

## A Conceptual Model for Understanding Self-Directed Learning in Online Environments

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### *Abstract*

*Research indicates that online learning often situates control of implementation with the learner. Recently, scholars have turned attention to the importance of self-directed learning (SDL) skills for online learning environments. Existing frameworks for understanding SDL focus primarily on process and personal attributes in face-to-face settings. Some frameworks depict SDL as a process, focusing on learner autonomy in the learning processes; other frameworks emphasize personal attributes, focusing on learner's capabilities of regulating the learning process. Yet, the level of self-direction needed may change in different contexts. The purpose of this paper is to introduce a research-based framework for understanding SDL in online learning contexts. Implications for future research and practice are provided at the end of the paper.*

### **Introduction**

The study of online learning has attracted much attention from scholars and practitioners, especially those in higher education institutions (Hill, Wiley, Nelson, & Han, 2003; Hofmann, 2002). Many studies have explored the benefits of online learning such as convenience (Poole, 2000) and flexibility (Chizmar & Walbert, 1999), as well as its challenges including technical difficulties, lack of a sense of community, and delayed communication (Song, Singleton, Hill, & Koh, 2004). An understanding of learner attributes and how these impact what occurs in online learning contexts, however, is equally important. Some researchers have explored specific attributes, ranging from prior knowledge (Mason & Weller, 2000) to time-management (Hill, 2002), to gender differences (Rovai, 2002). An area of particular interest to researchers exploring online learning is the learner's ability to guide and direct his or her own learning; in other words, self-directed learning (Hartley & Bendixen, 2001).

The study of self-direction has been explored primarily from two perspectives: process (e.g., Mocker & Spear, 1982), and personal attribute (e.g., Garrison, 1997). Research on SDL has focused in two main areas: (1) the verification of SDL among adults, and (2) descriptions of models for understanding SDL (Brockett, 2002; Merriam, 2001). An area that has received little attention from scholars is the operation of self-direction in a specific context (Brookfield, 1984), especially in higher education institutions (Merriam & Caffarella, 1999).

Some scholars have recognized the importance of the learning context for SDL (e.g., Candy, 1991), noting that learners may exhibit different levels of self-direction in different learning situations. According to Candy (1991), learners may have a high level of self-direction in an area in which they are familiar, or in areas that are similar to a prior experience. For example, a Spanish-speaking learner may have a high level of self-direction in learning Italian, and a learner who plays rugby may be highly self-directed when learning to play football. More

research is needed in this area if we are to gain a richer understanding of how SDL functions in specific contexts.

One area that is particularly promising for SDL research is online contexts. With the increasing trend of online learning in higher education (Sloan Consortium, 2004), SDL has started to attract more attention due to its speculated and reported impact in these contexts. Research exploring online learning has indicated that SDL skills may assist the learner with the learning process in these contexts (e.g., Hartley & Bendixen, 2001).

The purpose of the paper is to introduce a research-based conceptual model for understanding SDL in an online context (Song, 2005). First, we will review existing perspectives on SDL. Next, we will introduce the conceptual model for understanding SDL in online contexts, describing the individual components as well as the dynamic interaction between them. Finally, we will discuss implications of the model for future research and practice.

### *Perspectives on Self-Directed Learning*

Different scholars have presented different perspectives on SDL. Some scholars see SDL as a *process* of organizing the instruction (e.g., Harrison, 1978), focusing their attention on the level of learner autonomy over the instructional process. Others view self-direction as a *personal attribute* (e.g., Guglielmino, 1977; Kasworm, 1988), with the goal of education described as developing individuals who can assume moral, emotional, and intellectual autonomy (Candy, 1991). Several models have been proposed to understand SDL, starting with Mocker and Spear's *Two Dimensional Model* in the early 1980s to a more recent model from Garrison's *Three Dimensional Model* in the late 1990s. Three models were selected for further description, as they appear to be comprehensive representations of SDL. The key constructs associated with each model are summarized in Table 1. Descriptions and explanations of the models are provided in the following sections.

Table 1: *Perspectives on Self-Directed Learning*

Perspectives	Description	Models		
		Candy (1991)	Brockett & Hiemstra (1991)	Garrison (1997)
Personal Attribute	Moral, emotional, and intellectual management	<ul style="list-style-type: none"> <li>Personal autonomy</li> <li>Self-management</li> </ul>	<ul style="list-style-type: none"> <li>Goal orientation (personal attribute)</li> </ul>	Self-management (Use of resources) <ul style="list-style-type: none"> <li>Motivation</li> </ul>
Process	Learner autonomy over instruction	<ul style="list-style-type: none"> <li>Learner control</li> <li>Autodidaxy</li> </ul>	<ul style="list-style-type: none"> <li>Process orientation (learner control)</li> </ul>	<ul style="list-style-type: none"> <li>Self-monitoring</li> </ul>
Context	Environment where learning takes place	<ul style="list-style-type: none"> <li>Self-direction is context-bound</li> </ul>	<ul style="list-style-type: none"> <li>Social context: role of institutions and policies</li> </ul>	

