the software just in time to use it added a significant amount of time to the development phase. Having already developed a reasonable level of information technology proficiency, I was able to learn the new software relatively quickly. However, I do question whether the novice technology using teacher might be overwhelmed with having to learning Web design, Web design software, and instructional design all at the same time. Reflecting on this substantial task, I was reminded of readings regarding ID where a team-based approach to ID was often recommended. This ‘team’ would include among its ranks Web development specialists – people highly skilled in the construction of Web sites. I now clearly recognized how and why this may be a more efficient use of design time, especially given how much time I was spending on this.

Other than the broad issues of Web site design and software use, I also encountered several smaller specific situations relative to Web design during this phase. One of these situations was my experience with different Web browsers. I quickly discovered that Web pages viewed through one Web browser would not necessarily look the same when viewed through another Web browser. Although I found this quite frustrating, I came to understand that this is not unusual in the realm of Web design. I chose to address this issue through

determined procrastination. That is, I simply did not have the time to ‘solve’ this issue at this time, so I elected instead to postpone its resolution to some future date.

Analysis of Data Set 10

Critical Pivot 8 was uncovered during these reflections regarding the time cost of this project. Simply stated, **Critical Pivot 8 underscores the fact that time is an ever-present influence on ID activities.** It is obvious that design and development activities necessarily require time to complete, regardless of the context in which they are undertaken. ID may be very time consuming, while Web design (or design through another communication medium) is also time-consuming. However, this designer perceived that the time demands of this particular ID project were even more intense than what a typical instructional designer might face, given that the designer was undertaking these activities at the same time as being employed as a classroom teacher. Once it was recognized and accepted that the demands of time were inevitable, it was then possible to resolve the time management dilemma in a simple manner. The simple solution at this time was that whenever time constraints became intense, and this did occur frequently, the designer simply reviewed and reordered the ID priorities to take into account the time that was available. It is highly likely that the time demands of teachers engaging in significant ID projects would always be significant.

Data Set 11 (Week 4 of 14)

Field Notes 11

- broken links – after visiting several resource sites with broken links I determined not to have any broken links on this site – how do you make sure of this?
 - be careful – use copy/paste of proven urls rather than typing them in
 - test all links immediately after uploading the page

- page versions and edits – how to maintain some record of page versions?
 - keep all active files in one folder and older versions in another folder – adjust file names to keep separate

Researcher's Considerations 11

The next specific Web design issue that I encountered during this phase was establishing a system for ensuring the accuracy of both external and internal links. Visiting Web sites that have broken links has always been a Web surfing frustration for me, so I intended to make every effort to ensure that my constructed pages were free of such navigational roadblocks. My initial plan of action involved careful target file listing, followed by an immediate local file browser link test, and then concluded with testing of all links after the site pages were uploaded to the Web server. This simple link-testing system was mostly effective, yet I still had two occasions when links I had provided were broken by the time students went to use them. Continued diligence on my part would be required to ensure that such broken links were not a regular part of my students' experiences with this Web site.

The final Web design issue that I noted during this phase was the question of how to establish and maintain a system of page edits and revisions. Although I had almost completed construction of the first two units of this site, I recognized that the future would bring numerous revisions to this ID artifact. However, I had not yet developed any type of system for recording and archiving pages that have been revised. To remedy this I opted to employ two file sets for this site. One would be the active file, the electronic folder that contained the most current uploaded files for the site. The other would contain earlier versions of revised pages archived using altered file names to denote version numbers.

Having thus addressed what I perceived to be the major ID and Web design issues arising from the design and development phase of this project, I was ready to move into the next phase – the implementation of this learning resource in my classroom with my students.

Implementation Phase

After numerous hours of planning, sketching, and ultimately constructing the Web site, the moment of truth had finally arrived – the first day of class and students were about to use the learning resource for the first time, and thus begin a process that would continue at least until the end of the course. The designer’s experiences during this third and final phase of the research related to the reflective ID process used to develop this learning tool were every bit as rich as had been experienced during the first two phases. For the first time in this project the designer was about to experience the ‘implementation’ phase of the ADDIE ID model that had been the design guide throughout. To describe these experiences, the following reflections have been divided into three general categories: general observations of student use, ID observations, and Web design observations.

Implementation Phase – Student Use

Data Set 12 (Week 5 of 14)

Field Notes 12

- students are ‘using’ the site right from day one
 - students exploring sections and links, both internal and external to the site (eg. logos and resources in ‘Cool Stuff’)
 - some reading of page content is evident – however many appear to skim read or even skip much of text content (I wonder, is this any different than how they use textbooks?)

- feedback from students – no student comments are made to me at all during this early stage – no negative comments or complaints, but neither any positive comments or accolades

Researcher's Considerations 12

Beginning with general observations, there were several key elements of students' use of the site that became immediately obvious to me. The first of these is that their use of the site was immediate and apparently effortless. I began the first instructional class using the site with a short 10-15 minute tour of the site and its intentions, and then set students free to explore its contents. They immediately began to explore the content, the different site sections, and the links (both internal and external). During this time there were no student questions related to what any particular site element was. Also, students were able to navigate without any further instruction. Seeing students engage with this resource in this way was invigorating. For the first time, I was able to see this resource actually beginning to bear fruit.

Second, as the students and I began to delve into the content and activities that were outlined in the first unit, I became aware of the amount of reading that students were doing on these Web pages. That is, even though I had purposely written pages with what I thought was as little text as possible (having perceived that high school age students are not very likely to read long online articles), I became aware that many students were only skim-reading, if reading at all. My first internal reaction to this reality was one of bewilderment. Didn't they know how much time and effort I had put into making sure that the site pages contained as little text as possible? Didn't they appreciate what it was and what was involved in its creation? Clearly I was expecting more of a positive initial 'educational'

reaction to the site, but I quickly realized that, to my students, this site was likely perceived as ‘just another learning resource’. Reflecting on this reality, I pondered whether students actually ‘read’ other learning resources, like textbooks for example. Reading as part of the learning process is, I suggest, less valuable to students than reading that results in specific assessment activities. In other words, I was proposing that students were reading the content on my site’s pages about as much as they would read a traditional textbook – unless of course the reading directly resulted in some assessment, such as a mark of some sort.

My third observation of general student use of this site early in the implementation phase was the amount and nature of the feedback that I received from students regarding the site itself. I had never solicited any feedback from students regarding the site and, much to my surprise, that’s exactly what I got – nothing! No verbal feedback was offered from students at all, neither ‘good’ nor ‘bad’. This was quite disconcerting to me at first. However, the more that I thought about it, the more I began to perceive this as more likely positive than negative. That is, it has been my experience that high school students (not unlike adults) are much more likely to comment on negatives they perceive in a learning situation than they are to comment on any positives. The fact that they were not providing negative comments about the site was interpreted by me as being ‘good news’, at least as far as ‘no news is good news’.

Data Set 13 (Week 6 of 14)

Field Notes 13

- student computer skill – early observations suggest that students have sufficient computer skill to effectively use the site
 - browser use appears strong

- use of MS Word is effortless – students have skill necessary to complete Word-based activities without difficulty
- may need instruction on how to keep electronic files organized on network drives
- use of FirstClass software for email required some instruction – for example, sending emails with attachments was new to some – FirstClass is not an application that many students use often
- navigation – students appear to have no trouble navigating through site – the only issue was in reminding them of the site url
- on-task behavior – students’ on-task behavior has been good so far – speculate that hands-on computer use helps keep them engaged
 - better on-task behavior in these classes compared to Accounting 11 (course that is textbook based) – not a huge difference, but a noticeable one

Researcher’s Considerations 13

Early into the conceptualization and planning of this site I had anticipated that students would not have any difficulty with the technology being used. This prediction was certainly borne out through early observations. Students navigated through Web pages and Microsoft Word documents with fluency and independence. The only areas of computer use that students required early instruction in were file organization and some skills specific to the communications software (FirstClass) that we use in our school district. These early observations confirmed to me the potential of this type of learning resource as a foundational tool for the high school teaching and learning environment, at least in terms of its usability.

Yet another early observation that I made during the implementation phase was the level of on-task behavior that students appeared to be engaged in. Off-task behavior resulting in classroom management issues was virtually non-existent during this time. I speculate that the presence and use of computers for almost all learning activities thus far has helped to keep students engaged in the tasks at hand, at least when compared to another course that I teach (Accounting 11), where students work in the same computer lab yet almost never use the computers. Overall, the students using the learning resource developed in this project have demonstrated high levels of engagement up to this point.

