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***International Journal of Self-Directed Learning***

College of Education, CO 138, Florida Atlantic University

500 NW California Boulevard, Port Saint Lucie, FL 34986

[IJSDL@fau.edu](mailto:IJSDL@fau.edu)

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500 NW California Boulevard, Port Saint Lucie, FL 34986 [IJSDL@fau.edu](mailto:IJSDL@fau.edu)

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# *Preface*

It is very rewarding to see a continual development of the self-directed learning knowledge base. This issue of the journal reflects such advances as eleven authors, including three international colleagues, present their research efforts in five articles. Case study, evaluation, qualitative, and quantitative methods were utilized. It certainly has been my pleasure to serve you as guest editor for this and the prior issue. Working with such fine authors and a top notch Editorial Board has made my efforts very fulfilling.

In the first article Bulik, Burdine, and Shokar report on their development and testing of a template that can be utilized for developing web-based clinical learning experiences. They demonstrate the template's utility within the medical education arena, but speculate on its usefulness in other areas, too. Such a practical application in the encouragement of self-directed learning speaks volumes for its ever-widening acceptability across various disciplines.

Boyer, in the second article, also looks at an aspect of technology development by encouraging higher education faculty to become more self-directed in enhancing their skills. Through a summer institute and subsequent monthly support meetings, faculty overcame initial fears and hesitations to become proficient in a variety of hardware and software applications. The effort demonstrated that technology can be infused into daily practice.

The third article was authored by Maung, Abas, and Abdullah in Malaysia. They studied medical students at the International Medical University. Prior knowledge before beginning medical training and learning style preferences were examined as potential influences on perceptions about self-directed learning. Students were found to progress through three acceptance phases regarding the value of self-direction as a learning method.

Kirkman, Coughlin, and Kromrey, in the fourth article, looked at graduate students in both traditional and web-enhanced courses in terms of Internet usage, portfolio grades, satisfaction, and self-reports on success after using learning contracts and self reflective activities. Internet use appears as a positive factor and further research is required to understand its full impact on such aspects as perceptions of success and satisfaction.

The final article by Ricard also focuses on learner success in a case study review of nine educational settings with self-directed learning components. The importance of the learning process was observed through an assessment of facilitator and learner relationships and necessary resources for learning. An initial model that depicts a learner's movement through learning processes is presented along with the author's invitation for critique and dialogue.

Roger Hiemstra, Guest Editor

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## SEAMLESS INTEGRATION OF SELF AND OTHER DIRECTED LEARNING IN WEB-BASED CASES

Robert J. Bulik

Ramona L. Burdine

Gurjeet S. Shokar

Most professional education programs have come to rely heavily on web-based delivery of learning materials. Unlike interactive classroom instruction, many web-based learning environments are only static, non-adaptive mediums that present material in a linear path through the subject material, thus inhibiting self-directed learning (SDL). Creating web-based cases for the health care professions can further constrain SDL through the specific sequence students are required to utilize when presenting a patient's medical problem to a faculty preceptor. Overcoming the potential constraints of the medium and the medical-model format are significant challenges for faculty-authors developing web-based cases. We created a template that faculty could use when developing web-based clinical cases and assessed its potential to encourage SDL. Our assessment of those cases developed with our template has led us to conclude that the six elements we infused into our design did seamlessly integrate strategies for self-directed learning into an otherwise linear medical-model format.

Various professions such as architecture, engineering, law, medicine, nursing, and social work, now promote self-directed learning (SDL) as a recommended curricular outcome and a major aspect of their teaching. Professionals within these fields are expected to be self-regulating, to act within the limits of their training and expertise, to recognize their learning needs within the context of professional standards, and to keep abreast of changes in their fields with the creation of new knowledge and ever-widening access to information. Consequently, the strategies for encouraging SDL have become a major aspect of professional education. Pedagogies that encourage SDL such as case-based, problem-based, and team-based learning are being integrated into undergraduate and graduate professional environments. Research evidence indicates that student participation in problem-based learning (PBL) curricula leads to a demonstration of self-directed learning skills (Blumberg, 2000), and these same skills are associated with life-long learning (Candy, 1991).

At the same time, most professional education programs have come to rely heavily on the Internet for delivery of learning materials. Unlike interactive classroom modes of instruction that promote SDL, many web-based environments (but certainly not all) are only static, non-adaptive learning mediums that present material in a linear path through the subject material. Of all the professions, medical educators face an additional and unique challenge when creating web-based learning materials.

In medical education, the potential constraints of the Internet are further compounded by the traditional clinical teaching model. While the first two years of medical school are typically

focused on the study of the basic sciences, the third and fourth years of training (the clerkship years with an apprenticeship-style of training) center on clinical topics in hospital and out-patient clinic settings. In this apprenticeship-style of medical training, students encounter the knowledge, skills, and values as enacted by their preceptors in the context of caring for patients. The challenge for medical educators is to transfer this contextualized but linear process of training into a web-based learning experience while encouraging the development of self-directed learning.

The *medical model*, primarily utilized in the clerkship years, has a linear process for teaching and learning – a student describes to a faculty/preceptor the patient’s presenting problem, followed by findings from a focused medical history and physical exam, and culminates with recommendations for patient education and a management plan. In addition, students are also expected to advance their understanding of the underlying basic science of the presenting problem, describe the appropriate diagnostic testing, respond to questions on clinical pharmacology, and be able to defend a reasonable management plan. This prescribed linear approach can be at-odds with the constructs of SDL and exacerbate potential issues of the web environment. Specific to this discussion, Candy (2004) provides some insights from a study conducted for the Australian government in which he argues that in its current form, the web is less well suited to learning highly contextualized information.

To overcome the potential limitations imposed on the learning environment by distance, time, and the structure of the Internet itself, faculty must actively build in opportunities for learner interactivity and control in web-based educational materials. Faculty-authors developing web-based instructional materials in medical school settings are particularly challenged by both the potential constraints of the medium and the medical model format. Consequently, we sought a method to seamlessly integrate elements of SDL into the “other-directed” environment of web-based clinical cases.

The purpose of this article is to do the following: (a) explore the potential for web-based cases to encourage SDL; (b) describe the pedagogical elements embedded within a template for creation of web-based clinical cases; and (c) review the structure and utility of the embedded pedagogical features that could be perceived as encouraging SDL.

## THE POTENTIAL FOR WEB-BASED LEARNING

The World Wide Web has proven to be a valuable tool for education in terms of connecting students to an enormous fund of information and delivering various multimedia learning materials (Eastmond & Ziegahn, 1995). The use of hypertext and hypermedia – those links to huge static text or media files embedded within a document – facilitate a very natural and efficient form for connecting to, and retrieval of, information. Web-based learning has the potential to facilitate a wide variety of learning styles and approaches, thus creating a motivating and active learning environment. Likewise, it has the potential to truly democratize education by reaching learners prevented from accessing instructional resources by barriers of time and distance (Jonassen, Davidson, Collins, Campbell, & Haag, 1995). Since the early 1990s, a number of reports have discussed the opportunities offered by integrating computer-aided

instruction into professional teaching environments (Kulik, 1994), particularly in medical education (Hunt, Kallenberg, & Whitcomb, 1999; Moberg & Whitcomb, 1999; Salas & Anderson, 1997; Shokar, Shokar, Romero, & Bulik, 2002). Computer-based educational methods, including clinical cases delivered to medical students via the Internet, appear to be useful in filling gaps in a student's exposure to common problems and providing a consistent source of information about a wide range of conditions (Leong, Baldwin, Usatine, Adelman, & Gjerde, 2000).

These and other advantages offered by the medium have created considerable enthusiasm among educators toward the web in general and hypermedia as a pedagogical tool. As with all evolving instructional innovations, potential and reality are not always synonymous. In other words, the web (through web-based, on-line courses, and computer-assisted learning) only has the potential to support constructivist-oriented, SDL – the conditions that would encourage the learner to engage in their own knowledge construction by integrating new information into their existing schema, and by associating and representing it in a meaningful way. For example, a linear arrangement of content material where the subsequent page is dependent upon what was presented on the previous page(s) requires no learner interaction or reflective thought on the topic.

While the rationale for promotion of SDL skills is well documented in the literature of the various professions, it has not been well studied in web-based medical education learning environments. We believe that the definition of SDL described by Knowles (1975), now the most often used description, can also be applied to web-based learning:

. . . individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes. (p. 18)

Two major themes that appear to be embedded in the above definition, *interactivity* and *learner control*, dispel the myth that SDL is necessarily an autonomous, isolated, self-sufficient, solitary, or unconnected approach to learning even if it takes place in a web-based environment (Bulik & Hanor, 2000). To encourage (not inhibit) SDL, web-based cases need to be constructed with specific opportunities for students to be interactive and to exercise control over their own learning. Interactivity on the web can be described as a process of initiating an engagement or dialogue with learning resources (human or text-based) that allows for an active role on the part of the student in constructing knowledge and participating in the evaluation of learning outcomes. Learner control can be understood as a process of reflecting on personal learning needs, formulating learning goals, and choosing and implementing appropriate and preferred learning strategies.

The time-honored classroom lecture has long been the mainstay of professional educational programs – especially in medical education – even though research indicates that retention after time periods as short as fifteen minutes is only 10% for non-obvious or counterintuitive facts presented by direct instruction (Wieman & Perkins, 2005). Simply transferring content onto the

web and making it available 24 hours a day, 7 days a week does not meet the definition of SDL provided by Knowles nor contribute to learner interactivity or learner control as described above.

In traditional medical education, clinical teaching is founded on the rich human interaction of the apprentice model utilizing preceptors and patients. That resource-rich model is difficult to simulate in electronic formats, without multi-million dollar investments in artificial intelligence technologies. Replacing the face-to-face learning environment where interactivity and learner control are central, with interactivity on the web can be encouraged in two ways: First, interactions can be live dialogues with faculty situated at another computer or through threaded discussions among faculty and students. In the medical education setting, the dictates of the clinical schedule at distributed clinics in community settings precludes either of these options. Second, interactions can be simulated with the text through strategies described below which are infused into an otherwise static, linear, and web-based case structure.

Asynchronous question and answer text-interactions are much more feasible to develop, cost-effective, and efficient in the setting of community-based clerkships, than synchronous dialogues. However, development of web-based clinical cases has traditionally meant a huge investment of faculty time, inconsistent presentation styles, and modules that required little interactivity on the part of students. Or, it meant turning over clinical case scenarios to technical support individuals who needed to constantly check back with faculty to ensure fidelity of information and presentation within the case. The Design-A-Case<sup>©</sup> (DAC) template (described below) has allowed faculty to efficiently develop asynchronous, interactive web-based cases, with many of the features of PBL. Students are presented with both the linear medical model's structure and strategies associated with SDL – interactivity and learner control.

### DESIGN-A-CASE<sup>©</sup> TEMPLATE

For most of our faculty, creating an online clinical case scenario is no small task. With funding from HRSA (D16 HP00034-03), we developed an online case authoring template called Design-A-Case<sup>©</sup> (DAC) to build interactive web-based cases for medical education, but adaptable to many other settings (Shokar, Burns, & Bulik, 2007). The DAC template allows faculty to efficiently develop asynchronous, interactive web-based cases with many of the features of problem-based or small group-based learning.