### *Candy's Four-Dimensional Model*

In reviewing the literature on various views of SDL or related concepts, Candy (1991) concluded that SDL, as an umbrella concept, encompasses four dimensions: “ ‘self-direction’ as a personal attribute (*personal autonomy*); ‘self-direction’ as the willingness and capacity to conduct one’s own education (*self-management*); ‘self-direction’ as a mode of organizing instruction in formal settings (*learner-control*); and ‘self-direction’ as the individual, non-institutional pursuit of learning opportunities in the ‘natural societal setting’ (*autodidaxy*)” (p.23). The variety of the constructs in Candy's model added an element of depth to our understanding of SDL. Further, Candy's model was the first to state that a learners’ self-direction might be different in different *content* areas. Yet, there are elements missing from the model. For example, the model does not describe how SDL is relevant in different learning contexts such as classroom learning or online learning.

### *Brockett and Hiemstra's Personal Responsibility Orientation Model (PRO)*

Brockett and Hiemstra (1991) provided a rationale for two primary orientations in developing an understanding of SDL: process and goal. In the first orientation, SDL is viewed as a *process* “in which a learner assumes primary responsibility for planning, implementing, and evaluating the learning process” (p.24). In the second orientation, SDL is referred to as a *goal*, which focuses on “a learner’s desire or preference for assuming responsibility for learning” (Brockett & Hiemstra, 1991, p.24). Brockett and Hiemstra (1991) combined both the process and personal attribute perspectives in the model. They also integrated social context as a component in the model in that they discussed the role of institutions and policies in SDL. At the time the model was developed, this was a significant addition to the SDL models. Yet, in today's educational climate, the context factor in the model is rather limited. Brockett and Hiemstra (1991) defined the social context as different physical institutions where learning takes place, such as community colleges, libraries, and museums. In today's educational situation, where virtual learning continues to experience exponential growth, a focus only on face-to-face settings is rather limited.

### *Garrison's Three-Dimensional Model*

Garrison's model of SDL also includes the perspectives of SDL as a personal attribute as well as a learning process. According to Garrison (1997), SDL is accomplished by three dimensions interacting with each other: self-management, self-monitoring, and motivation. In educational settings, self-management involves learners’ use of learning resources within the learning context. The focus of Garrison’s (1997) model is on resource use, learning strategies use, and motivation to learn. Garrison explained that self-management involved learners taking control of the learning context to reach their learning objectives. He further explained that learner control did not mean independence, but rather collaboration with other people within the context. From this perspective, we can see Garrison’s model did have a certain focus on the learning process perspective of SDL. Like Candy (1991), as well as Brockett and Hiemstra (1991), Garrison (1997) also recognized the context factor in his model in that he specified self-management of resources in a given context. Yet, the role of context was somewhat superficial in Garrison’s (1997) model and the dynamic interaction between learning context and SDL was not explicit.

### *Summary*

The models developed to date have been valuable in enabling the extension of our thinking about SDL, examining process and learner control as well as the interaction between the two. In most of the SDL models reviewed, context was discussed to a certain extent. Yet, the fact that some raised awareness of the importance of context in SDL (e.g., Candy, 1991; Brockett & Hiemstra, 1991; Garrison, 1997) has not attracted much attention to date. A more comprehensive SDL model is needed to incorporate context as a contributor to the overall process.

### *A Conceptual Model for Understanding SDL in Online Environments*

It is generally believed that online learning gives more control of the instruction to the learners (Garrison, 2003; Gunawardena & McIssac, 2003). In fact, some scholars consider SDL critical in distance education settings with its unique characteristic of the physical and social separation of the learner from the instructor or expert as well as other learners (Long, 1998). Recent research in an online distance education indicates that students need to have a high level of self-direction to succeed in online learning environment (Shapley, 2000). In fact, not only does an online learning context influence the amount of control that is given to (or expected of) learners, it also impacts a learner's perception of his or her level of self-direction. For example, in a recent qualitative case study, Vonderwell and Turner (2005) examined pre-service teachers' online learning experience in a technology application course. Participants in the study expressed that the online learning context enhanced their responsibility and initiative towards learning. They reported they had more control of their learning and used resources more effectively.