Data Set 14 (Week 7 of 14)

Field Notes 14

- submitting assignments – somewhat challenging determining which method was the most efficient for me and the most efficient for students to use consistently
 - emailing assignments is simple for students – moderately time-consuming for me as I must save each file, make comments, re-save, and return email to student – problem of needing to be at my computer for review and assessment of student activities
 - using ‘Handin’ folder on the network drive is effective students (simple) – however, once I’ve marked them I need to either print and return them, or save and email them back to students
 - printing assignments – simplest to use (both for students and myself), but uses too much paper

Researcher’s Considerations 14

Moving beyond my initial observations, there were several logistical elements resulting from the site use that I became aware of. First, I had thus far used three different

methods of receiving students' completed assignments, none of which appeared to be an 'ideal' method. One of these methods was email. Having students submit work using this method was easy for them, yet time-consuming for me, as I needed to evaluate each piece at my computer, then save and email it back to the student. Email submission of assignments was good for students, good for the environment (paperless), yet bad for me. The second method that I tried was to have students copy/paste finished work into a protected electronic folder on one of the school's network drives. Like email, this method was good for students and the environment, but not so time-efficient for me, for reasons similar to the email option. The final method that I tried was to simply have students print work and physically hand it in. I found this method to be easier for me and just as easy for students, yet it was the worst environmental option of the three. The bottom line is that, even though the framework of this learning resource is electronic, there was still an apparent chasm between what I, as an instructional designer, wished to do and what the technology immediately available to me was capable of doing. It seemed 'crazy' that a process as basic as how students submit completed work would cause me such concern.

Analysis of Data Set 14

The frustration that the designer felt with being unable to find an efficient solution to a simple 'student submission method' problem led to the ninth Critical Pivot of this research. **Critical Pivot 9 refers to the recognition that all of the aspects of the teaching and learning experience being created are components of the ID process and therefore must be considered as such.** Previous to this point in the reflective journey the designer had misinterpreted the role of logistical systems such as how students submit work for assessment. It was mistakenly thought that they were beyond the realm of ID, and were

instead simply a component of a distinct related educational conceptual construct known as ‘administrative tasks’. The learning evidenced through this Critical Pivot included the recognition that all aspects of the teaching and learning environment were in fact part of the ID process, and that each element needs to be accommodated in design efforts. It was frustrating for the designer to recognize that, even though access to a plethora of technological tools to design, construct, and implement this site was available; immediate access to any tools that would allow electronic submission of student work without demanding yet more of the teacher’s time was not available. The short-term resolution to this issue was to have students submit work using the network hand-in folder; in this way sacrificing more of the designer’s time while other more efficient options were explored.

Data Set 15 (Week 8 of 14)

Field Notes 15

- making up missed classes – students who miss class have been able to quickly catch up on missed work because posting of activities and content on site is easily accessible from any Web-enabled computer – even though daily lesson plans are not posted
- students working ahead – I was concerned about students working too far ahead because I was uploading topic pages slightly ahead of where we were at the time – has not been a problem so far

Researcher’s Considerations 15

The next logistical element that I became aware of at this time was the ease through which students who had missed class were able to retrieve missed work. The structure of the site was such that all student activities were listed and briefly explained in its pages. I came

to appreciate this element, as I was not required to produce photocopied resources or thumb through textbook pages providing resources for students who had been absent. Instead, I referred students to the activity as outlined on the Web site. The final logistical element I observed early on was related to the previous one. Although posting student activities on the site was a benefit to students having missed a class, I was concerned that some students may work ahead – doing so without the context and introduction necessary to complete their learning. Fortunately, this was not the case. I saw no evidence of students working ahead – at least not to the degree where it impeded their learning of current topics.

Implementation Phase – Instructional Design

Once the teacher instructional designer and the student users had spent several class periods using the Web site, a number of observations were made regarding the design of instruction as it had first been constructed and the ensuing teaching and learning experiences. The nature of these observations was mixed. That is, some of what was observed affirmed the design of the learning experiences constructed thus far, while others revealed that further revisions would be necessary in order to most effectively encourage the meeting of student learning goals.

Data Set 16 (Week 8 of 14)

Field Notes 16

- use of PowerPoint ‘snippets’ as class introductions has been well received by students – provides context and content – should these be made available to students on the site? – if so, are there any copyright issues for posting work of this sort?
- Activity 1-4a (Marketing Research) – very successful!

- students seemed to love this activity – applied marketing research concepts to actual workings of the school store – students highly engaged because of real-world context
- the data students collected was extremely useful for the store

Researcher's Considerations 16

One of the first ‘successes’ that I observed relative to ID during the implementation phase was not even part of the Web site, but was rather a component of my daily lessons. I began each class session with a short 4-5 minute PowerPoint snippet of some interesting element or example of advertising. The content of these introductions were not necessarily related to the intended learning for the day, but were intended simply to engage students at the start of class. These lesson introductions proved to be very successful in engaging students in advertising-related content right from the outset of each class. After noticing the success of these introductions through several class periods, I began to ponder whether these advertising snippets might be a valuable addition to the site. That is, I considered archiving these snippets on the site to allow future student viewing. I have not thus far done this because I’m still unclear as to any copyright issues that might arise from the posting of previously published work (such as television commercials) on the site, as well as simply not having the time to create these at this time.

A second ID element that proved effective early on was the authentic learning activity involving the construction and conduction of market research. This activity (Activity 1-4a: *Surveys*) included the design and conduction of a survey of the general student body of our school regarding their attitudes and habits related to ‘healthy eating’. The intention of this activity was, not only to present the process and structure of one form of primary market

research, but also to obtain valuable data to be applied to the product mix of the school store. Students were thoroughly engaged in this project. I can only surmise that this was at least partly the case because the activity was authentic – one that provided them with a context in which their efforts would be applied in a real-world setting. Reflecting on the success of this type of activity reaffirmed for me the value of presenting as many authentic learning opportunities to students as was possible.

Analysis of Data Set 16

Critical Pivot 10 reaffirms the value of authentic learning activities. The more that this designer reflected on the success of the student activity discussed above, the more it reaffirmed the educational value of providing students with as many authentic learning activities as possible. Although this Critical Pivot concept is certainly not a revolutionary one, at least not in terms of existing literature, the designer's experience with it at this point in the ID process was significant in reinforcing personal epistemological beliefs specific to this concept. Further, it has also challenged the designer to provide as many authentic learning experiences for students as possible throughout the remainder of this project.

Data Set 17 (Week 9 of 14)

Field Notes 17

- students are learning – scope and sequence of early ID seems to have been effective – simple progression of what they 'know' to what is 'new' is good – early indication is that they're learning what they're supposed to be
- ID deficiencies

- topics 1-1 and 1-2 are too text-heavy – also took far too long to complete – I’m worried that this might turn off some of the students – need to rewrite these sections and maybe add more multimedia
- topics 1-1 and 1-2 took so long to complete that I ended up omitting 1-3 altogether because of timing concerns – definitely need to rework these issues
- why is it that most of the early student activities are low-level recall learning type of activities? I usually teach using an emphasis on problem-solving, yet I seem to have slipped into an early pattern of using recall learning more than I usually would – then again, maybe it’s just at the beginning of the course to get everyone on the same page? I need to be more careful to design all activities according to my own teaching/learning philosophies.

Researcher’s Considerations 17

Yet another ID element that appeared successful early on was the scope and sequence of content and activities that I had constructed. My assessments of student learning revealed to me that, at least for the most part, the learning goals that I had targeted were being achieved, and that they were using the learning scaffolds that I had laid out for them. The general progression of intended learning topics from what students ‘knew’ to what was ‘new’ to them appeared to be an effective one. My perceptions regarding the effectiveness of my efforts were purely subjective, as I had not built into the research any quantitative measures of student learning. However, as time went on, I became aware of more ID ‘deficiencies’ than affirmations.

The first ID deficiency that I would need to correct was the amount of content and the time it required to complete. Unit 1 (*What is Marketing?*), and especially Activity 1-1

(*Introduction to Marketing*), were simply too ‘content-heavy’ and resulted in a disproportionate amount of class time for completion. It took so long that I ended up omitting Activity 1-3 (*External Influences*) for fear that students would lose interest in this early content. Clearly, I needed to revise this first unit before engaging (or ‘disengaging’) future students with it.