This template differs from others developed for medical education because we simulate the learning process used in the clinical setting. Most other templates use a more direct instructional approach commonly associated with didactic sessions rather than the clinical setting, and virtually all of them use multiple choice questions as the only means of testing student's comprehension. The other way in which our template differs from others is that it has the flexibility to be used not just in the outpatient setting, but in the inpatient hospital setting, emergency room (ER) settings, and across disciplines.

Our template can also be adapted by other professional studies programs that utilize case-based learning such as architecture, engineering, law, nursing, social work, and various others.

The overall educational principles upon which the DAC template was designed are these:

1. The web case simulates the outpatient setting where students are asked to use a linear process – first ask the history, do a physical exam, recommend diagnostic testing, and defend a management plan. This is the information gathering process used by learners in clinical clerkships (and later in residencies).
2. We also wanted to maintain in the online setting as much of the small group problem-based format we successfully use in our first and second year curriculum to encourage SDL. Thus, the online cases are discovery-oriented and the learning objectives are provided at the end of the case to encourage critical reasoning skills in support of a diagnosis.
3. We also encourage short answers to open-ended questions that often require reflective thinking in order to discourage passively answering multiple choice questions.

In summary, we encourage a PBL style approach to learning, interactivity, and standardization of learning experiences.

We also conducted and published two studies on the usefulness of the case design for medical students. In our first study, we assessed the utility of our web-based clinical cases to support constructivist oriented, SDL (Shokar, Bulik, & Baldwin, 2005). We utilized student surveys and focus groups to look at how effectively students felt the web cases were integrated into the Family Medicine clerkship. In this study, nine, one-hour focus groups with students were conducted at the conclusion of the clerkship during the study period. All groups were asked the same questions. Students also completed a nine question evaluation form using a Likert scale and were provided space for comments. The questions in both the focus groups and evaluation forms concentrated on the clinical content of web cases, the web case structure, and the web case environment. The findings indicated positive medical student involvement with clinical decision making within the content of the case, especially the interactivity with faculty answers. Students also commented positively on additional case features such as supplemental Internet searches and appreciation for the “clinical pearls” provided by faculty.

In our second study, we looked at student performance in our Family Medicine Clerkship with completion of web cases (Shokar, Burdine, Callaway, & Bulik, 2005). In this study, the dependent variables were the National Board of Medical Examiners (NBME) Subject Exam in Family Medicine, the Standardized Patient–based Clinical Competence Exam (CCE), and the preceptor clinical rating form (CRF). The co-variables involved the U.S. Medical Licensing Exam (USMLE) STEP 1 scores – measures of prior academic achievement. ANCOVA was used to neutralize the effect of these co-variables. The 179 students in that study were divided into two groups – those that completed the cases and those that did not. Students who completed the web cases scored significantly higher on the NBME exam and the CCE compared to those who did not ( $F = 14.071, p < .000$  and  $F = 11.522, p < .001$  respectively). SYSTAT 11 software was used.

In this, our third study, we wanted to look critically at the DAC authoring template, along with the structure and utility of embedded pedagogical features developed in the web-based cases that could be perceived as encouraging SDL.

## STRUCTURE AND PROCESS

The DAC template allows faculty to develop interactive web-based cases without the help of a computer programmer, yet it produces learning modules with a similar look and feel across all the topics regardless of which faculty created the case. This tool was developed for a medical education setting, but any educational program working with web-based cases would benefit from using this it.

### *Case-Based Learning Format*

A typical web-based case created with the DAC template includes 8-12 modules. Each module consists of two screens (or two web pages). The first screen contains text that delivers information appropriate to the module topic, sometimes augmented with graphics or multimedia. Below this information, open-ended questions are posed and the student is required to enter answers to the questions before accessing the second screen. The second screen contains the “textbook” faculty answer, with *teaching pearls*, and links to relevant web resources. Because the cases are problem-based and discovery-oriented, the learning objectives are reserved until case’s end so they don’t guide the student’s clinical decision making. At the conclusion of the case, students can print out their answers (alongside those of the faculty), a summary sheet of the clinical pearls, and the links to web resources. When students complete a case, an email message containing students’ answers is automatically sent to the faculty case author.

Figure 1 is the header for our web-based clinical cases, and provides an overview of the linear structure of the medical model in columns one and two. The third column, Inserts, are modules that the case author may place anywhere within the flow of the case.

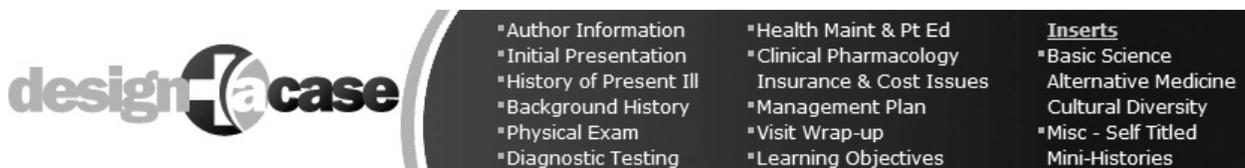


Figure 1. Design-A-Case Template ([www.designacase.org](http://www.designacase.org))

### *Web-Based Clinical Case Structure*

The cases developed with the DAC template follow a prescribed, standardized case presentation format. This medical-model template provides a sequenced series of modules for inclusion in a

case: author information, initial presentation, history of present illness, background history, physical exam, diagnostic testing, health maintenance and patient education, clinical pharmacology, insurance and cost issues, management plan, visit wrap-up, and learning objectives (see Figure 1). In addition, most of our cases contain graphics, multimedia presentations, or photographic enhancements, and use question and answer activities followed by embedded faculty responses to simulate interactive learning.

To author a web-based clinical case, faculty-authors select individual modules. Figure 2 shows an example – the *Initial Presentation*. Faculty develop a short introductory statement or stem for background information in order to provide a context for the patient visit. Then, they create between 1 and 4 open-ended questions that are posed to the student. Faculty also develop an evidence-based answer to each one (accessed by the *Faculty Response* button), which remains hidden from the student until a reply to the question is typed into the dialogue box and the *Submit* button is selected. The figures below show this faculty template (Figure 2), the student view (Figure 3), and the faculty text book response to the open-ended questions (Figure 4).

## History of Present Illness

**Stem** **B** *I* link

Britney tells you that her symptoms have stayed about the same for the last three days, with fever on and off, malaise, fatigue and general aches and pains in her joints. The throat discomfort has worsened today and she has a headache now. She has taken Tylenol for the last two days and she has not felt it has helped. She agrees with her mother that she "needs" antibiotics to help her recover. She denies rhinorrhea.

**Questions**

**Question 1** **B** *I* link

What other questions would you like to ask before you proceed to her past medical history?

**Answer 1** **B** *I* link

I would like to enquire about difficulty in swallowing, whether she has noticed tender swollen lymph nodes in her neck, if she has a rash or if she has noticed pus in the back of her throat. I would also ask about hoarseness of her voice, and difficulty in breathing and relieving/aggravating factors for the sore throat. I would also enquire about friends/family with similar symptoms as kissing/contact is a common way of contracting infectious mononucleosis in this age group.

Figure 2. Faculty View – Initial Presentation

## Initial Presentation



PATIENT: Britney Sears    PHYSICIAN: Initial Presentation    2 of    LOGOUT HOME [help?](#)

Britney Sears is a 13 year old African American female who lives with her divorced mother in the suburbs, and presents to the clinic with a three day history of a sore throat.

Her vital signs show her BP 110/60 mmHg, Pulse 104/mt, RR 20/mt and her temperature is 101.5F. She is 5 feet 4 inches tall and weighs 108 pounds. Her mother smiles and says "We are here for the antibiotic prescription."

**What are the common causes of a sore throat in a 13 year old girl?**

**What do you make of her mother's comment?**



**FACULTY RESPONSE**

**CONTINUE**

**Submit**

Figure 3. Student View – Initial Presentation

## Faculty Response - Initial Presentation



**What are the common causes of a sore throat in a 13 year old girl?**

These include

- viral pharyngitis (Including influenza)
- infectious mononucleosis (Epstein-Barr virus)
- bacterial tonsillitis (strep throat)

Less common causes include irritation from post nasal discharge, a foreign object stuck in the throat as well as bacterial infections such as gonococcal infection, group C and G streptococcus, Moraxella Catarrhalis and H.influenzae.

**What do you make of her mother's comment?**

From her comment it appears that she may suspect a bacterial cause as the culprit in her daughter's case or one may interpret it as nothing short of an antibiotic will be enough, regardless of whether her daughter needs it.

---



Common viruses that cause sore throat/pharyngitis in the general population include rhinovirus, adenovirus, coxsackievirus, parainfluenza virus and echovirus.

**CLOSE**

Figure 4. Faculty Response

Subsequent topics are developed and displayed in a similar manner. Figure 5 displays an author’s overview of the case. Individual modules may be reorganized in any order of presentation. It is important to note that a “Miscellaneous Module” may be used at any point in the development of the case and an author-supplied title will appear in the *Student View*. Consequently, any discipline or program that uses a case study approach could adopt this authoring template and create an entire web-based case with the Miscellaneous Module and author-supplied titles.

1		<a href="#">Preview</a>	Author Info	
2	↓	<a href="#">Preview</a>	Initial Presentation	<a href="#">Delete</a>
3	↑ ↓	<a href="#">Preview</a>	History of Present Illness	<a href="#">Delete</a>
4	↑ ↓	<a href="#">Preview</a>	Background History	<a href="#">Delete</a>
5	↑ ↓	<a href="#">Preview</a>	Physical Exam	<a href="#">Delete</a>
6	↑ ↓	<a href="#">Preview</a>	Diagnostic Testing	<a href="#">Delete</a>
7	↑ ↓	<a href="#">Preview</a>	Health Maintenance & Patient Ed	<a href="#">Delete</a>
8	↑ ↓	<a href="#">Preview</a>	Management Plan	<a href="#">Delete</a>
9	↑ ↓	<a href="#">Preview</a>	Basic Science 1	<a href="#">Delete</a>
10	↑ ↓	<a href="#">Preview</a>	Basic Science 2	<a href="#">Delete</a>
11	↑ ↓	<a href="#">Preview</a>	Clinical Pharmacology	<a href="#">Delete</a>
12	↑ ↓	<a href="#">Preview</a>	Visit Wrap-up	<a href="#">Delete</a>
13	↑ ↓	<a href="#">Preview</a>	Misc 1 - Your Feedback	<a href="#">Delete</a>
14	↑	<a href="#">Preview</a>	Learning Objectives	<a href="#">Delete</a>

Figure 5. Case Layout

## SELF AND OTHER DIRECTED LEARNING

The authoring template presents a structured, standardized, and sequenced approach to case development that follows the medical model. Within this template, we introduced the following six elements that we believe encourages SDL, while adhering to the medical model structure.

### *PBL-Style Questions*

Open-ended questions used to prompt student discussions are a hallmark of PBL. This style of questioning encourages students to think broadly about the issues, consider what it is they do know, and determine what learning issues they will research. We strive to ensure that questions posed to students in our web-based cases are also open-ended, able to stand alone, and not dependent on previous materials – students are not lead down a specific path by a series of closed-ended questions as they go through our clinical cases.