There is a need for new perspectives on how context influences SDL. When initial SDL models were developed, face-to-face instruction was the predominant mode in higher education. Almost a decade after the last model was developed (cf., Garrison, 1997), higher education is occurring in a variety of contexts, ranging from face-to-face classrooms to virtual classrooms. Within each of these settings, a variety of methods may be used to enable interactions, including 100% physical classroom interactions to a blend of face-to-face and online interactions to 100% online interactions. While there are indications that self-directedness is a desirable trait for online learners (Shapley, 2000), we do not have an adequate understanding of the impact of a specific learning context (i.e., physical classroom instruction, a web-based course, a computer-based instructional unit) on self-direction.

The following section introduces a conceptual model for understanding SDL in an online context (see Figure 1). The model incorporates SDL as a personal attribute and a learning process as pointed out by most scholars in the literature of SDL. We added a third dimension -- the learning context -- to indicate the impact of environmental factors on SDL.

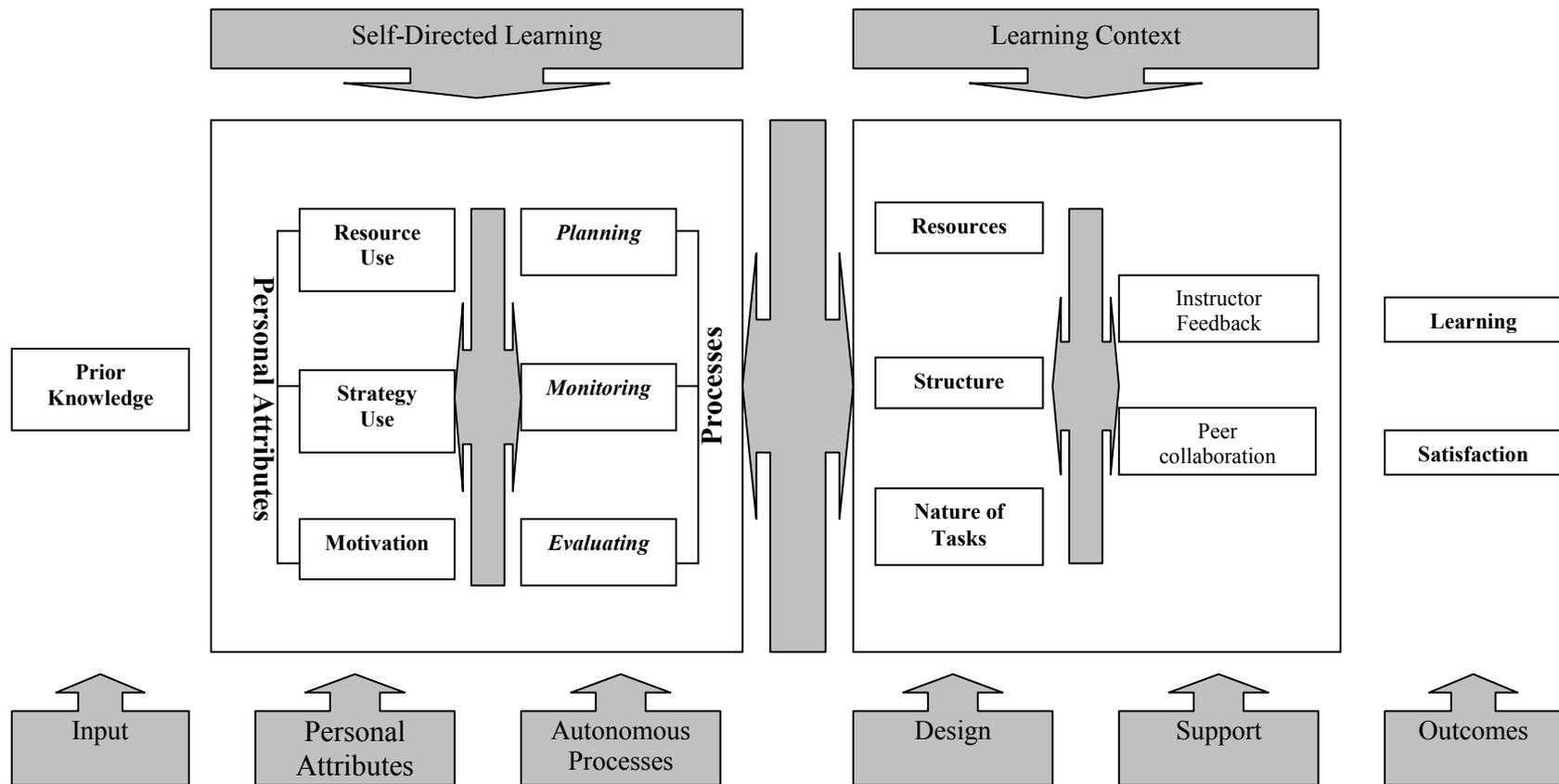


Figure 1. A Conceptual Model for Understanding Self-Directed Learning

### *Personal Attributes*

Personal attributes refer to learners' motivations for and capability of taking responsibility for their learning (Garrison, 1997). Personal attributes also include resource use and robust cognitive strategies. The personal attributes are characteristics learners bring to a specific learning context (e.g., intrinsic motivation and resourcefulness), together with their prior knowledge of the content area and prior experience with the learning context.