Related to this issue of there being too much content requiring too much teaching/learning time, I discovered that the nature of the content and related activities was unbalanced. For example, I perceived that too much of the early content, both from within the site as well as the content of externally linked pages, was text heavy. Such content would clearly benefit linguistic learners, yet I perceived that it might be more globally effective if I was to replace some of the text with more visuals, especially multimedia ones. Further, I discovered that, much to my dismay, I was presenting most content and learning activities in the manner in which I was taught when I was a high school student, instead of the manner in which I believe students learn best. That is, much of the early learning activities were low-level content-based, rather than higher-level problem-solving activities. This disturbing revelation caused me to once again stop and reflect.

Analysis of Data Set 17

Reflecting on the nature of the student learning activities being designed caused the designer to stop and reflect on the relationship of teaching and learning philosophies on ID. These reflections became **Critical Pivot 11, which emphasizes the direct and significant influence that a designer’s personal philosophies on teaching and learning have on the nature of the learning activities being designed.** Teacher training programs such as the one this designer participated in often warn aspiring educators to be diligent in ascertaining

their own teaching and learning philosophies rather than simply teaching as they were taught when they were school-age. This Critical Pivot bears evidence to the accuracy of this advice. The more that this designer engaged in designing learning experiences, the more that the designer became aware of personal convictions regarding teaching and learning philosophies. Initially, this realization made the ID more difficult, in that many early student-learning activities were not designed in congruence with the designer's personal perspective and thus created some internal conflict for the designer. However, the more that the designer focused on the necessary influence of personal teaching and learning philosophies on the ID process, the easier it became to develop more learning activities that paralleled these philosophies.

Data Set 18 (Week 10 of 14)

Field Notes 18

- more 'deficiencies'
 - student expectations – some activities have been somewhat confusing for students in terms of expectations – especially the more complex/higher-level learning ones – need to be more clearer regarding my expectations
 - assessment of student learning – no comprehensive framework in place yet – need to apply and communicate to students the following assessments based on activity type:
 - 'homework': complete or incomplete
 - 'objective': marks for correct response
 - 'writing' (paragraphs and short essays): rubric for grammar and content
 - 'application/creative': rubric for all creative design type activities
 - 'project': rubrics that vary according to project objectives

- site evaluation – I haven’t spent any effort formally ‘evaluating’ site – have I left out this ADDIE element? Reflecting on this I realized I hadn’t – evaluation takes place every class as I observe students using the site – my reflections become the informal (although subjective) evaluation

Researcher’s Considerations 18

Interestingly enough to me, another of the ‘problem’ areas of ID that I identified during the implementation phase was related to how I presented non-behavioral learning activities to my students. That is, I observed some level of student confusion regarding my expectations for them in the completion of some learning activities. Learning activities that were behavioral recall-type activities were always understood well by students; whereas higher-level activities often required more instruction and further explanations from me. Some of this confusion may be the result of students’ general unfamiliarity with higher-level activities, but I perceived that I could improve on the clarity of my communications when presenting these types of activities.

Reflecting on these needed revisions, I then became aware of a glaring oversight I had made in the design of this learning resource. I had not yet developed and communicated to students a comprehensive framework for the assessment of their learning. Even though I had developed a variety of types of learning activities, and included with each some consideration as to how it would be assessed, I had not formulated an overall framework for student assessment that could be clearly outlined for students. It’s no wonder that students were sometimes confused about what I expected of them because I had not yet provided them with this information! To remedy this, I developed a simple assessment structure that included several different types of assessment corresponding to different activity types. First,

for ‘homework’ activities I included an all-or-nothing marks approach, where students received full marks for demonstrating completion of specific activities. Second, for ‘objective’ activities, students received marks for correct responses to recall-type activities. Third, for ‘writing’ activities (such as paragraphs and short essays) I developed a rubric that included marks for written content as well as for writing skill. Fourth, for ‘creative’ activities I developed another rubric that outlined the learning goals for these types of learning activities. Finally, larger ‘projects’ would have assessment rubrics specifically designed for each one.

Being mindful to design effective assessment for learning constructs reminded me of the one ADDIE element that I had not yet addressed in my field notes - this being the ‘evaluation’ element. Again, as has been my behavior pattern throughout this project, I asked myself a question to stimulate the reflective process. The question this time was, ‘How do I evaluate the effectiveness of this evolving learning resource?’ My first reaction to this question was one of confusion and dismay. Confusion resulted from simply not knowing how I would evaluate this resource, especially given that my research method was not a scientific one with a control sample to compare results to. Thankfully, my confusion did not last long as I was soon reminded of the role that ‘evaluation’ has already played and will continue to play in this evolving artifact.

Analysis of Data Set 18

Critical Pivot 12 reflects the designer’s perception that formative evaluations of the effectiveness of a constructed learning resource occur as often as the instruction itself in situations where the teacher is also the instructional designer. That is, given that the designer of this resource was also the teacher using it, critical assessments of this

resource were occurring daily, in the same way as practicing teachers assess the quality of their instruction on a constant basis. Proof of this critical perspective is represented in the collection of reflections that have already been presented, many of which are evidenced by student learning. Although now satisfied that some evaluation efforts are underway, the designer has acknowledged that a summative research instrument has not been constructed nor selected. Not having the time to deal with this now, the designer postponed a formal evaluation design until at least 75% of the site had been completed.

Data Set 19 (Week 10 of 14)

Field Notes 19

- deficiency – treatment of ‘marketing terms’
 - use of quizzes to establish marketing language is questionable – currently, I haven’t included any activity requiring review or terms before quiz – is a quiz really necessary?
- ‘surprise’ finding re Activity 2-2a
 - students required to find examples of print ads that reflect one of Maslow’s 5 levels of needs
 - I specifically asked them to use actual magazines but many requested to use the Web to find ads instead
 - I thought they might appreciate a ‘break’ from computer use, but I guess I was wrong

Researcher’s Considerations 19

The manner in which I had addressed student learning of the key terms of Marketing, a content component that I referred to as ‘the language of Marketing’, was also problematic.

Early in the site design I had presented the terms as boldface text within unit sections. Each term was used in context and was accompanied with its definition. This structure didn't appear to be the problem. Instead, the problem was that, although I wanted students to understand the language of Marketing within the context of its use, I chose to assess their learning of these terms using an objective-type quiz. Students more comfortable with reading and recall test preparation clearly benefited from this approach; whereas the others suffered. The problem, I perceived, was that I was not assessing the type of learning that I had intended for students to demonstrate. This will require further revision.

By this time in the implementation phase, students had become totally comfortable with the site and had settled into the rhythm of learning activities. It was at this time that I noticed a peculiar reaction to a learning activity (Activity 2-2a – *Maslow's Hierarchy of Needs*) that students had begun working on. We were discussing Maslow's Hierarchy of Needs in relation to consumer behavior, and I had asked students to find magazine advertisements that demonstrated each of the five levels of needs. I had purposely chosen to use physical magazine ads for this task, thinking that students might appreciate a respite from computer use. A number of students reacted negatively to this instruction and asked if they could instead find magazine ads on the Internet. This request surprised me because I had perceived, apparently inaccurately, that students might enjoy some off-computer time. Instead, they demonstrated to me that their level of engagement with the technology might be even stronger than what I had first considered. I recognized that I might need to revise other activities to include options that support both technological tools and non-technological tools.

Data Set 20 (Week 11 of 14)

Field Notes 20

- whole-class discussions – have been OK so far, but often ‘strained’ – some students distracted by computers and lose focus of the discussion
 - solution option:
 - change physical learning space for discussions – didn’t try – too complicated
 - electronic discussion forum (eg. wikis and blogs) – tried both but didn’t work because of technical issues

Researcher’s Considerations 20

One final observation that I made relative to ID during the implementation phase was the lack of engagement in whole class discussions during a variety of classroom activities. That is, I found that whole class discussions were often short and somewhat strained. My students clearly had opinions – opinions that I tried to encourage them to share with their peers; but they were often reluctant to do so. I eventually recognized a correlation between these unproductive whole class discussions and the number of students who were trying to use their computers during these discussions. Although I had instructed them to turn off their computer monitors, many could not resist the temptation to turn them back on earlier than permitted, and then continue to work on the computer activity at hand. I perceived this behavior as being a negative byproduct of the level of engagement the students were feeling about computer use. It appeared that I was not going to have a problem engaging students via technology, but I was going to have some issues disengaging them when the need arose. I needed to incorporate some type of non-standard discussion in my classes to encourage more social learning.