*Student Answers*

A text box is provided below each question for students to enter their individual responses. Students reply with short written answers before proceeding through the case. Some students will engage the links provided to web-based resources, and then develop individual responses in support of their thinking about the presented question. Students are blocked from progressing through the case or seeing the faculty responses (see the next section) until they reply to the question and enter “submit.”

*Faculty Responses*

In all our cases, faculty provide textbook-style responses to the questions they pose to students on the previous screen. While these specific responses would not necessarily encourage SDL, faculty most often expand upon the specific answer with additional teachable moment narratives that could be generalized to other clinical problems and encourage students to do further reading or research on the topic.

*Clinical Pearls*

Our DAC template encourages faculty to share their experiences on a particular presenting patient problem through clinical pearls. While a textbook answer may well be appropriate for the question that was posed to the students, faculty have extensive clinical experiences that can't be learned from a book. Clinical pearls are experiential insights – When I exam a patient that presents with....., I also look for....., and ensure that I ask about..... These pearls help students to see the presenting problem and textbook answers within the context of the patient.

*Resources*

Faculty who create cases within our DAC template are encouraged to provide additional resources for students. For example, a clinical case written about a young adolescent might also include a standard growth chart with explanations of normal and abnormal development. Other resources embedded within the case might be radiological pictures, a body-mass indicator (BMI) calculator, x-rays, or even diagrams of enzyme pathways or mechanisms of action.

*Links*

We also encourage our faculty to ensure that their approach to writing the web-based clinical cases is evidence-based. Throughout the case, clinical protocols, treatment plans, and references to standards of care, all contain hyperlinks to appropriate research articles, medical association web sites, or similar authoritative resources.

## ASSESSING THE BALANCE

Education programs around the world and across professions are actively using online learning as a tool to expand educational opportunities without creating additional burdens on educational resources. The literature supports this as an effective strategy to promote SDL. This growth has resulted in a rapidly emerging field of specialized educational research as educators evolve traditional teaching structures into facilitative online materials that promote SDL.

A conceptual model for understanding SDL in online environments has been described by Song and Hill (2007) in which online “SDL” and “learning context” are separate influencing factors to be evaluated. SDL activities are assigned into two primary learner focused categories: process and personal attributes. The learning context refers to the environment that is created and experienced by the learner based on educational design and support elements. The challenge in online education is to create an experience that engages learners, promotes autonomy, and at the same time provides faculty direction and feedback. Successful implementation of a web-based education program requires learners to cultivate SDL characteristics (Hanna, Glowacki-Dudka, & Conceicao-Runlee, 2000). Learners must be self-motivated and willing to accept individual responsibility over their own educational goals. Development of effective design and support elements depends on the instructor’s ability to construct an interactive online learning environment which allows the student to explore their own SDL agendas while providing directive feedback that ensures balance between instructor and learner goals.

Our challenge, then, was to seamlessly integrate elements of SDL into a very traditional and linear learning structure. Previous studies (noted earlier) done to evaluate the instructional utility of Design-A-Case<sup>®</sup>, demonstrate positive outcomes in student performance and SDL experience. The purpose of this study was to qualitatively assess our web cases for structural elements that promote SDL. We considered elements integrated both within the web case design template itself and activities independently developed by the web case author to give students directive feedback. As stated previously, the main challenge in developing effective web-based education is providing a balance of learner versus instructor identified goals (i.e., self versus other directed learning). The result of our study reveals that the Design-A-Case<sup>®</sup> template meshes both types of learning:

- Self-Directed Learning – The DAC template provides open-ended questions, clinical pearls, web links, and evidence-based resources to encourage interactivity and learner control to promote SDL.
- Other-Directed Learning – The DAC template mirrors the linear medical model students are required to use when presenting a patient to their preceptor, as well as faculty-author generated textbook answers and targeted hypertext links.

Every web-based clinical case was constructed around the medical model utilizing the DAC template to reinforce in students this method of learning. But not every page of every web-based clinical case contained all the interactive elements mentioned above. We felt that we had provided students with some strategies for encouraging SDL through interactivity and learner

control (Bulik & Hanor, 2000), but we had not looked at the balance of other directed learning and SDL through the lens of the definition provided earlier by Knowles:

- .....individuals take the initiative.....Completion of a set number of web-based clinical cases is not necessary to receive a passing grade in the Family Medicine clerkship; students have the option to utilize the web cases as a learning opportunity.
- .....with or without the help of others.....The web cases act as gap fillers for students assigned to community-based clinical sites who may encounter differing populations of patients with diverse presenting problems. These clinical cases ensure that all students are exposed to the common medical problems most often seen by Family Medicine physicians (as well as clinical problems that are rarely seen, but important to understand), and provide clerkships across the medical school with assistance in addressing both course objectives and Licensing Committee on Medical Education requirements.
- .....in diagnosing their learning needs.....The open ended questions that are the centerpiece of each module of every case provides an opportunity for students to reflect on what it is they do know (or don't know) about a specific topic prior to determining the necessity of pursuing the resource links provided by faculty-authors.
- .....formulating learning goals.....Not every student taking the 4-week Family Medicine Clerkship will become a family medicine doctor or generalist physician. Regardless of any one medical student's eventual area of practice, each learner will make a choice about the importance of the topics presented in the web cases and then invest an appropriate amount of time following the hypertext links and reading other resources provided by the author, depending on their own individual learning goals.
- .....identifying human and material resources for learning.....The links and resources within the web cases are optional learning opportunities that provide a depth to the discussion generated by the faculty, but are not necessarily needed to answer the questions posed by faculty-authors. In the focus groups reported in our previous study, students noted talking with their preceptor about the topics (and questions) in the web cases, thus utilizing appropriate human resources.
- .....choosing and implementing appropriate learning strategies.....The web cases are accessible 24/7 from anywhere through an Internet access; they may also be printed out as an enduring resource for current learning or future reference. Additionally, we strive to use the first-person voice in our dialogue with students to provide a learning strategy that simulates a discussion of a patient's presenting problem during a clinic visit with a preceptor, but in the context of a web-based case.
- .....evaluating learning outcomes.....Clinical pearls help students to see the presenting problem within the context of a patient and provide an opportunity for self-assessment – learners can determine if the broader discussion provided by the clinical pearl is in fact how they would generalize and presented issues. Further, upon completion of the web case, the DAC template generates an automatic email to the case author. This element of the template provides an opportunity for both the student and case author to assess the answers submitted for each questions and to dialogue about specific responses.

There were 57 web-based clinical cases developed through The DAC template. We assessed them to determine the number and type of learning strategies utilized by the developers. Table 1 shows the results.

*Table 1. Learning Strategies Utilized in 57 Web-Based Clinical Cases*

Case Elements		Averages per case
Modules / Pages per Case		12
Interactivity Strategies	PBL-style questions	16
	Student answers	16
	Supplemental “teachable moments”	16
Learner Control Strategies	Clinical pearls	5
	Evidence-based resources	6
	Links	6

## CONCLUSION

In medical education, it is the rich human interaction of the apprentice-model utilizing preceptors and patients that is difficult to simulate in electronic formats without multi-million dollar investments in artificial intelligent technologies. Replacing the face-to-face learning environment with interactivity on the web can be encouraged in two ways: First, interactions can be live dialogues with faculty situated at another computer or through threaded discussions among faculty and students. In the medical education setting, dictates of the clinical schedule at distributed clinics across the state precludes either of these options. Second, interactions can be simulated with the text through the strategies we have infused into an otherwise static, linear, web-based case structure.

Asynchronous question and answer text-interactions are much more feasible to develop, cost-effective, and efficient in the setting of community-based clerkships than synchronous dialogues. However, development of web-based clinical cases has traditionally meant a huge investment of faculty time, inconsistent presentation styles, and modules that required little interactivity on the part of students. Or, it meant turning over clinical case scenarios to technical support individuals who needed to constantly check back with faculty to ensure fidelity of information and presentation within a case. The DAC template has allowed faculty to efficiently develop asynchronous, interactive web-based cases with many features of PBL. Students were presented with both the structure of the linear medical model, along with strategies associated with SDL – interactivity and learner control.

Medical educators face a distinct evolutionary challenge in redesigning traditional teaching methods for the future generations of technology savvy students. Based on trends in medical school expansions, we can predict that students will be increasingly dispersed at separate geographic sites during their clinical clerkship years in order to obtain a sufficient quantity of patient experiences. Additionally, there has been a substantial growth in the availability of online educational materials (databases, images, protocols, outcome studies, and others) that are widely available to faculty. Given these conditions, medical educators will need to develop skills in assessing and delivering effective online educational materials. This discussion also points to the limitation of this study – it was a qualitative study conducted with one specific authoring template and a restricted review of literature in medical education field.

However, we believe that the web case model produced by the DAC template is useful in providing a framework in which to both evaluate and develop an approach for the delivery of distance educational materials. Our assessment of these cases developed with the DAC template has lead us to conclude that the six elements we infused into our design did seamlessly integrate strategies for self and other directed learning into an otherwise linear medical model format.

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**Robert J. Bulik** is an Associate Professor in the School of Medicine at UTMB, Associate Director for the Office of Educational Development, member of the Academy of Master Teachers, and has NIH and HRSA grant funding. He also directs the Scholars in Education program, a multidisciplinary faculty development course. ([rjbulik@utmb.edu](mailto:rjbulik@utmb.edu))

**Ramona Burdine** is an Associate Professor of Family Medicine and Assistant Dean of Educational Affairs at Texas Tech University Health Sciences Center - Permian Basin. She has extensive experience developing educational materials and integrating problem-based cases into web-based activities. Her special interests include curriculum development to enhance family-centered care. ([ramona.burdine@ttuhsc.edu](mailto:ramona.burdine@ttuhsc.edu))

**Gurjeet Shokar** is an Associate Professor of Family Medicine and the Predoctoral Program Director at UTMB. He is an experienced PBL facilitator, has awards for innovation in medical education, and has presented and published widely. His educational interests include distance education, self-directed learning, and learner performance on standardized exams. ([gsshokar@utmb.edu](mailto:gsshokar@utmb.edu))

## A SEA OF CHANGE: FACULTY SELF-DIRECTION IN TECHNOLOGY INTEGRATION

Naomi R. Boyer

University faculty generally tend to be self-directed within their area of expertise. However, when it comes to technology professional development, some are fearful, intimidated, or cautious and, therefore, avoid the utilization of technological tools in practice. While most early adopters of technology self-direct in the learning and utilization of technical tools to enhance the learning process, those in the lower two-thirds of the innovation curve require development opportunities that stimulate exploration, support risk taking, and provide a strong foundation of mentoring. The study's purpose was to explore how university faculty can be encouraged and facilitated in technology development efforts to become more self-directed and willing to take risks with teaching innovations. A program was developed to facilitate faculty in such endeavors. Evaluation of the program efforts shows that the successes far outweighed the challenges at the individual and collective levels and impacted productivity, innovation, teaching, and research.