### *Processes*

Process refers to learners' autonomous learning processes. Specifically, learner autonomy is primarily manifested in the process of planning, monitoring, and evaluating one's learning (Moore, 1972). Learner autonomy in learning processes is viewed as a continuum (Candy, 1991). Depending on the level of learner autonomy, a learning experience can range from an instructor lecturing 100% of the class time (no learner control) to a student taking charge of the learning process in an independent study experience (almost complete learner control).

### *Context*

Context focuses on environmental factors and how those factors impact the level of self-direction provided to the learner. There are various factors in a learning context that can impact a learner's SDL experience. As the model illustrates, there are design elements and support elements. Design elements include the resources, structure and nature of the tasks in the learning context. These resources could be embedded in the specific learning context and could be designed by the instructor as instructional support. Similarly, the specific learning context may decide on the structure of the course.

Some learning contexts appear to naturally default to different levels of SDL in the learning experience. For example, the anytime, anywhere characteristics of asynchronous online learning puts the learner in control of when, where, and how they learn (Berge, 1999). It can also be decided based on the instructor's design of the course. Further, the nature of the tasks also influence the level of self-direction required from and placed on the learners.

Another set of elements in the learning context that have impact on a learner's SDL is the support in the learning context. The support can come from the instructor's feedback or peer collaboration and communication. For example, constructive and informative feedback from the instructor can facilitate learners' SDL, but simple judgmental feedback such as "right" or "wrong" may lead to learners trying to figure out what the instructor wants instead of what they can make sense of when they are learning.

The interaction between personal attributes and processes is important and has been the primary focus of SDL theory and research to date (Brookfield, 1984; Merriam & Caffarella, 1999). To understand SDL from personal attribute and process perspectives is important in that it provides information regarding how learners are different in terms of the level of self-direction (e.g., Grow, 1991) as well as how learners take control in the learning process (e.g., Moore, 1972). The model presents the interactive relationship between the learning processes and personal attributes. For learners to take control of the planning, monitoring, and evaluating learning processes, they rely on their use of

strategies and resources, and their ability to motivate themselves to involve in the learning processes. Meanwhile, their involvement in the learning processes can impact their level of self-regulation personal attributes. Research has indicated that active involvement in controlling learning processes can help learners improve their ability to effectively use resources and strategies (Vonderwell & Turner, 2005).

The addition of the learning context is important in the current climate where there is not one dominating mode of learning. The learning context not only impacts the way learners plan, monitor, and evaluate their learning (process), but it has the potential to influence how a learner becomes motivated to learn, and how he or she uses various resources and strategies to accomplish learning in the specific learning context. In the following section, we use online learning context as an example to describe and analyze the interaction between learning context and a learner's SDL experience. Specifically, we will discuss what SDL processes are like in an online context, and how an online context interacts with personal attributes and learner autonomy

### **SDL Personal Attributes in an Online Context**

The online learning context impacts SDL personal attributes of resource use, strategy use, and motivation. The following sections describe the opportunities as well as challenges.

#### *Resources*

Resources take different forms, which include but are not limited to human resources and information resources (Hill & Hannafin, 2001). Online learning, with its unique characteristics, presents both opportunities and challenges to learners in terms of resource use. For example, the permanency of the written communication in an online learning context makes peers' ideas and instructor's comments easily and conveniently accessible to learners throughout a course (Petrides, 2002). Learners can access instructor's and peers' ideas and perspectives on a certain topic multiple times. They are also given the opportunity to view the exact verbatim of those comments, thus being able to reflect more deeply on the topic (Garrison, Anderson, & Archer, 1999).

However, online learning also presents challenges in resource use for online learners. Delayed response time from the instructor (e.g., Hara & Kling, 1999) makes it a difficult task for online learners to effectively take advantage of the instructor as an expert human resource in their online learning. Further, the uncertainty online learners have on the accuracy of peers' knowledge (Petrides, 2002) may hinder their use of their colleagues as human resources. Yet, it does not mean that it is impossible for online learners to use the instructor and peers as human resources. Rather, it takes good strategies to explore effective ways to do so.

Gathering information can be a challenge to students with the rise of electronic media (Tobin, 2004). Students need to evaluate the validity and reliability of the resources accessed. Increasing learner's information literacy skills can assist in this regard (Hill & Hannafin, 2001), but it remains an issue that needs to be explored further. It is important to educate learners to pay attention to the sources and the date of information so that they could make better judgment whether the information they have obtained is reliable and still valid.