Reflecting on these non-productive discussions, I recognized two immediate possibilities for addressing this issue. The first was to simply establish a new behavioral routine in class whereby students would, not only disengage themselves with their computers, but also perhaps physically disengage themselves from the physical computer space. The other option I considered was to establish some type of computer-based discussion vehicle such as a wiki or blog. I chose to try a wiki first, and then a blog. Unfortunately, both of these social software options were not immediately successful because of technical issues. The wiki that I had created for my students was never accessible to them because the registration confirmation email never got through to them, having been caught by our school district's email spam filter. Then, the blog that I had set up on a popular blogging host server was again not accessible by my students. The bottom line is that, at the time of this writing, no Web-based social communication system has been set up for this site, although it is expected that these technical issues will be resolved shortly and at least one of these tools will soon be in place for my students.

Reflecting on ID during the implementation phase was an extremely productive exercise for the designer. It was recognized that there were ID constructs that have proven educationally effective, yet there were even more constructs that would require further revisions. The designer has come to perceive the processes of ID in this project as distinctly similar to what is experienced by classroom teachers during their practice. That is, the plan/implement/revise cycle is not limited to the lesson planning done by classroom teachers, but is also a fundamental process for instructional design as evidenced through the ADDIE model. Being satisfied with the ID learning experienced during the implementation phase, the designer took one more reflective look at Web design.

Implementation Phase – Web Design

The Web design observations made during the implementation phase of this project were much different than those of the first two phases. During the first two phases the designer had noted a number of specific Web design decisions that had been made. However, during this phase the designer reflected on Web design from a more global perspective, critically considering the Web-based artifact whose prototype had not only been created but was already fully in use. These final Web design reflections are framed by general questions such as: What have I done? What do I do now? And, how do I know if this site is any good?

Data Set 21 (Weeks 12-14 of 14)

Field Notes 21

- Web design – no specific notes during this phase – why is this?
 - site must be ‘working’
 - too busy to make notes at this time?
- site revision – I’ve started making mental plans for the first site revision – I haven’t even finished the whole site yet!
 - When do revisions happen? – not now, I don’t have time
- site design – I’m starting to get ‘tired’ of the look of the site – is this normal or does this mean that I need to start thinking of making changes?
- are students using the site outside of class? – I wonder if students are any more likely to use this Web-based resource outside of class than they are a textbook or other resource?

Researcher's Considerations 21

The nature of my reflections regarding Web design during the implementation phase was distinctly different than those during the previous two phases. During this phase I took a general retrospective stance, critically examining a number of general issues relative to Web design. The first item I noted was the recognition of what I didn't note during this phase. That is, I did not note any specific issues relative to Web design that I hadn't already noted during the previous two phases. I surmised that this was the case because the site was operating as it was intended to – students were engaging with the content and activities, while encountering no serious issues related to navigation or usability. With this in mind, I began to suspect that I was moving towards the first revision cycle for the parts of the site completed thus far.

My second general Web design observation at this time was the recognition and acceptance of the fact that I was already beginning the cognitive processes towards revising the site's content and navigational structures. Considering the concept of revision for this Web site was both inevitable and daunting. That is, I was pondering needed revisions of the site, yet at the same time was resisting this direction. The time commitment for this site had thus far been so significant that I couldn't begin planning revision cycles at least until the prototype of this site was complete. I recognized that, even if my revision plans were not enacted for several more months, I would need to prepare a formal plan for revision cycles at some future date.

The third general area of reflections relative to Web design that I had noted during the implementation phase revolved around a growing list of questions I had about Web design and student use. For example, I began to ask myself what role, if any, that Web design plays

in the following areas: engaging students, communicating vital learning elements to students, and providing a vehicle for students to learn, apply, and maintain their context of learning. Further, I began to question whether Web design (or the use of the Web at all) provided any more beneficial learning opportunities for students when compared to those offered by traditional learning resources. Intuitively, I perceived many benefits of using the Web for teaching and learning, but I began to question my own assumptions, likely to provide some self-confirmation that what I was doing was educationally beneficial for my students.

The fourth type of Web design reflective conversations I was having with myself at this time included a growing discontent with the look and feel of the site. Although I was satisfied that the site was accomplishing what it was intended to, I still questioned whether it could be better, and if so, what ‘better’ meant. I began to wonder when a teacher-as-instructional-designer should leave well enough alone. That is, at what point is a constructed learning artifact ‘finished’? At what point should the designer stop refining the design? Were my concerns about the Web design of the site justified, or was I questioning my work because the ‘artist’ is never really satisfied with his creation? Thankfully, regardless of the outcome of these reflective conversations with myself, I simply did not have the time to make significant design changes at this time anyhow.

The final general reflective observations that I made during this phase pondered the extent to which my students were using the site. I have already documented my observations regarding student use of this site while in my class, but I began to wonder whether any of them were using the site outside of the classroom. Student use of this site outside of my classroom was, for me, a subjective measure of the level of engagement students are having

with the site. This is clearly not a scientific method for determining such data, but I wondered whether there was any significant use of the site outside of class time. These reflections reemphasized for me the value of student engagement in learning activities, whatever media platform they are presented with.

Conclusion

What considerations does a teacher instructional designer need to be mindful of when designing learning resources? This has been the guiding question represented by the data and analyses contained in this chapter. These findings were obtained using a narrative methodology during an instructional design process, where the researcher acted in a triad of roles (teacher, instructional designer, researcher) and compiled field notes describing personal observations and experiences during the application of the ADDIE ID model to the construction of a substantial Web-based learning resource. Once the field notes were complete, further reflections on this raw data then took the form of short narratives that provide a more comprehensive picture of the researcher's experience. Then, the researcher has provided some interpretive analyses for some of the data; in particular, analyses were provided for observations and experiences that the researcher perceived to be key events of personal learning relative to ID.

These key personal learning events have been labeled as Critical Pivots - the most significant findings relative to the thesis question. The twelve Critical Pivots identified through this research are summarized in Table 4.3 below. Although these Critical Pivots represent the bulk of the research findings, it is important to recognize that the process of reflective practice thorough instructional design has provided significant insights for the researcher's professional practice. The experience of identifying Critical Pivots and

recognizing their value has enriched the teaching practice of this researcher and has reinforce the personal and professional growth that may be expected when one commits to such discovery exercises. The next chapter, Chapter 5, presents these Critical Pivots in more detail, as well as the other key findings of this research endeavor.

Table 4.3: Summary of Critical Pivots

Critical Pivot Number	Critical Pivot Finding
1	Frame a vision for the instructional design process
2	Adopt some form of reflective practice
3	Student-centered design
4	Design and development phases of ID are not distinct
5	Added richness of ID process when instructional designer is also the teacher
6	ID is influenced by the preferred useful life of the artifact
7	Reciprocal influence of ID and the medium for which it's being developed
8	Time is an ever-present influence on ID
9	ID includes all aspects of the teaching and learning context, even those often considered to be 'administrative'
10	Reaffirming the value of authentic learning activities
11	Influence of teaching and learning philosophies on ID actions
12	Evaluation of a constructed learning resource occurs daily when the teacher is the instructional designer

5. DISCUSSION & CONCLUSION

The goal of this research project has been to identify what considerations a teacher instructional designer needs to be mindful of when designing a substantial Web-based learning resource. The methodology has been a qualitative one where the researcher has employed the ADDIE instructional design model to develop a Web-based learning resource for two secondary school level Marketing courses, and has compiled field notes based on reflections of observations and experiences throughout this ID process, culminating in a written narrative translating the field notes. The researcher has also maintained a unique triad of professional roles throughout this project, including not only researcher, but also teacher and instructional designer. This research project has in this way adopted and emphasized the interrelationships between three key conceptual areas: reflective practice, instructional design, and Web design to address the research goal. This chapter presents the findings of this research.

The following discussion will present the findings of this research project in terms of the stated research goal, and includes suggested areas for further research as their related topics are presented. First, the concept of ‘reflective instructional design’ is discussed in terms of how it may be beneficial to teacher instructional designers. Second, the novel concept of the Critical Pivot is presented as a valuable tool for teacher designers. Third, the twelve specific Critical Pivots identified by this researcher are individually discussed as key learning events resulting from the reflective ID process. Finally, a summary of areas for further research is provided.