### OVERVIEW

Technology is changing the way faculty teach, research, and serve within the academic community at an exponential pace (Baldwin, 1998), creating a pressing need for faculty professional development to learn and apply these new technologies (King, 2002). Given this reality, the process of learning new technology has the capacity to overload both faculty and organizations (Gallant, 2000). While the “click here” hands-on workshop method of technology training is productive for short term skill development, it doesn't often help faculty to overcome fear of technology experimentation and implementation. Löfström and Nevgi (2007) indicate that hands-on experiences for faculty is expected to be transformational in the process of improving student learning by including opportunities for “qualitative, conceptual change in thinking” (p. 322). For university faculty to be successful in implementing innovation within teaching, learning, and research, they will need to be comfortable with experimentation and self-managed learning, as well as be able to adapt technologies into the context of personal expertise. In addition, the faculty role demands that they know how to “cope with new knowledge and change” to implement lifelong learning strategies (King, 2002).

Roger's (1995) diffusion of innovation model provides categories (innovators, early adopters, early majority, late majority, and laggards) that can be combined into three broad areas to represent the faculty population along the normal curve: early adopter faculty, mainstream faculty, and resistant faculty (Baldwin, 1998). The problem is not that early adopters need more opportunities for learning; rather, the issue is that the mainstream and cautious or resistant faculty need unique, personalized, and responsive approaches to the introduction of technology concepts. It is critical that this target audience be provided with safety devices while they dip their toe into the proverbial waters of technology implementation through self-direction. Odasz

(1999) notes that while some faculty may quickly acclimate to a self-directed environment, others require encouraging mentorship before they are ready to sail the seas alone. This approach reduces a major barrier facing faculty development programs: the provision of minimal ongoing and contextual support as described by Whitelaw, Sears, & Campbell (2004). In addition, Grow delineates in the Staged Self-Directed Learning Model (1991, 1994) between the developmental level of the learner within the context of their content and their “readiness” for self-direction. As with any organization, university faculty are at varied stages of comfort levels with new technologies and therefore require support and follow-up mechanisms that meet the individual and situational needs.

Faculty must constantly stay current on their topics of expertise and self-direct through the acquisition of new knowledge in order to teach and publish. “Self-directed learning is an essential attribute for educators. Teaching is a profession in which knowledge workers use information to make independent decisions in complex and unique situations” (Garmston, 2000, p. 64). They would be characterized by Grow (1991) as being in Stage 4 Self-Directed, as their specified role demands they engage in tasks and strategies such as the following: “time management, project management, goal-setting, self-evaluation, peer critique, information gathering, and using educational resources” (p. 134). But, as is further supported by Grow’s model, some may become “temporarily dependent in the face of new topics” (p. 129), which tends to be the case when exploring technology concepts.

Clay (1999) identifies a number of other barriers to faculty acceptance of online teaching that were found in the literature. These include an “increased workload, the altered role of the instructor, lack of technical and administrative support, reduced course quality, and negative attitudes of other faculty” (p. 2). Time constraints appear to be yet another consideration that may impact faculty willingness to learn and implement new technologies (Leh, 2005). Allen (2002) notes, “Faculty members who have invested much time and effort in refining traditional teaching methods and mastering older technologies may be understandably reluctant to lay them aside” (p. 4). Despite such constraints that faculty are faced with in university settings, the integration of technology into the teaching and learning practice is not an instructional variable that can be ignored or minimized, as technology is changing the “nature of adult learning” (Merriam, Caffarella, & Baumgartner, 2007, p. 19). In fact, the use of technology as a tool to facilitate, delivery, and enhance the instructional process has become an element that has the potential to transform the learning component within higher education institutions.

## PURPOSE

This study’s purpose was to explore how university faculty can be encouraged and facilitated in technology development efforts to become more self-directed and be willing to take risks with teaching innovation. Of further interest is how an investment in campus faculty can impact the overall organization? How could such an investment, focused on faculty self-direction in technology development, be structured? How would all faculty in the organization be impacted as a result of implementing a program designed to address emergent instructional needs? As is described by Lessen & Sorensen (2006), “Faculty training and support are critical to success in making technology integral to any academic program” (p. 49). Therefore, a program was

designed to respond to the need to infuse the use of technology into daily practices of higher education. This article investigates the program's impact on individual faculty self-direction in technology implementation and how it influenced change in the campus environment.

## THE PROGRAM AND METHODS

The program, titled the "Faculty Technology Integration Institute" (FTII), was designed to include a multifaceted approach to faculty development that aligned with the National Staff Development Council's (2001) standards for professional development and the Florida Professional Development System Evaluation Protocol (Florida Department of Education, 2006). The program was designed to begin with a three day summer institute, as a collaborative enterprise between support divisions, to provide training on such topics as the following: action research, Blackboard, Elluminate, Internet security, library services, and online surveys. The development of a faculty learning community was the primary objective of the intensive three days, although building a foundation of skills was also critical. This initial experience provided instruction with the leader operating from a Stage 2 (Grow, 1991) perspective utilizing team activities, discussion, hands-on experiences, networking activities, and follow-up commitments to use new technology in the coming semester. The shift from learner to implementer was intended to propel participants from more dependent stages of self-directed development to the model's involved and self-directed levels.

Monthly support meetings with the teacher as a facilitator, consultant, and delegator (Stage 3 & 4 teaching) (Grow, 1991) were also planned. The entire group was to meet every other month to share knowledge, give process updates, and describe challenges and successes. The months in between were designed for small research groups to form and implement collaborative action research projects. However, as the program began the involved faculty (described in the next section) soon requested monthly meetings with an integrated research component.

Of course the research, publication, and presentation options greatly enhanced the viability of the project for those who were working on tenure. While this aspect of the program was not intended to encourage self-directed learning, it was purposefully included to encourage critical reflection, enhance institutional support, and provide personal meaning for those in the faculty role. The FTII group also was to have immediate access to technology support, brainstorming, pedagogical guidance, and troubleshooting. As the program was implemented, help tips were sent out periodically and communication options were established such as an email group and a Blackboard organization. Finally, implementation reflections were to be completed by participants at the end of each semester to track individual learning and encourage personal critical reflection.

### *The Faculty Participants*

The University of South Florida-Lakeland had 35 full time faculty in five divisions at the time of this project: Arts & Sciences, Business, Education, Engineering, and Undergraduate Studies. All faculty were invited to apply for program participation. Although 15 slots were funded for participation, only nine faculty members applied and all were accepted. Cross divisional

representation did occur although females made up all but one of the participants. Table 1 provides a program participation breakdown.

*Table 1. Faculty Representation by Division and Gender*

Division	Female	Male
Arts & Sciences	3	0
Business	1	0
Education	3	0
Engineering	1	0
Undergraduate Studies	0	1

Of the participating faculty, two were tenured, three were on a tenure track, and four were instructors. Technology competence was self-rated as the following: one person noting limited knowledge, six felt they could get by, and two noted extensive knowledge. Observation during the event by the author indicated that three of the faculty had limited knowledge, three could get by, and the remaining three had extensive knowledge. The three with extensive knowledge began the program at a Stage 4 level of self-direction and were already very comfortable with “playing” with and learning from new technologies. However, the other six members were identified as being within a Stage 1 or 2 level of self-direction, per the instructor’s observation, which Grow (1991) purports as sufficient, although he does question this ability in later reflection (1994). A base assumption upon implementation of this program was that all faculty had a capacity and motivation for being self-directed; however, of particular interest was whether the year long experience would instigate a propensity for risk taking, educational innovation, and self-learning or self-direction in the area of technology integration.

All faculty involved completed an online application packet with three main components: basic information including courses in which technology would be implemented each semester, a needs assessment with questions based on topics of interest, and a commitment to participate. As part of this commitment, faculty agreed to attend the three day summer institute, attend monthly meetings, complete a technology implementation reflection, and share their learning with their colleagues in the various divisions. Assuming these commitments were met, participating faculty would be given a small two-part stipend, instructional resources, software, additional coaching and mentoring, ongoing workshops, and one-on-one support. Utilizing these types of faculty incentives has been found to improve chances of program success (Jacobsen, 1997).

#### DATA COLLECTION

In order to collect information about the program process and outcomes, a number of sources were utilized and analyzed: summer institute evaluations, learning community meetings, implementation reflections from the first year (two semesters), and action research team reports. Within the summer institute evaluation, space was provided for comments about the technologies planned for implementation and suggestions for improvement, strengths, and future needed support.

The monthly learning community meetings were organized as free flow focus groups that provided information about the technologies that were being utilized, research group progress, challenges, successes, and brainstorming on future group direction. A few of these sessions were taped and digitized for analysis. Notes and reflections were compiled after each session and session comments were discussed among project team members.

At the end of each semester, the faculty completed an implementation reflection that asked questions about the following: initial technology that was planned for use, reflection on what went well and what posed a challenge, what could have been done differently in the process, the impact of the implementation on student learning and associated documentation, and advice to other faculty. Each of these reflections was then analyzed for trends and that information added to the overall program formative evaluation.

## RESULTS OF THE PROGRAM IMPLEMENTATION

The program has completed one full cycle, with all nine faculty members completing the entire year. The summer institute was reported as being of high quality with best practices modeled and information provided that was relevant and meaningful. Some of the topics that were rated as the most useful were the concepts of integrating technology into the teaching process, Camtasia, Library databases for promotion and tenure, e-grades, classroom technologies, applied or action research, and advanced use of Blackboard.

The implementation reflections demonstrated the range of technologies that were integrated into teaching and research by the faculty. They also showed evidence of personal reflection, consideration of student outcomes as a result of the technologies implemented, and documentation of the growth demonstrated by each individual. [Contact the author for information on all technologies used and associated faculty comments.]

### *The Range of Technologies and Their Relationship to Self-Direction*

Several faculty members explored the use of web-quests (Dodge, 2007) in the instructional practice and were pleased with the level of student satisfaction and impact on their learning. Web-quests encourage active learning and integrate self-directed techniques for individuals and groups. Additional software that was utilized by all nine participants included Blackboard, Elluminate, and Respondus. A variety of hardware items were also employed by the participating faculty. A new building had been opened on campus with advanced classroom technologies that could be utilized in the instructional process. Components of these systems included video or DVD, computers, audio controls, ELMO, and a Crestron control. Smartboard/Symphoniums were either available or could be checked out. FTII participants utilized all of these technologies.

The vast array of technologies was not utilized by all participating faculty during the first year; however, each faculty member had the opportunity to self-direct their way through the design of technology for potential use in a student's learning experiences and to self-evaluate the tools that were appropriate within their particular context. Faculty understand the content that they are responsible for and typically can make appropriate decisions on what technologies can be

utilized. What was unique and interesting were the particular tools that each faculty member utilized after having been given an overview workshop on many of the available options.

### *Impacting Instruction Risks in Teaching Innovation*

Three action research teams formed and some independent research projects were designed. These projects connected the learning experience to the scholarship activity that is required of most faculty. Innovation in the classroom appeared to extend beyond technology implementation to include a shift in the teaching process that involved the utilization of more student-centered approaches. This shift in the educator's role was also identified by King (2002) to have occurred in a similar professional development program focused on K-12 teacher growth.

The technologies reported as having the greatest impact on student learning were Blackboard tools, Camtasia, WebQuests, and an integration of classroom instructional hardware. Faculty also began to question previously held beliefs and perspectives about teaching and learning and became more willing to take additional risks in exploration and innovation. This transformation of teaching and learning perspectives through professional development in educational technology has been found by King (2002) to bring new possibilities in teaching practice.