### *Strategies*

Successful learning in every learning environment involves the use of effective learning strategies. Researchers have indicated that strategy use is important in online learning contexts (Hannafin, Hill, Oliver, Glazer, & Sharma, 2003) in that online learning may present challenges to learners that they have not yet experienced in face-to-face classroom learning. For example, the communication in an online learning context is mostly written as opposed to verbal in a classroom context. While some research has shown that online learning, especially asynchronous online learning, provides learners with the opportunity to reflect more when putting their thoughts on writing (Petrides, 2002), the lack of facial expressions and body language in written communication may lead to misinterpretation (Petrides, 2002). To avoid being misinterpreted and better use the reflection opportunity in online communication, learners need to develop communication strategies that are more relevant to text-based online learning context. The fact that text-based online environments continue to dominate makes this even more important.

The timing of responses from the instructor and peers in an online learning context is another challenge. First, the response from the instructor is often delayed (Hara & Kling, 1999). Secondly, peer students may not always feel obligated to respond to every message in an online environment (Vonderwell, 2003). It is possible to get quicker responses from the instructor and peers. Some research suggested that time management strategies could help learners improve their online learning experience by having effective online communication with the instructor and peers (Hill, 2002). Setting established guidelines for response may assist in this regard.

### *Motivation*

Research indicates that motivation to learn in an online learning context may be a difficult task due to the easy-to-procrastinate nature of online learning (Elvers, Polzella, & Graetz, 2003). For example, it can be easy to hide in an online learning situation (Song et al., 2004). A learner can log in to the online course for live chats or presentations (synchronous learning) with her/his name showing on the participant's list, yet, he or she may be surfing the Web or engaged in other activities rather than fully participating in the conversation.

When learners do participate, their motivation to contribute in-depth thoughts and ideas may be low. For example, in asynchronous bulletin board discussions, learners may be posting messages simply to fulfill the course requirement to post certain number of postings. This does not mean they are actually engaged in meaningful cognitive thinking (Biesenbach-Lucas, 2003). Research indicates that for meaningful interaction to occur in online environments, learners need to be motivated to contribute cognitively deep messages (King, 2002).

Another challenge to motivation in online learning relates to procrastination. Scholars have indicated that it is easier to procrastinate in an online learning situation as compared to a traditional face-to-face classroom primarily because online classes often do not provide strict schedule (Elvers, Polzella, & Graetz, 2003). In a face-to-face class, though students may procrastinate, the required physical presence in each class session exposes them to the materials on a regular basis. However, in an online situation, learners may not engage in course-related reading until the last minute (Elvers, Polzella,

& Graetz, 2003). Therefore, online learners need enhanced motivational strategies to avoid procrastination in learning.

### *Summary*

Online learning lends itself to a SDL experience. To succeed in online learning context, learners need to take control in planning their learning pace (Chizmar & Walbert, 1999), monitoring their learning comprehension (Shapley, 2000), and making judgments on various aspects in their learning process (Petrides, 2002). Learners need to become aware of and actively explore various learning resources in an online learning context (Sener & Stover, 2000). Further, learners need to develop strategies to effectively use resources and overcome challenges that are uniquely associated with online learning (e.g., written communication) (Hill, 2002). Last but not least, online learners need to become motivated to overcome the procrastination challenge associated with online learning (see Elvers, Polzella, & Graetz, 2003), and to take advantage of online communication affordances to create meaningful interaction (King, 2002). Implications for research and practice related to the contextualization of SDL are explored next.

## **SDL Processes in an Online Context**

Some researchers have also examined the impact of online learning on the SDL process. Three primary areas have been explored: planning, monitoring, and evaluating.

### *Planning*

Online learning provides flexibility for learners to pace their own study (Chizmar & Walbert, 1999). The anytime, anywhere feature of asynchronous online learning provides learners with the ability to plan their activities at the time and the place that are most convenient for them (Palloff & Pratt, 1999). In synchronous learning (e.g., live chats or virtual classrooms), learners still have the flexibility to choose the most convenient place from which to participate. Unlike in a traditional classroom where a specific time, place, and a schedule of activities are arranged for a class that requires the learners' physical presence and the learners as a group to follow the same schedule, online learning affords much control for learners to create their own learning space (Song et al., 2004), and decide on their own learning pace and sequence (Chizmar & Walbert, 1999).

### *Monitoring*

The flexibility provided in online learning offers more freedom to learners, yet it presents challenges as well (Song et al., 2004). Some of the challenges can be observed as learners monitor their learning. Research has indicated that online learners were more likely than traditional students to monitor their comprehension (Shapley, 2000). Unlike in a traditional classroom setting where the instructor can easily see whether the learners are paying attention or actively participating in the class activities by observing their physical cues (such as facial expressions), in an online learning environment, the monitoring responsibilities are in large part left to the learner. They must decide whether they understand the subject correctly (Shapley, 2000) or are heading in the right direction with their course work. Further, the level of responsibility for seeking assistance is also

much more centered with the learner since they are directly involved in monitoring the process, and seeking resources to improve the situation as needed.