Reflective Instructional Design

The first key finding from the research data relates to the significance of the practice of reflective instructional design. The review of existing literature in Chapter 2 provided a broad outline for the three key interrelated conceptual areas of this research: reflective practice, instructional design, and Web design. The nature of reflective practice was discussed, as was the value of reflective practice for teachers. Further, the characteristics of instructional design were presented and, included among them, was its inherent reflective nature. Then, Web design for learning was examined as it represents the medium of communication used in this ID project. Moving forward from the valuable data obtained through the review of existing literature, this research exercise presented several valuable findings relative to reflective instructional design as practiced by professional teachers.

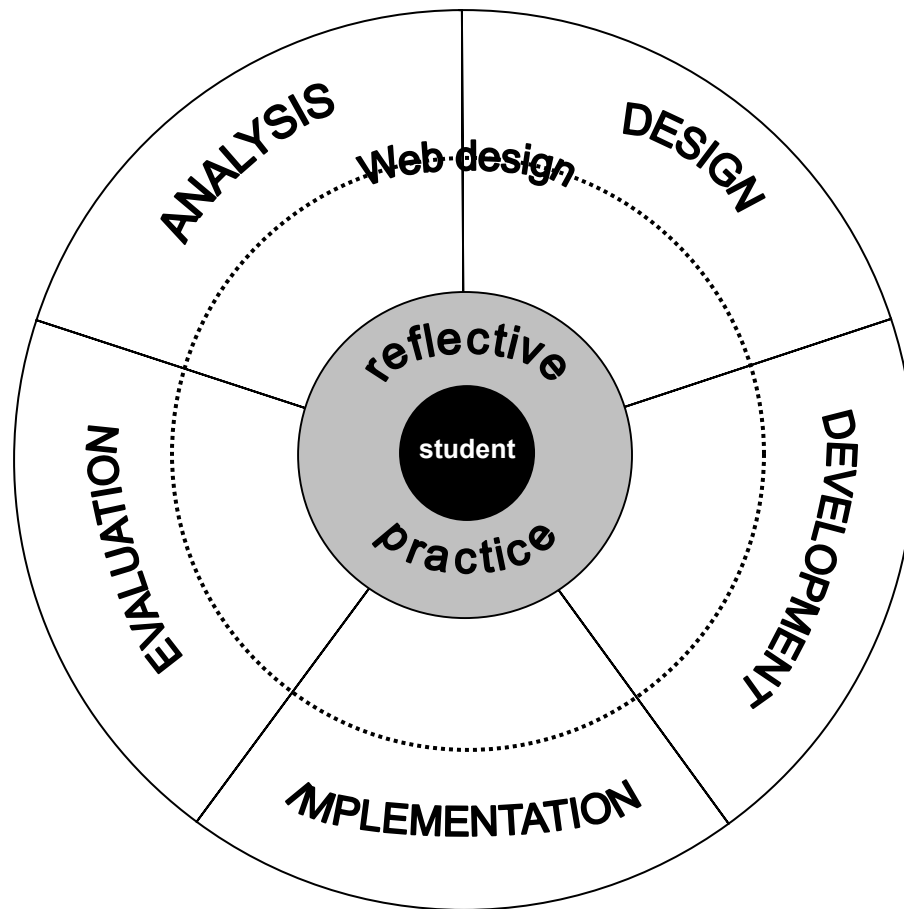
The implied structure of the process combining reflective practice, ID, and Web design as practiced by this teacher instructional designer resulted in several noteworthy findings. Figure 5.1 illustrates the structure of the relationship between these three key conceptual areas during this research project. First, the diagram is represented as a circular form to indicate the continuous process inherent in ID. There is effectively neither a point of entry nor an exit point, and in this way demonstrates the fluid, almost organic, nature of ID as this classroom teacher designer had practiced it. Second, the diagram shows the level of connectedness between each of the three conceptual areas. All five of the ADDIE processes are connected to one another through reflective practice and the student-centered learning focus. Further, they are all grounded in reflective practice, and are further linked together via a continuous woven circle representing Web design as the applied communication medium.

Third, the student is at the core or center of the diagram, representing the need to consistently focus and refocus ID efforts on the learning goals for the learners. Fourth, reflective practice is placed surrounding the student and in this way represents a filter through which ID and Web design efforts must flow before affecting the student. Finally, Web design is illustrated as a line woven through the ADDIE processes to show the interrelationship between the communication medium and ID. In this way, Web design is suggested to affect the student in as much as it is interwoven with the processes of ID. This diagram represents the structure of reflective ID as experienced by this researcher, but how may it inform the ID practice of other teacher designers?

The key value derived from Figure 5.1 for professional teachers is its role as a ‘model’. That is, the data represented in this illustration is a mental model. Mental models are human constructs intended to make sense of something encountered, are subject to change as knowledge and perspectives change, and are often represented visually in the form of maps, charts, diagrams, or illustrations (Magliaro & Shambaugh, 2006). Examining the illustration in Figure 5.1 as representing a mental model will aid the teacher designer in understanding the functioning of the three key conceptual areas, and through these cognitive processes perhaps identify how aspects may be applied to their own practice. However, the notion of the diagram as representing a model also comes with a warning. This diagram does not represent a prescriptive model for the practice of ID. Gustafson & Branch (2002) have identified dozens of existing ID models, and have even suggested that there are already more ID models than there are unique learning contexts in which to apply them. It was never the intention of this research to add yet another ID model to the burgeoning list. Having dispensed with this warning, this diagram may provide some practical ID value to teacher

designers in terms of what it doesn't show. It doesn't show prescriptive steps to follow. It doesn't show where to start – or end. It doesn't show specifically what types of instruction to design. Instead, it shows that student-centered reflective ID applying the ADDIE processes using the Web as the communication medium is an interrelated activity that factors in the true nature of the classroom teaching and learning context.

Figure 5.1: Reflective Instructional Design in a Web-based Medium



Critical Pivots

The second key finding resulting from this research undertaking is the identification and labeling of the notion of Critical Pivots. Critical Pivots have been defined as those points in time during which the instructional designer became acutely aware of elevated levels of cognitive dissonance, and was stimulated to take some form of proactive or reactive action. They represent the points in time when the designer recognized personal and professional learning events relative to the instructional design process. Critical Pivots have been labeled as such because they represent ‘critical’ thought that examines a cognitive stimulus from all sides, ‘pivoting’ around it to identify the most effective course of action from the array of perceived options. The notion of Critical Pivots is valuable to the teacher instructional designer by giving form and language to key learning events as they are experienced. However, Critical Pivots as a conceptual notion would not exist at all, were it not for the reflective context of this research.

This research project is not just about instructional design; but it is rather about ‘reflective’ instructional design using a Web-based medium. Reflective instructional design is essentially ID practiced in the spirit of the reflective practitioner, where the reflective practitioner is one who recognizes the value in actively reflecting on professional experiences in an attempt to gain valuable practical and theoretical learning (Schön, 1983). Such a context of reflective practice has provided the experiential foundation for the identification and labeling of Critical Pivots.

Further, reflective practice theorists support the existence of the Critical Pivot concept. One such theorist is Donald Schön, who outlines five steps of what he calls reflection-in-action (Schön, 1983). Critical Pivots directly correspond to both step three

(reflection stimulated by a cognitive trigger) and step four (critical reflection and reframing of the situation at hand). Specifically referencing reflective teachers, John Dewey has also proposed a number of phases through which reflective teachers ought to navigate (Rogers, 2002). With respect to Dewey's phases, Critical Pivots directly correspond to a combination of phase two (interpretation of cognitive trigger event), phase three (naming the 'problem' arising out of reflection), and phase four (reframing the problem to attempt explanations). The notion of the Critical Pivot is thus a valuable conceptual construct to facilitate professional learning of the teacher instructional designer operating within a context of reflective practice. Moving from the conceptual perspective of Critical Pivots to the specific nature of the Critical Pivots noted in this research, the twelve specific Critical Pivots identified in this research are now presented below.