One particular member who began the learning process as a highly dependent learner in terms of technology self-direction, worked on a personal ethnography that described her learning through the program and the challenges and successes with implementation of the technology. The journaling, personal reflection, and oral reporting that were utilized in this research effort provided an intriguing window into the growth process. She initially was quite insecure with personal technology knowledge, but the reported self-growth was phenomenal.

In general, the faculty described a greater connection between classroom teaching techniques and research activities. While each group member had their own discipline specific research agenda, the linkage between applied technologies and student learning offered a valuable option for those in tenure track and instructor roles. New interdisciplinary concepts were evoked from the learning community and research team exchanges.

### PROGRAM IMPACT

The program, despite its infancy, appears to have been highly valued by both the participants and those external to the program. Conversations and dialogues are occurring as a result of various factors, one of which is the new level of faculty self-direction and advocacy from the FTII members. The inaugural program cohort decided upon its conclusion that their experience was not complete. In response to their requests, a year two experience has been planned for additional research endeavors and continuation of workshop opportunities. The original nine participants have transitioned into the role of mentors who have pledged to serve a new group of 11 faculty members who have formed the next program cohort.

*Personal Level*

A number of stories emerged from the faculty in both formal learning community meetings and informal gatherings. A faculty member who had felt disconnected with the academic community, reported that the FTII group provided her not only with a sense of belonging, but also a safe zone to try new things with support and encouragement. Another faculty member discussed a previous feeling of vulnerability that limited her successful implementation of technology, but reported to have achieved a general sense of comfort with the new technologies she was now utilizing in her classes. One faculty member, who would have been categorized at the beginning as possessing limited technology knowledge, summarized the personal transformation that was experienced:

One of the exceptional students commented to me that she observed a difference in my attitude when I taught in the Smart Room this semester, as compared to the crowded room of the Fall semester. She sensed a greater eagerness in my approach to the course. Also, I found that brainstorming with the students opened a door for more personal interaction . . . . While I have not wanted to intentionally practice the “jug and mug” perception or assume the “sage on the stage” persona, I believe “The Wave of the Future,” as expressed by Toffler . . . arrived in the 1990s.

This statement reflects the shift in teaching perspective and the willingness to now take risks; the change in teaching action and the implementation of technology are no longer viewed as risks, but an extension of the self-learning experience that can touch the learning experiences of the students.

Technology implementation is a very personal component of the teaching and research process. Ability to overcome fear, reduce resistance, and establish a network of supportive relationships with close mentoring and coaching, has proved successful at the individual level. Participating faculty appear more self-directed in their technology adoption in general and also are considering how self-directed learning techniques can impact their students.

The faculty stories that have been told suggest that despite the level of technology comfort or the adoption rate, faculty can progress at a pace that is appropriate for their own development and content. The FTII faculty began to use the vocabulary of self-direction, explore and implement technologies on their own, and set personal goals for the self-management, self-monitoring, and self-modification of their learning. Not all faculty were at the Stage 4 of Grow’s model upon completion of the program, but there was obvious growth in all participants to higher stages of development.

*Division Level*

The involved faculty represented all of the campus divisions and shared their learning experiences via formal and informal means with campus colleagues. They became viewed as local “experts” on how to utilize many of the technological tools and others began to seek their assistance. Some FTII participants were questioned by colleagues as they passed by their office and saw them preparing content with the tools described above. These learners then became

facilitators of the technology themselves, guiding others through the waters that they too had traversed.

A few participants began to engage their divisions in programmatic and curriculum development with and through the use of the technologies. Some began dialogue within their departments on specialty programs that could become all or partially web-based. Distance technologies such as video conferencing, instructional television, web-casting, and Elluminate classes are being explored. Four of the nine FTII members are involved in the development of fully online undergraduate programs, while two others are teaching or developing online courses.

For the first time, technology became a topic at division meetings where FTII members described the technologies they were using to enhance instruction. They became motivators to their Stage 1 and Stage 2 peers who showed interest, resulting in calls of interest for additional faculty development. Faculty members from outside of the FTII program have initiated conversation about tools that program members are utilizing. Finally, the campus administration has valued the professional development activities by including these concepts into the annual evaluation process.

#### *Organizational Level*

There were four institutional agents that stimulated comprehensive faculty change in regards to technology at the campus during this study. First, the USF system began a new e-grades system that required all faculty and adjuncts to submit their grades electronically. In order to successfully complete this task, access to Blackboard was necessary. Therefore, many faculty who had not previously logged into the Blackboard system were exposed to new tools and information. Second, a new technology building on campus provided access to new multimedia instructional technology. Training in the use of these advanced classrooms was necessary to teach in this newly designed space. Third, a drop in campus enrollment and subsequent encouragement from administration to attend to this issue, had many campus faculty exploring online course and program delivery, multi-location delivery mechanisms, and alternative instructional design.

The last major catalyst was a more far-reaching strategic change agent. New campus leadership quickly established a vision that required the implementation of technology into the teaching and learning process, the adaptation and creation of technology focused programs, and support for research in all areas of technology. This provided the mechanisms for faculty across campus to establish common direction and comfort in technology exploration.

However, the ocean of technological implementation is fraught with challenge and turmoil. Often technical difficulties can cause frustration and limit successful implementation. If a life vest of technical support is not at the ready, then impressions can often become negative, thereby requiring a more coaching, explicit instructional support. Technology, by definition, is likely not to work successfully on occasion, requiring learners and teachers to exhibit flexibility, quick thinking, humor, and perseverance. It appears that the FTII members who emerged from the typical technical difficulties to try the selected innovation again or problem solve the situation, were the ones that had matured in their ability to be self-directed within the context of

technology implementation. Eight of the nine participants experienced roadblocks and hurdles, but continued with their teaching innovation efforts to hone personal skills in implementing technology that impacted student learning.

## CONCLUSION

Despite possible limitations and concerns, the inaugural FTII learning community has begun their year two experiences and adventures. All of the participants expressed a desire to continue in some fashion during subsequent years beyond inclusion of a new cohort that was established. Additionally, the charter members of the FTII have agreed to serve as mentors to peers entering the program. One member of the FTII found an interesting, similarly designed program (a summer institute with online monthly sessions and networking opportunities) at a national level offered by the University of California at San Diego through NSF funding. Two of the faculty involved in FTII applied, were approved, and attended this workshop. They now are engaged in a national research effort as the result of their participation in that program.

The participating faculty members appeared to transcend initial fear and trepidation to obtain Grow's (1994) Stage 4 development level on specific implemented technologies. Overall, while most were not utilizing all of the presented technologies, there appeared a greater willingness to not only mentor others, but also to explore technologies, ask for assistance, and attempt new technology projects independently. In general, faculty appeared able and willing to become more and more self-directed on the use of instructional technologies in the teaching and research process. Comfort with one technology led to self-direction in others; those who were secure enough to "play" with the one particular tool, then became acclimated to self-learning with others. Like the pebble dropped in the pond, the ripples from one success extended and broadened to influence others. Future research on faculty development programs should explore whether Grow's (1991) model appropriately captures the learning and teaching needs of faculty in this content area and whether there is a significant relationship between the acquisition of one technology and the ability of faculty to self-direct in the learning and implementation of other tools.

As is common to most tides of change, there are tumultuous elements that elicit fear, danger, and concern for those involved. Burge (2000) underscores the challenges to faculty technology development opportunities, "Unspoken anxieties have an impact too: fear of the unknown, potential loss of status with learners or prestige with peers, management of increased workload, and loss of academic rigor if new ways of teaching are linked to hot new technologies" (p. 93). It is nearly impossible to remove these emotions in the face of innovation and organizational adjustment, particularly when the catalyst is technologically driven. However, support systems, just-in-time guidance, mentorship, institutional infrastructure, and collegial networking can act as a buffer through the rough waters of change (Gallant, 2000). The personal investment of time, in a self-directed environment, to implement new tools that will enhance the learning process can impact the organizational landscape and facilitate development of a technologically innovative culture.

The sharks also threaten within any enterprise that has not been institutionally integrated into the strategic plan of the organization. Baldwin (1998) suggests that “institutions wishing to promote faculty use of technology need policies that enhance the perceived value of incorporating technology into teaching, scholarship, and service” (p. 16). While the FTII program was aligned with a general strategic direction, institutional change at the university has minimized clear direction and caused disequilibrium in the absence of information. As a result, available funding, always an issue, has limited some of the remarkable possibility that has emerged from the FTII group. Plans for future FTII learning communities will also necessitate additional funding, as many campus faculty have already asked about the next rendition of this program and listed participation as part of their academic goal-setting with the Associate Vice-President for Academic Affairs.

Barker (2003) concurs with this notion of existing peril: “Faculty development activities are not singular or sequential, but involve an ongoing commitment of time and money” (p. 278). In addition, issues of faculty time, work assignments, and institutional infrastructure limitations represent potential future difficulties. Helping faculty to perceive technology as an “invited guest” rather than an interloper at a learning event can facilitate the adoption and integration of educational technologies (Gandolfo, 1998).

The program design built into the FTII structure minimized some of these issues, but forging the future ways will require adaptation of existing systems to value and support faculty as they self-direct in technology integration, implementation, and innovation. Löfström and Nevgi (2007) speak to the existence of such challenges and suggest that strategic planning be used to develop congruence between a university’s aims and its faculty’s required teaching activities so that altered role definitions, increased resources, and additional support in the context of distance learning and technology integration can be achieved.

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**Naomi R. Boyer** is Director for Teaching and Learning Technologies, Lakeland Campus of the University of South Florida. She teaches, conducts research, and assists faculty with the development of online courses, implementation of distance delivery, and the integration of technology across campus. Her research interests include the role of self-direction in online programs and a variety of technology integration topics. ([nboyer@lakeland.usf.edu](mailto:nboyer@lakeland.usf.edu))

## FACTORS INFLUENCING DEVELOPMENT OF SELF-DIRECTED LEARNING IN A HIGHER EDUCATION ENVIRONMENT

Mala-Maung  
Zoraini Wati Abas  
Azman Abdullah

The majority of medical students at the International Medical University (IMU) transfer to partner medical schools worldwide after the phase one program. Thus it is desirable to inculcate self-directed learning (SDL) skills to enable them in adapting to these schools' learning strategies. As learner characteristics importantly influence successful SDL, the effect of learning styles and pre-university education on the appreciation of SDL in relation to the learning resources was assessed. Appreciation for SDL as a good learning method was higher as compared to the appreciation of resources. Appreciation of SDL and utilization of IMU resources are positive irrespective of learning style and pre-university education. This study identified *receiving*, *adaptation*, and *acceptance* phases as students progress through a higher education environment. Importantly, providers of higher education must be aware of these phases and address them appropriately to achieve maximum benefit.

### INTRODUCTION

Inculcation of independence, self-direction, and self-reliance is an ongoing process. It is dependent on the learner and the learning environment. Learners pursuing higher education are expected to be self-directed and self-motivated for them to fully benefit from the learning experiences (Brockett, 1994). While some students may achieve this expectation with relative ease, others find it a daunting challenge. This especially applies to some students whose entire educational lives have involved rote memorization and aims to achieve high marks during examinations through reproduction of the facts they have learned.