### *Evaluating*

Although they note that their evidence is largely anecdotal, two of the best known online learning experts, Palloff and Pratt (1999), have concluded that instructors spend much more time delivering an online course than they do a face-to-face class. The heavy workload challenge makes it almost impossible for the instructor to respond to every single message posted in the bulletin board. The dynamic flow of live chat discussions also presents a great challenge for the instructor to answer every single question asked in a live-chat room. It is somewhat inevitable that learners will provide comments, suggestions, and answers for each other in this kind of environment. How learners react to peers' comments may present a challenge. For example, in Petrides' (2002) study, participants indicated that they were rather suspicious of the validity of peers' knowledge. It can be challenging to evaluate one's learning in an online context not only because instructors have time pressures associated with providing feedback to every student, but also because of learners' uncertainty in evaluating their own learning and peer's knowledge.

The online learning context provides learners with benefits associated with flexibility. However, there are also challenges in planning, monitoring, and evaluating learning, many of which learners have not faced with in traditional classroom environments. It is important to continue to explore how the unique characteristics of online learning influence the processes associated with SDL.

## **Implications**

Online learning is closely associated with SDL from both the process and the personal attribute perspective. Some research studies have examined the relationship between online learning context and SDL. For example, some studies found that online learning is more beneficial to self-regulated learners (Shapely, 2000). Some have found that certain aspects of SDL attribute, such as self-efficacy, were positively related to students' attitudes and achievement in online learning (Lee, Hong, & Ling, 2002). Yet, the results of the studies are rather superficial in understanding the complex and dynamic interaction between the various components. The SDL conceptual model is designed to extend our understanding of the important relationship between SDL and the online learning context. It provides many opportunities for future research and has implications for practice. We explore four areas in the following section.

### *Examining Learner's SDL Process in an Online Learning Context*

As illustrated in the model, the specific learning context has an impact on how much control a learner has over the process of planning, monitoring, and evaluating her or his learning experience. The SDL process may differ in different learning contexts (Candy, 1991). As an innovative and popular context, online learning presents learners with unique opportunities and challenges. To understand the interaction of online learning context and SDL processes, it is important to examine the learners' perspectives on taking control in online learning context. This is especially important for adult learners. With years of traditional classroom learning experience, online learning can be a

transformative learning experience for adult learners (Mezirow, 1990). Understanding how adult learners embrace the level of control placed upon or expected of them in an online learning context can assist instructors with implementation. Specific questions that may be considered include: What do adult learners perceive as their role(s) and responsibility (ies) in an online learning context? How do adult learners facilitate planning, monitoring and evaluating their learning in an online context? What resources and strategies do adult learners utilize in the online SDL process?

#### *Investigating Learners' SDL Personal Attributes in an Online Learning Context*

Studies have indicated that a learner can improve his or her level of self-direction by experiencing SDL (e.g., Vonderwell & Turner; 2005). Yet, how the specific context impacts the development of self-direction is not clear (Meyer & Turner, 2002). While it appears that SDL is context-dependent in that the level of a learner's self-direction (personal attribute) may vary in different learning contexts, it has been proposed that some of the attributes are trans-contextual (Candy, 1991). Several research questions remain, including: What are some of the SDL attributes that are unique in online learning? What are some of the online learning SDL attributes that are similar in other learning contexts? How do learners motivate themselves in an online learning context? How do learners use resources and cognitive strategies to enhance their online learning experience?

#### *Investigating the Interaction between SDL Process and SDL Personal Attributes*

Another area in need of further investigation is the different approaches by learners who have different levels of self-direction. Research has attempted to measure the level of a learner's self-direction (e.g., Grow, 1991; Guglielmino, 1977). Many questions need to be examined or further investigated in the field of SDL, including: how does a learner become motivated in a SDL context that requires high level of learner autonomy? How does a highly self-directed learner become motivated to learn in a structured learning context where she or he does not have a lot of power? Studies in this area will enable us to identify the characteristics of high and low level self-directed learners as well as the cognitive strategies they have used in their successful and not so successful SDL experiences.

#### *Designing Effective Online SDL Environments*

The ultimate goal of education is to help improve students' learning. Some argue that the goal of adult education is to develop self-directed learners (Candy, 1991; Garrison, 1997; Merriam, 2001). To understand SDL phenomenon is only a first step in achieving the educational goal of facilitating learners' learning. The key lies in the design of an effective online SDL environment. Following a grounded design process (Hannafin, Hannafin, Land, & Oliver, 1997), instructors need to align their epistemological beliefs with the practice of instructional design. Therefore, an instructor who believes in the importance of SDL needs to design a learning environment that fosters learners' SDL.