Critical Pivot 1 - Framing a vision for the instructional design process

The first Critical Pivot identified in this research is the recognition of the requisite nature of establishing and defining a vision for both the instructional design process and the resulting artifact. The importance of beginning an ID project with a clear vision of what ought to occur and what the end result ought to be cannot be overstated. Articulating a specific vision for the ID process and product benefits both the designer and the end users of the artifact. Designers benefit by having a clear vision of the end goals of the artifact and allowing them to subdivide large projects into smaller, more manageable, constituent parts. This reduces the cognitive stress on the designer as well as provides an initial ID map to follow. On the other hand, users will benefit because a goal-oriented learning artifact is more likely to be effective in facilitating the achievement of intended learning outcomes.

This first Critical Pivot underscores the significance of the ‘analysis’ processes of the ADDIE instructional design model used in this project. During analysis processes, designers seek out pre-design information relative to precisely what the learning goals are, who the learners are, and the justification for the creation of the envisioned learning artifact. Defining and refining a vision for an ID artifact may take a variety of forms. One such form is a method that includes a comprehensive ‘needs analysis’ conducted using an extensive checklist detailing necessary considerations regarding the learning goals and context, as well as the end users of the artifact (Morrison, Ross, & Kemp, 2007). Another, more simplistic, method to articulate a vision for the ID project is through the use of guiding questions such as: What are the learning goals? What will the finished artifact look like? What is the learning context? And, why is this artifact necessary? Regardless of which method a designer adopts, it is imperative that the ID process begins with some process culminating in the definition of the overall vision of the project.

Critical Pivot 2 - Adopting some form of reflective practice

The second Critical Pivot represents the need for reflective instructional designers to adopt some practical method(s) of reflective practice. Although reflective practice theorists such as Schön and Dewey have presented comprehensive arguments regarding the nature and value of reflective practice (Rogers, 2002; Schön, 1983), neither has offered specific practical methods to accomplish this. This researcher began this ID project with no notion of precisely how the ‘reflective’ aspect of reflective practice was going to occur; but a reflective method soon emerged. What emerged was an unintentionally adopted habit of self-questioning to stimulate and guide periods of reflection. Such self-questioning was stimulated by ID experiences, observations, and Critical Pivots, and provided the designer

with a cognitive stimulus that continuously fueled the reflective process. The key consideration here is that teachers engaging in reflective ID identify, not only the need for reflective practice, but also precisely how this type of practice will be conducted.

Reflective ID represents ID that is defined by a purposefully reflective attitude of the designer, and in this way may be considered to be what Schön refers to as ‘professional problem-solving’ (Schön, 1983). To be a reflective instructional designer requires attention to several key steps. First, the designer must cognitively subscribe to the value of reflective practice for informing their professional design practice. Scholarly research regarding the benefits of reflective practice is a good place to begin. Second, the designer must adopt or create some type of vehicle to be used to record reflections as they occur. Written journals, drawings, and personal audio recordings are three examples of such vehicles. Finally, the reflective designer requires time to both cognitively reflect on and then record reflections. Initially recording reflections as they occur will not require much time; however, cognitively reflecting on the possible implications of experiences on current and future design processes is likely to require greater allotments of time.

Critical Pivot 3 - Student-centered design

This Critical Pivot affirms the need for designers to conduct all ID activities with a focus on the identified characteristics of the intended users. That is, each design consideration must be framed by the ID process while also being viewed through the lens of the users – a lens representing the perspective of the users. Although student-centered teaching and learning are certainly not new concepts in the field of education, teacher instructional designers do need to become cognizant of the extent to which this student-centered focus in ID should go.

For example, consider examples of student-centered considerations in each of the five defining elements of the ADDIE model. First, during ‘analysis’ processes designers need to be mindful of a variety of student user characteristics. A sampling of these might include the following: age (for level of difficulty), preferred learning styles (for design of most effective learning activities), and technological skill level (for the design of user interface and learning activities). Second, during ‘design’ processes designers must be aware of user characteristics such as what types of activities most engage them, the level of prior knowledge they possess, or general knowledge regarding the micro-cultural environment that the users abide in. Third, ‘development’ processes are enhanced when designers construct ID artifacts that are visually appealing to users, while also being easy to use. Such development goals would not be possible without a clear understanding of the users’ preferences. Fourth, ‘implementation’ processes ought to be guided by knowledge of users to ascertain when the ID product should be prototyped, who should use it, how it should be used, and how subsequent revisions should be completed. Finally, ‘evaluation’ processes require knowledge of user characteristics to benchmark the product’s effectiveness according to the goals identified and refined through ‘analysis’ processes.

Critical Pivot 4 - Design and development ID phases are not distinct

Critical Pivot 4 occurred early in the ‘development’ processes of this project; and is the finding that ‘design’ and ‘development’ processes of ID are not distinct sequentially occurring processes, but are rather related elements of a single process. Even though early ID literature described the ADDIE model as consisting of sequentially occurring mutually exclusive phases, current writers argue that each of the phases are in fact mutually dependent, operating in a system where outputs of one phase become the inputs for any other phase

(Gustafson & Branch, 2007). Critical Pivot 4 provides further evidence that such a reciprocal co-dependent relationship exists between each of the five key ADDIE elements.

Further, if each key element of the ADDIE model is related in this way, it then becomes necessary to revise the language used to describe them. Early ID literature refers to the five key elements as ‘phases’ or ‘stages’ (Gustafson & Branch, 2007; Morrison, Ross & Kemp, 2007). Such language choice implies that the elements are distinct (ie. a phase with a defined beginning and end) and are sequentially ordered (ie. one stage before another). However, the reality of reflective instructional design is such that the five elements may be employed in any order, for any duration, and are mutually dependent. It is suggested then, that a more accurate label for each of these five elements is a ‘process’ rather than a phase or step.

Critical Pivot 5 - Added richness of ID process when instructional designer is also the teacher

It has already been mentioned several times in this discourse that this research project includes a rather unique perspective in the triad of roles assumed by the researcher, including researcher, instructional designer, and teacher. Critical Pivot 5 provides evidence that the ID process is made richer when the roles of instructional designer and teacher are combined. One of the immediate effects of these combined roles is a shift from relative objectivity towards subjectivity in the design and development of learning activities. That is, a designer operating outside of the sphere of the end users is more likely to maintain a relatively objective stance relative to the types of learning experiences being designed. On the other hand, a teacher instructional designer is likely to be more subjective, perhaps even designing learning activities enjoyed by the designer, and not just the students. It is important to note,

however, that a more subjective perspective in ID is not necessarily a detriment to its effectiveness.

ID may be made even more effective when the teacher is also the instructional designer. For example, teachers engaged in teaching and learning activities, not only of their own design, but also of their own choice, may provide a more engaging learning environment for their students. A teacher that is more ‘excited’ or engaged with particular teaching and learning activities is more likely to have students also become more engaged with the activities. Another example of the positive effects of teachers in instructional design roles is the feedback they receive during and after ‘implementation’ processes. Teachers have an opportunity to receive immediate feedback from students, providing the teacher designer with data regarding the effectiveness of the designed instruction and stimulating the revision of all five ADDIE processes. All things considered, the role of the teacher as instructional designer provides a rich context for ID, with the potential of enhancing student-learning experiences compared to those provided by external designers.

Critical Pivot 6 - ID is influenced by the preferred useful life of the artifact

The sixth Critical Pivot represents the revelation that instructional design processes are directly influenced by the preferred useful life of the learning product. This finding also reaffirms and reemphasizes Critical Pivot 1, which argued for the need to begin each ID project with a clear vision of the design goals and processes. ID projects such as this one that are intended to be used for several years require significantly more designer effort than much smaller projects with shorter life expectancies. The extra effort required of designers for these large projects is not just a result of the large amount of content, but it is also the result of the need to develop instructional systems and structures that will stand the test of time.

For example, imagine a scenario where a teacher designer intended to create a learning activity that would be completed by students in one class. What would be an effective title for this activity, and how should the steps in the activity be identified? The simplest solution would be to title the activity according to its purpose or content, and then to label each step numerically in ascending order. A designed learning artifact such as this is disposable – used once and then discarded. The amount of designer time and effort for this scenario is minimal. However, consider another scenario where the teacher designer is designing a primary learning resource to span an entire course. A learning artifact of this size would likely be structured around numerous chapters, units, sections, topics, and/or individual lessons. How should the teacher designer title and label all of these content chunks? Clearly, there is no one solution to this question; however, what must be emphasized is that teacher instructional designers be cognizant of the intended useful life of the learning product being developed, and ensure that design and development processes take this into consideration.