These conditioned and entrenched attitudes of students may contribute towards resistance of new learning methods encountered within a higher learning environment (Townsend, 1994). Some higher education faculty and administrators thus have expressed concern about students having difficulty in adapting to the SDL style expected within many higher education environments (Lightfoot, 2006; Shepherd, 2006) and have realized the need to create strategies that will enable students to develop SDL skills (Van der Steeg, 2003).

Literature on the types of resources that can be used to facilitate SDL activities and even enhance SDL processes is available. These include learning resources as categorized by Brockett and Hiemstra (1991): (a) mediated resources such as journals, magazines, and learning modules; (b) individualized resources such as observations and personal inventories; (c) agency or group resources such as art galleries, libraries, and museums; and (d) mentored resources such as learning partners, mentoring relationships, and peer reviews. Further information on learning objects for flexible learning has also been reported by the VET Learning Object Repository

(Arkell, 2006). Resource materials including print-based materials and electronic versions that promote flexible learning have been developed as supplements to achieve student-centered learning (University of Tasmania, 2007). Flexible teaching and learning approaches use a combination of teaching methods to suit students and the subject matter. This may involve combining group work, lectures, practical exercises, problem-based learning, tutorials, and workshops with other approaches such as conferencing technologies, online delivery tools, and resource-based learning materials (University of Tasmania, 2006).

The IMU philosophy is to encourage SDL, and the institution has implemented a problem-based learning (PBL) curriculum since 1992 when its medical faculty was first founded. The development of SDL is especially relevant for IMU students, as the majority transfer to partner medical universities worldwide after the phase one program. Thus they need the requisite knowledge and skills that will enable them to adapt to the different learning strategies at these partner universities. To this end in addition to PBL, other traditional and innovative resources are provided, such as assigned independent reading (AIR), clinical skill sessions (CSU), communication with peers, communication with subject matter experts, laboratory sessions, library resources, museum resources, online learning interactive system (OLIS), printed materials, and structured independent learning online system (SILOS).

Provision of AIR, OLIS, and SILOS, which are information technology and computer-assisted learning resources, complements the effectiveness of a PBL curriculum (Jones, Higgs, de Angelis, & Prideaux, 2001). In their study on the elements of the learning context influencing SDL, Song and Hill (2007) discussed the importance of communication, instructor's feedback, and peer collaboration, and the role these learning methods play in an online learning environment. Mala-Maung, Abas, and Abdullah (2006b) showed that students ranked printed materials as their most preferred learning resource for SDL. This may indicate that students, while adapting to the different learning strategies of a higher learning environment, are more comfortable with and thus prefer the learning resource to which they have been accustomed.

Thus, while higher education institutions strive to create learning environments that promote SDL, it is equally important to determine the perception and preparedness of those learners for which the environment is created and with which they interact. As the development of SDL is a balance between the learner and the environment, it may not be successful if learners lack independence or if there is a lack of resources (Kaufman, 2003). This study aims to determine how prior knowledge obtained from pre-university education that the IMU students experienced and their learning style preferences influenced a perception of SDL in relation to the learning resources provided in a higher education environment.

## METHODS

### *Study Population and Data Collection*

Respondents were comprised of students attending semesters one to five of the phase 1 IMU medical program. Participation was wholly voluntary and anonymous. A total of 708 students were involved in the study. Table 1 provides information about the respondents.

*Table 1. Study Respondents*

Semester of Involvement	No. Volunteering	Participation Rate
Semester 1	181 students	92%
Semester 2	162 students	93%
Semester 3	144 students	96%
Semester 4	122 students	80%
Semester 5	99 students	83%
Total	708 students	

Data were collected via a questionnaire distributed to students who agreed to participate. The study's purpose was described to the students by one of the researchers and it was highlighted that they were to participate only if they agreed to do so. Upon recommendation of the University Research Committee, the students were also briefed on the process of Self-Directed Learning and the benefits of applying it in the learning process. Students were assured that their responses would be kept anonymous and confidential. Finally, they were invited to voice their opinion on matters related to the research.

#### *Questionnaire on Learning Styles*

Prior to answering the SDL questionnaire (described below), respondents were asked to assess their learning style by responding to a preferred learning style inventory developed by Felder and Solomon (1996). Their scores were subsequently reported on the SDL questionnaire.

#### *Questionnaire on SDL*

The questionnaire was designed by the authors and comprised two parts. Part A requested for particulars of the students such as age, gender, learning style scores, pre-university education, and semester in school. Part B was comprised of questions related to the following areas: (a) the student's role in SDL; (b) the skills needed to benefit from SDL; (c) their confidence in applying SDL; (d) their perception of the lecturer's role; (e) how they have benefited from SDL; (f) what SDL has enabled them to do; (g) and which of the learning resources made available to them at the university were useful. The students were asked to rate these items on a Likert scale of one (Strongly Disagree) to five (Strongly Agree). An open-ended item was also included to capture students' comments on SDL and related issues that may not have been covered by the other items. Students were also asked to give an overall rating (on a scale of 1 to 10, with one being low and 10 the highest) to two other questions. These questions addressed the following: (a) the extent of appreciation of SDL as a good learning method; and (b) whether the learning resources provided at IMU were beneficial.

The questionnaire was presented to the IMU Research and Ethical Committees for comments on the items and recommendations on its implementation. The questionnaire was pilot tested with a small sample to test for readability and understanding of the items. After subsequent modifications, it was administered to those students who had volunteered for the study.

Analysis of data included comparing the mean scores for various pre-university groups on an appreciation of SDL and an appreciation of the benefits of IMU resources. ANOVA was used to determine statistically significant differences ( $p < .05$ ).

## RESULTS

### *Does Pre-University Education Affect the Appreciation of SDL?*

The pre-university education that respondents had experienced were categorized into three main groups: (a) General Certificate of Education A-level (GCE A-level); (b) Malaysian Higher School Certificate (STPM); and (c) South Australian Matriculation (SAM). The General Certificate of Education A-level is an advanced level GCE qualification used internationally as a pre-university requirement. The Malaysian Higher School Certificate is a pre-university examination that allows admission to Malaysian universities. Most universities consider STPM results equivalent to GCE A-Level results. The South Australian Matriculation program is a one-year pre-university matriculation program that provides an opportunity for students to study in their own country. Then successful completion provides for acceptance by universities in Australia, India, New Zealand, the UK, and the US.

The number of students who had undergone other types of pre-university education was 188 and the number of students who failed to indicate the type of pre-university education that they had undertaken was 11 (see Table 2). Of those students who provided appropriate information, appreciation of SDL as a learning method and of the IMU resources, generally was positive, irrespective of the type of pre-university education experienced. The mean values shown in columns three and four were calculated based on responses to the questions on appreciation of SDL as a good learning method and appreciation of the IMU resources. The scale used for these two questions ranged from 1 to 10. The overall mean values for the appreciation of SDL and appreciation of IMU resources were 6.10 and 5.50, respectively. STPM students had the highest mean for appreciation of SDL as a good learning method (6.17) followed by GCE and SAM, although this same student group scored lowest for an appreciation of IMU resources. However, an ANOVA showed no significant difference in mean scores between the groups for an appreciation of IMU resources ( $F = .89, p < .05$ ) and appreciation of SDL ( $F = 1.06, p < .05$ ).

*Table 2. Types of Pre-University Education and Appreciation (mean values) of SDL and IMU Resources*

Pre-university Education	Number of Participants	Appreciation of SDL	Appreciation of IMU Resources
GCE : A-level	247	6.09	5.53
STPM	110	6.17	5.21
SAM	152	5.83	5.37
Other types	188	n.a.	n.a.
Failed to indicate	11	n.a.	n.a.

*Relationship between Pre-University Education and Appreciation of Resources*

The preference for printed materials as a learning resource was scored highest (a mean of 4.4) and the preference for assigned independent learning (AIR) was the lowest (a mean of 2.5), irrespective of pre-university education (see Figure 1). The preferences, in decreasing order were as follows: (a) printed materials; (b) Clinical Skills Unit (CSU); (tied with) (c) library; (d) communication with peers; (e) communication with subject matter experts; (f) museum resources; (g) problem based learning (PBL); (h) laboratory sessions; (i) structured independent learning online system (SILOS); (j) online learning interactive learning system (OLIS); and (k) AIR. SAM students had the highest preference scores for printed materials, library resources, and communication with experts. STPM students scored the highest means for PBL, communication with peers, SILOS, and OLIS, while GCE students scored museum resources, laboratory sessions, and AIR highest.