### **Conclusion**

SDL is an important aspect of adult education. It is both a goal of adult education and the process that leads to successful learning (Merriam, 2001). Self directed learning

is also a dominating philosophy in adult education (Garrison, 1992). The existing literature on SDL has established a good understanding of SDL as a process and a personal attribute. The study of SDL needs to continue, especially relating it to formal educational context, such as higher education institutions (Merriam & Caffarella, 1999). Given that the context where learning takes place influences the level of learner autonomy that is allowed in the specific context, as well as how a learner utilizes resources and strategies, and becomes motivated to learn, integrating the learning context in the study of SDL is significant. This is particularly true in online learning contexts, a relatively new area of exploration. The study of SDL online can help identify those trans-contextual SDL attributes as well as those unique online-based ones, enabling better online teaching and learning experiences.

## References

- Berge, Z. L. (1999). Interaction in post-secondary web-based learning. *Educational Technology, 39*(1), 5-11.
- Biesenbach-Lucas, S. (2003). Asynchronous discussion groups in teacher training classes: Perceptions of native and non-native students. *Journal of Asynchronous Learning Networks, 7*(3). Retrieved March 08, 2004, from <http://www.sloan-c.org/publications/jaln/v7n3/index.asp>
- Brockett, R. G. (2002). Conceptions of self-directed learning (Book Review). *Adult Education Quarterly, 52*(2), 155-156.
- Brockett, R. G., & Hiemstra, R. (1991). *Self-direction in adult learning: Perspectives on theory, research, and practice*. New York: Routledge.
- Brookfield, S. (1984). Self-directed learning: A critical paradigm. *Adult Education Quarterly, 35*, 59-71.
- Candy, P. C. (1991). *Self-direction for lifelong learning: A comprehensive guide to theory and practice*. San Francisco: Jossey-Bass.
- Chizmar, J. F., & Walbert, M. S. (1999). Web-based learning environments guided by principles of good teaching practice. *Journal of Economic Education, 30*(3), 248-264.
- Elvers, G. C., Polzella, D. J., & Graetz, K. (2003). Procrastination in online courses: Performance and attitudinal differences. *Teaching of Psychology, 30*(2), 159-162.
- Garrison, D. R. (1992). Critical thinking and self-directed learning in adult education: An analysis of responsibilities and control issues. *Adult Education Quarterly, 42*(3), 136-148.
- Garrison, D. R. (1997). Self-directed learning: Toward a comprehensive model. *Adult Education Quarterly, 48*(1), 18-33.
- Garrison, D. R. (2003). Self-directed learning and distance education. In M. G. Moore & W. Anderson (Eds.), *Handbook of Distance Education* (pp. 161-168). Mahwah, NJ: Lawrence Erlbaum.
- Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *Internet and Higher Education, 2*(2-3), 87-105.
- Grow, G. (1991). Teaching learners to be self-directed: A stage approach. *Adult Education Quarterly, 41*(3), 125-149.
- Guglielmino, L. M. (1977). *Development of the self-directed learning readiness scale*. Unpublished doctoral dissertation, University of Georgia, Athens.
- Gunawardena, C. N., & McIssac, M. S. (2003). Distance education. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology* (pp. 355-395). Mahwah, NJ: Lawrence Erlbaum.
- Hannafin, M. J., Hannafin, K. M., Land, S., & Oliver, K. (1997). Grounded practice in the design of learning systems. *Educational Technology Research and Development, 45*(3), 101-117.
- Hannafin, M. J., Hill, J. R., Oliver, K., Glazer, E., & Sharma, P. (2003). Cognitive and learning factors in Web-based distance learning environments. In M. G. Moore, & W. G. Anderson (Eds.), *Handbook of distance education* (pp. 245-260). Mahwah, NJ: Lawrence Erlbaum.