Critical Pivot 7 - Reciprocal influence of ID and the medium for which it's being developed

The identification of the seventh Critical Pivot in this project also came during ‘development’ activities in the ADDIE ID process. It acknowledges the reciprocal influence of ID and the medium for which it's being developed. ID has previously been defined as the systematic yet creative process of designing instruction that is both effective for and appealing to learners based on existing theories inherent in a teaching and learning context. Designing instruction necessarily includes consideration of ‘what’ should be taught/learned (content) as well as ‘how’ this content will be presented (communication medium). The communication of content is directly affected by the design and use of various media assets

strategically employed to correspond to fundamental principles of graphic design (Thorlacius, 2007). In this way, ‘development’ processes of ID both influence and are influenced by the communication medium being used.

Given that the World Wide Web is the medium used in this project, it is important to recognize several guiding principles of Web design that facilitate effective content communication. First, although Web design is fundamentally grounded on the concepts of usability, navigation, and graphic design; each of these must work in concert to communicate the content as it is intended; underscoring the fact that ‘content is king’ (Cato, 2001). Second, specific media assets included in a Web site may be most effective in the communication of specific types of content and content forms (Cennamo & Kalk, 2005). Text and narration, for example, are most useful for providing clarity of content, factual information, and detailed explanations; whereas images are most useful for enhancing the appeal of instruction, illustrating steps in a process, and providing visual examples of textual information. Music and sound effects are most useful in providing emphasis and emotion; video for creating emotion, showing historical perspectives, and creating realness; while animations for illustrating events that unfold over time and those that aren’t feasible in reality. The third and final aspect of Web design that influences content communication is the role of aesthetics. Aesthetics of a Web site affects the communication process in the following four distinct ways: it supports the perceived image of the sender, it supports the content and functional aspects of the site, it must be adapted to the genre of the site, and it must be adapted to the target audience (Thorlacius, 2007). Therefore, it can be seen that considerations relative to the content designed through ID processes may be most effectively

communicated when specific attention is directed towards the structure of the chosen medium.

Critical Pivot 8 - Time is an ever-present influence on ID

The eighth Critical Pivot recognizes that, not only does ID require significant time to conduct, but that a teacher instructional designer is especially pressed for time given the already present time constraints of the teaching profession. So how much time does the ID process actually take? The amount of time required for effective ID is influenced by a number of factors, such as the level of ID experience of the designer, the nature of the learning outcomes, the characteristics of the targeted learners, and the medium for the instruction. It has been estimated in the literature that the ID processes characteristic of this research project would require approximately 10-50 hours of design and development time for every one hour of time spent being used by learners (Piskurich, 2006). Therefore, if the courses for which this learning resource were developed for were 100 hours in duration, then the time required for ID would be approximately 1000+ hours! The experience of this researcher, however, was such that the total time spent on ID processes for this project was far less than the amount suggested above, and is estimated to be approximately 150 hours, not including time spent in the classroom after implemented. Whether the ID process required 150 or 1000+ hours, the key point is that time is a significant consideration for the teacher instructional designer.

So, how can this time issue for teacher instructional designers be addressed? The first possible resolution for teacher instructional designers is simple avoidance. That is, some teachers may elect to avoid engaging in a large-scale ID project while being employed as a classroom teacher. A second resolution might be for teachers to divide large-scale projects

into numerous smaller chunks, and then apply ID methods to the development of these chunks as time permits. A final potential resolution for teacher designers is to develop some personalized system of time management that allows for large-scale ID practice, but only within clearly defined time parameters. This was the approach used by this researcher. This researcher found that a simple method of priority restructuring was sufficient to maintain some level of control over the time demands of ID while teaching. That is, every time this researcher perceived that the time demands of ID were becoming debilitating, a new ID priority list was created that reflected what was possible to create and what was simply not possible to create. Time constraints are significant factors in the activities of teacher instructional designers.

Critical Pivot 9 - ID includes all aspects of the teaching and learning context, even those logistical or administrative in nature

This Critical Pivot addresses the extent of ID activities, suggesting that ID includes all aspects of the teaching and learning context – even those perceived as logistical or administrative in nature. The fundamental issue here is the question of where ID begins and ends; or more specifically, where instruction begins and ends. The findings from this research endeavor suggest that instruction begins with the first planning efforts of a designer, even as a learning goal is first identified. It then continues through all ADDIE ID processes, and culminates when learning goals have been achieved or the course of study has concluded. If the beginning and ending of instruction and instructional design are this extensive, then the content must include all types of activities within this teaching and learning context, as any and all types of interaction with the learners in this context play active roles in the attainment of learning goals.

Consider the following hypothetical scenario. An intermediate-level elementary teacher instructional designer has designed a learning resource for a ‘weather’ unit to be used in class. Within this unit is a student activity that has students describe and illustrate four different types of cloud formations. Should the teacher have students handwrite the descriptions and draw the illustrations by hand, or should the students use computers to type the descriptions and source images from the Internet? Although this issue might seem trivial, the reality is that this is a key instructional design decision to be made by the teacher. Inherent in this design decision are contextual issues not directly related to the specific learning outcome. For example, if the students lack handwriting skill and enjoy drawing, then that hand work may be the best choice; whereas if students require more computer skill practice, then the computer option might be the most effective one. Now consider a second issue within this example. Once students have completed this activity, how should they submit it to their teacher, and what should the teacher then do with them? Again, this is not just a logistical or administrative question, but is rather an instructional design issue. The teacher designer may elect to have students physically hand in their finished work and then post them on a classroom bulletin board to reinforce affective values such as positive student self-esteem. The key point here is simply that ID includes all aspects of the teaching and learning context, and the teacher designer must consider all of these contextual elements. No aspect of the instructional process is trivial in affecting learning.

Critical Pivot 10 - Reaffirming the value of authentic learning activities

Critical Pivot 10 represents an affirmation of what existing literature has to say regarding the educational value of authentic learning activities. Authentic learning activities are those that are typically problem-based and are intended to represent real-life situations in

which the targeted learning would be applied and demonstrated. Numerous authors have espoused authentic learning activities as providing, not only superior learning results, but also higher levels of student engagement when compared to more content-based learning activities. Authentic learning activities in the form of problems requiring solving have been suggested to represent the foundation for all ID processes (Merrill, 2002). The learning effectiveness of authentic learning activities is further enhanced when used in a computer or Internet context of learning (Jonassen, 2002; MacGregor & Lou, 2005). Finally, other theorists argue that the current generation of school-age students actually prefers authentic learning situations to content-based ones (McNeely, 2005).

The findings of this research concur with the arguments made by these theorists. Student learning activities that were ‘authentic’ in their design were perceived by this researcher as being among the most effective in terms of the attainment of learning goals. What was even more obvious to this researcher, however, was the observation that student motivation levels appeared to be higher during authentic learning activities than during many other types of activities. Teacher instructional designers are encouraged to exploit this type of instructional activity by designing and including as many authentic learning activities as is practical within the parameters of their design context.

Critical Pivot 11 - Influence of teaching and learning philosophies on ID actions

The eleventh Critical Pivot emphasizes the relationship between a designer’s personal and professional philosophies of teaching and learning and the ID decisions that result. The processes of ID require that designers identify learning objectives, design instructional strategies, develop the vehicles to be used for instruction, and implement these with the targeted learners. However, what informs the designer in terms of what types of learning

activities to create? One such influence on the ID process is the philosophies of teaching and learning held by the designer. For example, if a designer believes that learning activities are most effective when they address low-level cognitive processes such as recall, then it is likely that the instructional design efforts of this individual will reflect this type of learning.

Recognizing the influence of teaching and learning philosophies on the ID process, teacher instructional designers may address this issue through three sequential steps. First, it is necessary for teachers, as with any other instructional designer, to first research existing literature regarding theories of teaching and learning. Second, reflecting upon this body of literature, the teacher designer needs to come to a level of understanding of these theories and how they may affect the ID process. Finally, when engaged in the ID process, teacher designers need to be mindful of applying theoretical knowledge to designed learning activities in the most effective manner – applying a variety of types of teaching and learning theories, depending on the specific learning intended for a specific learning activity.