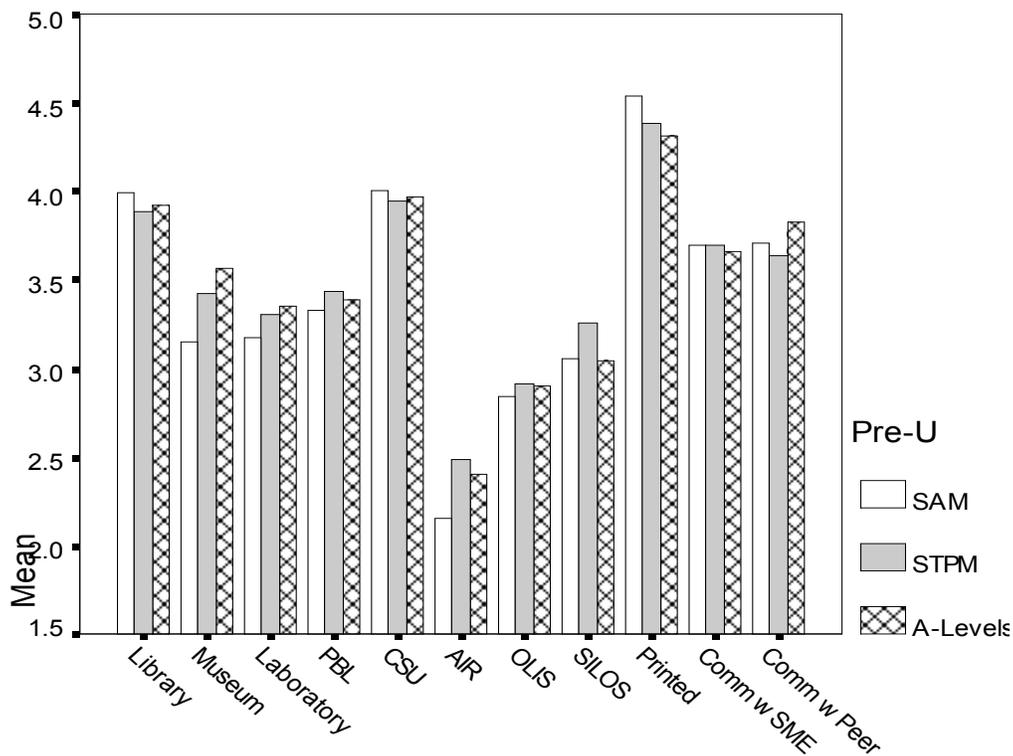


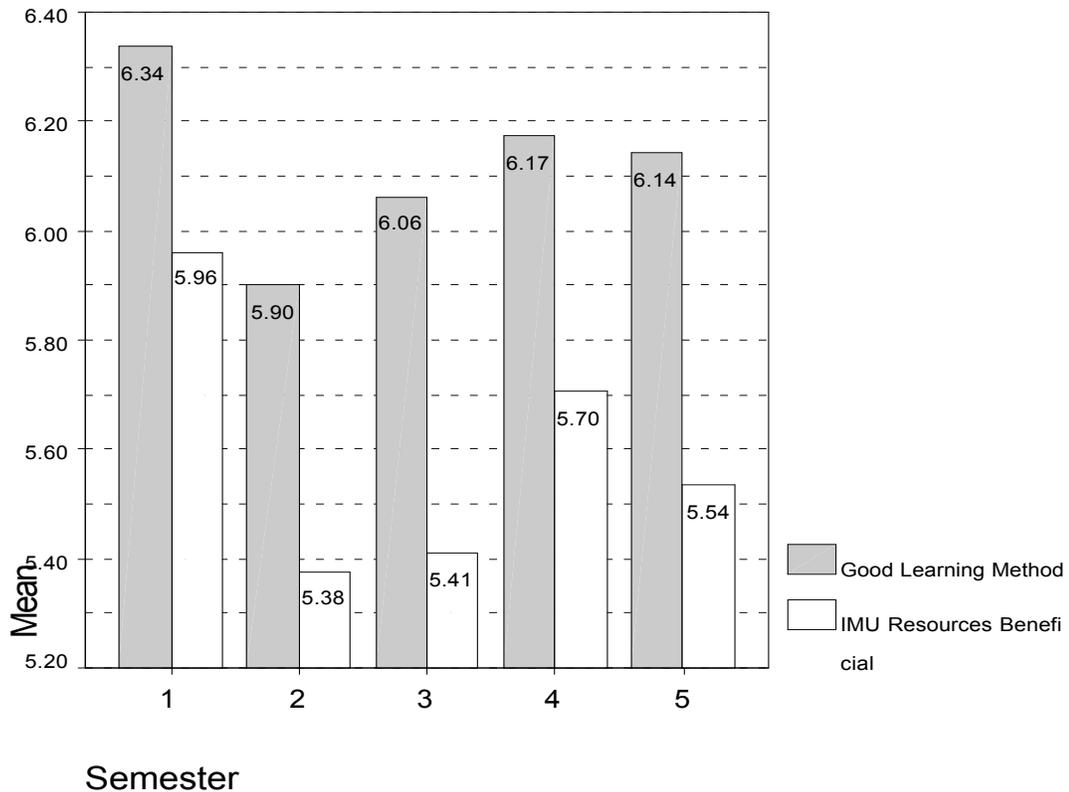
Figure 1. Relationship between Pre-University Education and Appreciation of Individual Resources

AIR is an application of the IMU E-Learning System with topics selected to reflect the learning sessions undertaken during a study of the various body systems (e.g., cardiovascular, respiratory) in a semester. A list of printed materials and websites are provided as references. Specific instructions are given with respect to the subject matter and achievement of the IMU learning outcomes. Students undertake the assignment independently and submit a corresponding portfolio online. SILOS is an application of the IMU E-Learning System. Students utilize this online application to submit AIR portfolios and to participate in online formative assessment

sessions for self-assessment and reinforcement. OLIS is a virtual learning environment in which topics relevant for each body system have been formulated. An individual topic thus identified, includes objectives, content, references, and formative assessment components.

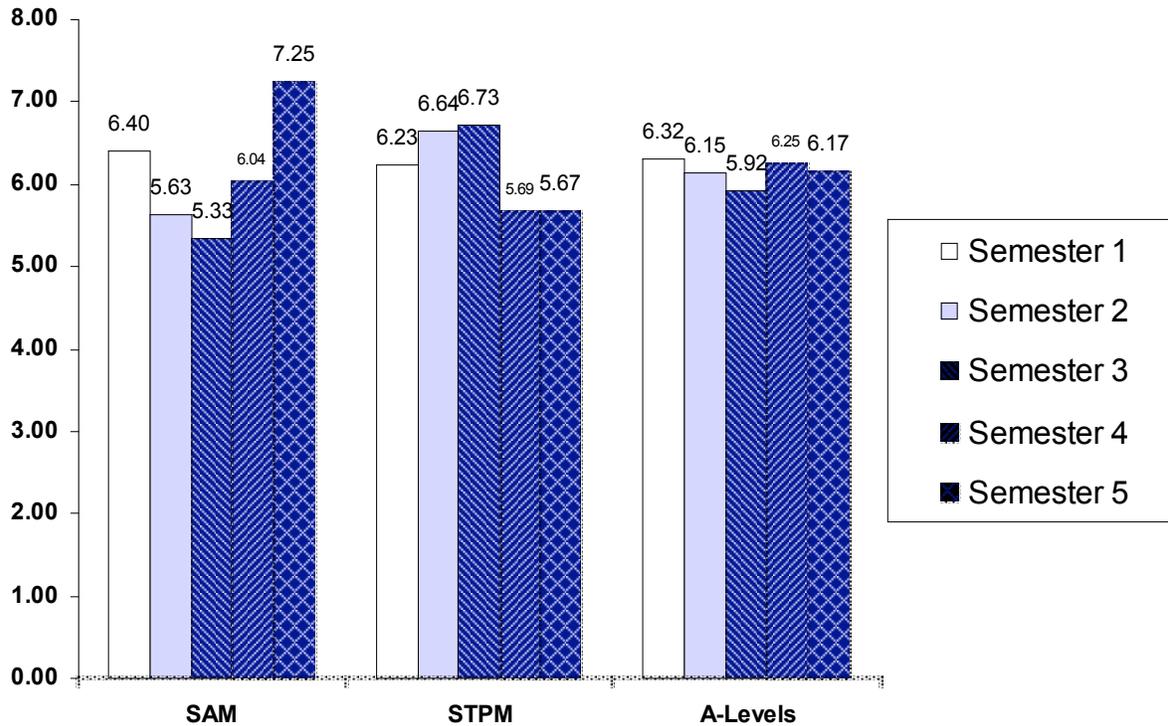
*Relationship between Semester and Appreciation of SDL*

Based on responses to the respective items included in the questionnaire, students in all semesters perceived SDL as a good learning method (average mean score of 6.1) and that the IMU resources were useful for SDL (average mean score of 5.6). The ranking scale used for these items also was from 1 to 10. The mean values in relation to each semester for appreciation of SDL were 6.34, 5.90, 6.06, 6.17, and 6.14 (from semester 1 to 5, respectively) (see Figure 2). The mean values in relation to each semester for IMU resources were 5.96, 5.38, 5.41, 5.70, and 5.54. Learners in semester 1 scored the highest means for appreciation of SDL and for IMU resources, while semester 2 students scored the lowest (See Figure 2). However, ANOVA showed no significant difference between the semesters for appreciation of IMU resources ( $F = 2.19, p < .05$ ) and appreciation of SDL ( $F = .99, p < .05$ ). Although there were negative correlations between the semesters and appreciation of IMU resources (-0.015) and appreciation of SDL (-0.045), these correlations were not significant.



*Figure 2. Relationship Between Semester and Appreciation of SDL as A Learning Method*

The relationship between semester and the appreciation of SDL based on the major types of pre-university education is shown in Figure 3. The appreciation for SDL was consistently higher compared to the appreciation of IMU resources for all three types of pre-university education across all the semesters. The initial enthusiasm, a slow decline during the mid-phase semesters, and the eventual enhancement of appreciation was clearly seen in learners with SAM as pre-university education.



*Figure 3. Relationship Between Semester and Appreciation of SDL as A Learning Method Based on Types of Pre-University Education*

*Relationship between Learning Style and an Appreciation of SDL and IMU Resources*

To answer the question of whether or not there is a relationship between learning style and an appreciation of SDL, the learning styles of IMU students and their appreciation of SDL were examined. For those who reported learning style scores, there were more reflective than active ( $n = 374$  and  $304$ , respectively), more sensing than intuitive ( $469$  and  $187$ ), more visual than verbal ( $478$  and  $106$ ), and more sequential than global ( $415$  and  $259$ ) learners. Generally, as indicated by the overall ratings (see Table 3), an appreciation of SDL and IMU resources was positive. An appreciation of SDL was scored higher than for IMU resources irrespective of different learning styles. Both visual and verbal learners scored higher means for the appreciation of SDL compared to the IMU resources. ANOVA showed a significant difference between visual and verbal learners for an appreciation of IMU resources ( $F = 6.65, p < .05$ ) and appreciation of SDL ( $F = 4.94, p < .05$ ).

Table 3. Relationship between Learning Style and an Appreciation of Self-Directed Learning and IMU Resources

Learning Style	SAM		STPM		A-Levels		Others		Overall	
	SDL <sup>1</sup>	IMU <sup>2</sup>								
Active	5.84	5.42	6.11	5.11	6.07	5.48	6.40	5.97	6.11	5.50
Reflective	5.87	5.38	6.27	5.52	6.18	5.72	6.23	5.91	6.14	5.63
Sensing	5.87	5.54	6.46	5.65	5.98	5.54	6.18	5.94	6.12	5.67
Intuitive	5.88	5.06	5.86	4.57	6.39	5.57	6.49	5.82	6.16	5.26
Visual	5.92	5.38	6.32	5.64	6.32	5.78	6.20	5.83	6.19	5.66
Verbal	5.52	5.40	5.75	4.35	5.45	4.80	6.10	5.81	5.71	5.09
Sequential	5.77	5.36	6.20	5.61	6.16	5.58	6.09	5.80	6.06	5.59
Global	5.98	5.41	6.42	5.23	6.14	5.73	6.65	6.14	6.30	5.63

<sup>1</sup>An appreciation of self-directed learning.

<sup>2</sup>An appreciation of IMU resources.

## DISCUSSION AND CONCLUSIONS

The provision of a varied mix of traditional and innovative learning resources at the IMU ensures that learners develop the ability to acquire knowledge, skills, and attitudes related to SDL through both group activities and individual learning. The importance of providing the right mix of learning activities to promote SDL has been reported earlier (Snell, 2000). The use of a variety of learning resources and approaches as a means of developing SDL through flexible learning has been further highlighted by the University of Tasmania (2006).

Learners in semester 1 had the highest means for and appreciation of SDL as a good learning method as well as for an appreciation of IMU resources. It is perceived that these students had not been exposed to various innovative learning resources in their prior learning endeavors and thus their scores reflect exposure to novel means of learning. The learners may have entered the university environment with great anticipation and expectation which are contributory factors towards instilling new learning modalities. This period of learning may be termed the *receiving or receptive phase* where any new experiences in relation to learning, especially SDL, constitute a novelty and thus the students in their eagerness to learn are receptive. This stage may be the best period to initiate new teaching and learning strategies, taking into consideration the traits that have been already acquired from pre-university education. The implementers must be sensitive to this receptive stage and take advantage of it in enhancing student engagement in learning resources. It has been stated that promoting student engagement with learning resources helps to develop and nurture SDL traits in learners (El-Khawas, 2002; Van der Steeg, 2003).

The *honeymoon effect* of a training program as described by Boyatzis, is seen as a situation in which the initial enthusiasm and expectancy of learners declines when the novelty of a new learning experience wears off after a period of time (Boyatzis, 2002). This may be reflected by the results seen with the semester 2 students who exhibited the lowest mean values. It may also mean that the learners have adapted to the learning environment and are beginning to take things in their stride. Thus this period may be termed the *adaptation phase*. During this phase the

implementers must be aware that reinforcement is crucial to maintain the initial interest and enthusiasm.