- Hara, N., & Kling, R. (1999). Students' frustrations with a web-based distance education course. *First Monday*, 4(12). Retrieved January 12, 2003, from [http://www.firstmonday.org/issues/issue4\\_12/index.html](http://www.firstmonday.org/issues/issue4_12/index.html)
- Harrison, R. (1978). How to design and conduct self-directed learning experiences. *Group and Organization Studies*, 3(2), 149-167.
- Hartley, K., & Bendixen, L. D. (2001). Educational research in the Internet age: Examining the role of individual characteristics. *Educational Researcher*, 30(9), 22-26.
- Hill, J. R. (2002). Overcoming obstacles and creating connections: Community building in web-based learning environments. *Journal of Computing in Higher Education*, 14(1), 67-86.
- Hill, J. R., & Hannafin, M. J. (2001). Teaching and learning in digital environments: The resurgence of resource-based learning. *Educational Technology Research and Development*, 49(3), 37-52.
- Hill, J. R., Wiley, D., Nelson, L. M., & Han, S. (2003). Exploring research on Internet-based learning: From infrastructure to interactions. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology* (pp. 433-460). Mahwah, NJ: Lawrence Erlbaum.
- Kasworm, C. E. (1988). *Part-time credit learners as full-time workers: The role of self-directed learning in their lives*. Paper presented at the Annual conference of the American Association for Adult and Continuing Education, Tulsa, OK.
- King, K. P. (2002). Identifying success in online teacher education and professional development. *Internet and Higher Education*, 5(3), 231-246.
- Lee, J., Hong, N. L., & Ling, N. L. (2002). An analysis of students' preparation for the virtual learning environment. *Internet and Higher Education*, 5(3), 231-242.
- Long, H. B. (1998). Theoretical and practical implications of selected paradigms of self-directed learning. In H. B. Long & Associates (Eds.), *Developing paradigms for self-directed learning* (pp. 1-14). Norman, OK: Public Managers Center at University of Oklahoma.
- Mason, R., & Weller, M. (2000). Factors affecting students' satisfaction on a web course. *Australia Journal of Educational Technology*, 16(2), 173-200.
- Merriam, S. B. (2001). Andragogy and self-directed learning. *New Directions for Adult and Continuing Education*, 89, 3-14.
- Merriam, S. B., & Caffarella, R. S. (1999). *Learning in Adulthood*. San Francisco: Jossey-Bass.
- Meyer, D. K., & Turner, J. C. (2002). Using instructional discourse analysis to study the scaffolding of student self-regulation. *Educational Psychologist*, 37(1), 17-25.
- Mezirow, J. (1990). *Fostering critical reflection in adulthood: A guide to transformative and emancipatory learning*. San Francisco: Jossey-Bass.
- Mocker, D. W., & Spear, G. E. (1982). *Lifelong learning: Formal, nonformal, informal, and self-directed*. Columbus, OH: ERIC Clearinghouse for Adult, Career, and Vocational Education, Ohio State University.
- Moore, M. G. (1972). Learner autonomy: The second dimension of independent learning. *Convergence: An International Journal of Adult Education*, 5(2), 76-87.
- Palloff, R. M., & Pratt, K. (1999). *Building learning communities in cyberspace: Effective strategies for the online classroom*. San Francisco, CA: Jossey-Bass.

- Petrides, L. A. (2002). Web-based technologies for distributed (or distance) learning: Creating learning-centered educational experiences in the higher education classroom. *International Journal of Instructional Media*, 29(1), 69-77.
- Poole, D. M. (2000). Student participation in a discussion-oriented online course: A case study. *Journal of Research on Computing in Education*, 33(2), 162-177.
- Rovai, A. P. (2002). Development of an instrument to measure classroom community. *Internet and Higher Education*, 5(3), 197-211.
- Sener, J., & Stover, M. L. (2000). Integrating ALN into an independent study distance education program: NVCC case studies. *Journal of Asynchronous Learning Networks*, 4(2). Retrieved December 8, 2003, from <http://www.sloan-c.org/publications/jaln/v4n2/index.asp>
- Shapley, P. (2000). On-line education to develop complex reasoning skills in organic chemistry. *Journal of Asynchronous Learning Networks*, 4(2). Retrieved December 8, 2003, from <http://www.sloan-c.org/publications/jaln/v4n2/index.asp>
- Sloan Consortium. (2004). *Entering the mainstream: The quality and extent of online education in the United States, 2003 and 2004*. Retrieved March 10, 2005, from <http://www.sloan-c.org/resources/>.
- Song, L. (2005). *Adult learners' self-directed learning in online environments: Process, personal attribute, and context*. Unpublished Dissertation, The University of Georgia, Athens, GA.
- Song, L., Singleton, E. S., Hill, J. R., & Koh, M. H. (2004). Improving online learning: Student perceptions of useful and challenging characteristics. *Internet & Higher Education*, 7(1), 59-70.
- Tobin, T. J. (2004). Best practices for online information-literacy courses. *Journal of Interactive Online Learning*, 2(4). Retrieved 2006 from <http://www.ncolr.org/jiol/issues/PDF/2.4.3.pdf>
- Vonderwell, S. (2003). An examination of asynchronous communication experiences and perspectives of students in an online course: A case study. *Internet and Higher Education*, 6(1), 77-90.
- Vonderwell, S., & Turner, S. (2005). Active learning and preservice teachers' experience in an online course: A case study. *Journal of Technology and Teacher Education*, 13(1), 65-84.

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