Critical Pivot 12 - Evaluation of a constructed learning resource occurs daily when the teacher is also the instructional designer

The final Critical Pivot to be discussed is the recognition that, in a reflective instructional design context where the teacher is the instructional designer, ‘evaluation’ processes examining the effectiveness of the learning resource occur almost continuously. As has previously been discussed, the ‘E’ in ADDIE refers to ‘evaluation’ – specifically, evaluation of the effectiveness of a learning artifact in terms of achieving its intended learning goals. ‘Evaluation’ processes are vital for the success of an ID initiative, and take a variety of forms encompassing both formative and summative perspectives (Cennamo & Kalk, 2005; Morrison, Ross, & Kemp, 2007). Teacher instructional designers are in a somewhat unique position in that they not only design the learning artifact, but they also

participate in the learning activities they have designed for their students. This context of use for the learning artifact allows the teacher designer to observe the extent to which learning is occurring, at almost the instant that it occurs.

Practicing teachers are often engaged in informal evaluations of learning resources used in their classroom, but the teacher instructional designer is afforded an opportunity to evaluate a resource of their own design. That is, as the teacher designer implements the developed learning artifact in the classroom, data in the form of observations of student activities flow continuously back to the teacher. This data is invaluable to the teacher designer as it provides confirmation of successful ID decisions as well as ID aspects requiring further revision. The key for the teacher designer is to maintain a reflective stance, and in this way be receptive to the significance of the data relative to the effectiveness of the developed learning resource.

The above discussion has presented the findings of this research in terms of key considerations that a teacher instructional designer needs to be mindful of when designing substantial Web-based learning resources. However, although these findings represent valuable insight for teachers engaging in reflective instructional design, this research has also identified a number of additional concept areas requiring further research.

Suggested Areas for Further Research

Given that this research endeavor has combined three fundamental conceptual areas (reflective practice, instructional design, and Web design), it should come as no surprise that there have been a number of areas requiring further research that have been identified through this process. Each of these areas for further research combines, to some extent, the three key conceptual areas. Further, the areas requiring further research are presented below

in the form of questions to resemble the self-questioning reflective approach that this researcher has adopted throughout this project. The suggested areas for further research are as follows:

1. Does 'reflective instructional design' result in a more effective learning artifact than ID in which reflective practice is not emphasized? Reflective practice is, by definition, a practice suggested to improve the professional ability of a practicing professional (Schön, 1983). However, further research must be conducted to determine whether an ID approach that emphasizes reflectivity of the designer results in learning artifacts that improve the learning of its users, compared to traditionally designed learning artifacts.
2. Critical Pivots are, by definition, personal learning events; but what role, if any, may one person's Critical Pivots play in encouraging learning in others? Critical Pivots are an effective method for the identification of personal learning, as well as providing a structure and stimulus for reflective practice. However, are Critical Pivots only useful for personal professional learning, or are they also useful in informing the practice of other individuals? It is suggested that further research be undertaken to identify the effects of Critical Pivots in informing the practice of other individuals.
3. Is a learning resource designed and delivered by the same person any more or less effective for student learning than one designed by a design team external to the teaching and learning context? The key issue here is essentially whether a teacher-developed instructional resource results in more effective learning for students than an externally-developed learning resource. Inherent in this issue is the notion of

subjectivity by the teacher designer. Teacher designers will have some level of subjective bias in their ID processes, but is this a ‘good’ thing or a ‘bad’ thing in terms of student learning? Clearly, more research needs to be conducted to explore any correlations between who develops a learning resource and the effectiveness of demonstrated student learning.

4. What role, if any, does ‘aesthetics’ play in the effectiveness of a learning resource?

Graphic design, as a fundamental component of Web design has been suggested to be a medium of communication, or ‘visual information management’ (Lynch & Horton, 2002). However, specifically how does the appearance of a learning resource affect student engagement and learning effectiveness? And, if there were demonstrated benefits to aesthetically pleasing learning resources, what would these look like? Are there particular colors, or typography, or page layouts that are most effective for learners? It is suggested that much still needs to be learned regarding the influence of aesthetics on learning resource effectiveness.

5. Is the time required for teachers to conduct reflective instructional design ‘worth it’ for either the teacher or the learners? Time is a key detriment to the engagement of teachers in reflective ID practice. It is suggested that further research be conducted to gain some insight regarding the cost-benefit tradeoff for teachers completing ID activities. Further, if a classroom teacher is engaged in ID activities, does that mean that time is taken away from other student learning initiatives? That is, is any available teacher time better spent directly with students, or involved in ID processes?
6. What, if any, relationships exist between ‘authentic learning’ activities and both the level of student engagement and the demonstrated effectiveness of student learning?

Although some research has been conducted in this general area, it is still unclear what direct relationships exist between these concepts. For example, if the level of student engagement is improved via authentic learning activities, then are any student learning gains the result of this increase in student motivation, or are there cognitive processes that are also improved through authentic learning activities. Much more research is suggested to more clearly understand the role of authentic learning activities in teaching and learning contexts.

7. Are students more engaged in learning activities that involve the use of various technologies, compared to activities that do not include technology? Although there has been some research in this area suggesting that technology use does result in higher levels of student motivation towards learning (Ringstaff & Kelley, 2002), the specific role of technology in student motivation is still unclear. For example, if technology motivates students, then in a society where modern day young people are extremely digitally literate (Oblinger & Oblinger, 2005; Tapscott, 1998), is it possible that students may become bored with technology use in schools because it already consumes essentially every other area of their lives? More research is required to ascertain the correlation between motivation for learning and technology use, particularly given the digital culture that pervades modern youth society.

It can be seen from the above list of suggested areas for further research that, although the findings of this project have been extensive, the research process has revealed numerous areas in which much more still needs to be understood. This should come as no surprise, given the fact that each of the three key conceptual areas is so extensive and complex; so that when combined, an extremely complex and convoluted process emerges.

Conclusion

The focus of this research project has been to identify what specific considerations a teacher instructional designer needs to be mindful of when designing a substantial Web-based learning resource. The methodology used has been a qualitative one directed towards instructional design where the researcher designed and developed a Web-based learning resource for two high school level Marketing courses, during which time field notes were compiled regarding observations and experiences reflectively considered during this process. Further reflections then took shape in the form of narratives describing the experience. The application of this methodology to the research question may be considered to be 'reflective instructional design'. The findings of this research generally combine each of the three key conceptual areas, including reflective practice, instructional design, and Web design. Specific findings include considerations relative to the nature of reflective practice and how it may benefit teacher instructional designers, the concept of Critical Pivots as a personal professional learning tool, and the twelve specific Critical Pivots arising out of the reflective instructional design process.

Moving beyond the specific considerations that have been presented in this chapter, there are also a number of specific subjective suggestions that may be of benefit to burgeoning teacher instructional designers. First, before undertaking an ID project, it is recommended to establish some fundamental learning regarding reflective practice, instructional design, and Web design (or the communication medium of choice). This learning need not be extensive, but rather a review of the basics regarding each of these areas would certainly suffice. Second, be conscious of time constraints affecting teacher instructional designers, and set realistic time-frame goals. Related to the setting of realistic

goals is the third suggestion, which urges teacher instructional designers to be flexible with their goals and ID processes. It is unlikely that the goals will be achieved as first intended and the ID process itself is unlikely to proceed exactly as first planned, so teacher designers ought to be flexible with their efforts to reduce stress. Fourth, understand and accept that any teaching or learning artifacts developed need to evolve over time as students and learning contexts themselves change. Finally, to maximize the value for teachers in engaging in ID initiatives, it is important to savor the experience of ID – if for no other reason than to accept it as a valuable professional development activity.

The process of reflective instructional design as practiced by professional teachers may be an extremely valuable exercise. For example, reflective practice considered on its own is valuable as a tool for professional skill development and knowledge construction (Schön, 1983). Reflective teaching considered on its own is valuable towards improving the quality of instruction provided for learners (Rogers, 2002). Further, knowledge of instructional design principles and processes have value in helping the teacher improve the quality of designed instruction (Harris, 2001; Morrison, Ross, & Kemp, 2007). Finally, knowledge regarding the construct and implications of a particular communication medium such as the Internet has value in terms of creating effective learning communications (Cato, 2001). The bottom line is that the process of reflective instruction design is an extremely valuable one, whether undertaken from a quest for understanding, as this research project has been; or from a simple perspective of maximizing teaching and learning experiences to learn from the process. Even the simple process has significant learning value for the teacher designer remembering that, “Everybody experiences far more than he understands. Yet it is

experience, rather than understanding, that influences behavior” (McLuhan, 1994, p.318).

Never stop experiencing - never stop learning.

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