The increase in appreciation which is seen as students progress into the later semesters may reflect a third phase of the learning process. This phase may represent the period during which learners, having experienced SDL, acquire a deeper appreciation of its value and greater appreciation of it as a useful learning method. This phase may be termed the *acceptance phase*. Implementers need to ensure that the resources available to support SDL are appropriate for reinforcing and sustaining this phase.

The study has identified different learning phases as students progress through a higher learning environment. The crucial need to provide a formal learning environment that supports the development of learning which occur in various stages has been previously described (Grow, 1991). Higher education providers need to appreciate that it is essential to plan, implement, and review the resources or the mode of delivery in order to sustain the continued interest and enthusiasm of learners throughout their learning period. Hakkarainen, Saarelainen, and Ruokamo (2007) in their study on students' meaningful learning discussed the process characteristics and outcomes defining meaningful learning and the role of SDL. Moreover, appropriate encouragement of learners is crucial as development of self-direction and independence occurs over a period of time (Van der Steeg, 2003).

Models of intellectual development, the assessment of development at various levels, and recommendations on instructional conditions facilitating intellectual development of students were reported by Felder and Brent (2005). Taking into account the different developmental models in the literature, they categorized patterns of student differences into levels of absolute learning, belief in the validity of different viewpoints, and contextual knowers. In our study the enhanced appreciation of self-directed learning as students advanced through the semesters may be due to the increasing maturity of learners and the development of confidence, independence, and interpersonal skills which develops with a problem based learning curriculum (Das Carlo, Swadi, & Mpofu, 2003; Steinert, 2004).

This study showed that there was no significant difference between the different learning styles and the learners' appreciation of SDL or of the IMU resources. The knowledge of an individual's learning style provides additional support for effective instruction and aids in the delivery of learning tools. This may be advantageous for learners as an indicator of their strengths or weaknesses and a means for helping them develop an appropriate approach to improving their academic performance. However, although this knowledge of individual learning styles is a positive addition to learning, Felder, Felder, and Dietz (2002) stated that it is advisable for implementers to address and be able to adapt to the different learning styles of students. Additionally, Felder and Brent (2005) noted that an individual learning style is neither preferable nor inferior to another and, as such, students should be equipped with the skills of different learning styles to enable them to cope effectively as professionals. Active learners tend to feel that they benefit more from learning through teamwork (Mala-Maung, Abas, & Abdullah, 2006a), and are found to enjoy and learn better when working with peers (Felder & Spurlin, 2005). An earlier study showed that problem-solving skill was seen as being most appreciated, irrespective of the learning style (Mala-Maung, Abas, & Abdullah, 2006a).

This study identified the presence of learners with different learning style preferences in relation to their appreciation of SDL and utilization of resources. As learners absorb and process information differently based on their learning styles, it is important for implementers to provide, as much as it is feasible, a balance or a variety of learning media to encompass different learning styles. Providers of education should ensure through balanced instruction that the learning needs of students with different preferences are addressed to some extent (Litzinger, Lee, Wise, & Felder, 2007). This will enable students to be taught partly in a manner they prefer and partly in a manner, which is less preferred. Being able to learn in their preferred styles should enhance their willingness to learn, and learning in the less preferred style should help them to develop thinking and problem-solving skills. It is therefore advantageous for students to be taught in the style they prefer to keep them from being too uncomfortable for learning to occur as well as in a less preferred style to help them to develop diverse capabilities that may be needed for them to function effectively in their careers as professionals (Felder, Felder & Dietz, 2002).

Other learner characteristics that influence the development of SDL and that would need further research include gender and family background. Reio (2004) noted for example, that female participants have lower levels of self-directed learning readiness. Family attributes and practices, and cultural background of learners are also areas for future research as they are found to be relevant to the success of group-learning (Das Carlo, Swadi, & Mpofu 2003).

In conclusion, this study is believed to have furthered SDL knowledge. It is expected that SDL will continue to make an impact in higher education and as such, design and implementation for a more effective learning environment to support SDL should be a serious endeavor and an important activity.

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**Mala Maung** is Associate Professor (Microbiology) at International Medical University, Malaysia. She obtained her MBBS and postgraduate Diploma (Bacteriology) from the University of Medicine, Yangon; postgraduate Diploma (London School of Hygiene & Tropical Medicine) and PhD from London University; and FRCP from Edinburgh. She is a fellow of the Australasian College of Tropical Medicine and has been educating health care professionals for over thirty years. ([malamaung@imu.edu.my](mailto:malamaung@imu.edu.my))

**Zoraini Wati Abas** is Director of the Centre for Instructional Design & Technology, Open University Malaysia; President of South East Asian Association for Institutional Research; and Secretary of the Malaysian Association for Distance Education. She holds a B.Sc. (Biological

Sciences) and Masters and Doctorate degrees in Instructional Technology (Northern Illinois University). She is a member of the International Federation of Information Processing Working Group and Regional Advisory Council of Microsoft Partners in Learning. ([zoraini@oum.edu.my](mailto:zoraini@oum.edu.my))

**Azman Abdullah** is IT/Helpdesk Manager at International Medical University, Malaysia, and is responsible for the IT/AV user support. He has developed multimedia learning materials for Malaysian secondary schools, and is involved in e-learning initiatives at the University. He obtained his B.Sc. (Computer Science & Statistics) from the University of Sheffield and Masters in Education from University Malaya. ([azman\\_abd@imu.edu.my](mailto:azman_abd@imu.edu.my))

## CORRELATES OF SATISFACTION AND SUCCESS IN SELF-DIRECTED LEARNING: RELATIONSHIPS WITH SCHOOL EXPERIENCE, COURSE FORMAT, AND INTERNET USE

Suzanne Kirkman  
Kevin Coughlin  
Jeff Kromrey

Learner graduate school experience, course format (traditional or web-enhanced), and student Internet use were examined as they related to instructor portfolio grade, student satisfaction, and student self report of success when using learning contracts and graded reflections. Three unbalanced factorial 2X2X2 ANOVAs and, to augment statistical tests with small sample sizes, estimates of sample effect sizes were calculated for 39 students. The results of the three ANOVAs indicated none of the main effects or interaction effects was statistically significant; however, five of the sample effect sizes fell within the medium range which would merit further study with larger samples.

Knowles (1980) described a learning contract as a learner-centered instructional method in which the learner could individualize learning even within the confines of a formal course. Learning contracts are flexible tools which accommodate and encourage the learner in systematic fashion through the process of achieving personal goals and reconciles these in light of organizational and educational institution objectives (Berger, Caffarella, & O'Donnell, 2004). A learning contract is defined as a written document that describes an individual's learning objectives, activities that will be completed to meet the objectives, and assessment criteria for each activity output (Hiemstra & Sisco, 1990; Knowles, 1980). As self-directed tools, learning contracts can be successfully incorporated in online as well as traditionally delivered courses (Boyer, 2003).

Recent studies of language students (Rivers, 2001) demonstrate that experienced learners will strive for self-direction by modifying course objectives, learning methods, and learning tools. When expert learners work to acquire a new language, Rivers found that any effort of the instructor to unilaterally impose a specific learning method, objective, or criteria led to a diminished learning experience for the student. This review of studies supports learning contract use with experienced learners. When the learner was unfamiliar with the content area, however, Knowles (1986) suggested that the use of a learning contract should be limited. Berger, Caffarella, and O'Donnell (2004) further stated that "learners need enough familiarity with the subject matter to be able to select resources and learning strategies . . . After all, novices may have a sense of not even knowing what they need to know" (p. 306). While novice learners may not have had resources to determine what they needed to know about a particular content domain when learning contracts were first introduced, readily available information through the use of technology has changed the ability of novice learners to gain insight concerning the scope of specific content domains. Participants still come to higher education with varied knowledge backgrounds and diverse experiences, but with more technological skills and higher reliance on this peripheral resource of information than in any previous period.

Self-regulated learning is a “complex interactive process involving not only metacognitive components but also motivational and behavioral components” (Zimmerman, 1995, p. 22). Riddley, Schutz, Glanz, and Weinstein (1992) suggest “that it may not be enough for teachers to employ strategies such as goal-setting aimed at fostering students’ motivation. Instead, educational interventions aimed at developing students’ metacognitive awareness and motivation may be important to foster purposeful self-regulation of their own learning” (p. 305). Fostering critical reflection skills has been identified as a strategy for effective distance learning (Kerka, 1997) and a vital component of transformative learning (Mezirow, 2000). Self-reflective tools, journals, reflection questions, and reflection guides, have been incorporated in both traditional and distance courses to enhance the autonomous learning process (Boyer, 2003; Boyer, Maher, & Kirkman, 2006; Lankard, 1996).

### RESEARCH PROBLEM AND QUESTIONS

Technology has added a new dimension to our delivery of education and with it the re-introduction and emphasis on journal writing, portfolios, and reflective responses. Today’s adults have access to a tremendous amount of information. To the learning endeavor, adult students bring unique levels of learning expertise, social skills, and technical fluency. Based on their capacity to critically assess a resource’s value and their comfort with technology, adults can determine their own learning needs and find novel information concerning these needs. Employing a reflection tool in tandem with the learning contract could promote the double beneficial effect of learning a content domain and developing skills of self-regulated learning within that domain, even for the novice learner. Given the radical changes to the context in which adults learn, new research is needed in addressing the effectiveness of learning contracts and graded self reflections in the pursuit of new content and in multiple learning modalities.

Three research questions were designed to address this research need:

1. Does the amount of learner experience in the content domain make a difference in learner satisfaction or performance success when learning contracts and graded reflections are employed?
2. Is there a difference between traditional and web-enhanced satisfaction and performance success when learning contracts and graded reflections are employed?
3. Does a learner’s Internet use make a difference in satisfaction or performance success when learning contracts and graded reflections are employed?

### METHOD

The study’s purpose was to examine the use of learning contracts and self reflective ratings with new and experienced graduate students in both a face-to-face classroom and with a web-enhanced course delivery. Students included in this study came from two sections of the same graduate introductory course which reviews the historical development of adult education, scope

of the field, and major contributors and theories including self-directed learning (SDL) and learning contracts. One section was offered in a face-to-face (F2F) classroom over the traditional semester period of 15 weeks, and one section was web-enhanced with approximately 20% of the course offered on-line through Blackboard in an accelerated eight week time frame. Both sections were taught by the same instructor and both required participants to develop their own learning contracts in conjunction with course expectations and graded self reflections.

### *Sample*

This study included 43 students with diversity in terms of their experience with graduate school, some in their first semester and others in their last semester of a graduate degree program. Once records with missing data were eliminated, this study analyzed the performance of 39 students. Learning contract grades ranged from 15.5 to 50 points for those students in the study. Of the four students with records missing, one student, due to a family emergency, received an incomplete with plans to finish the course later. Another student withdrew after the second week due to new job requirements and the two remaining students withdrew late in the semester with learning contract grades of 0 and 3.5 points. Both of the late withdrawals were new students. The student that withdrew early and the student who received an incomplete were experienced graduate students.

University records were used to determine the number of graduate hours that each student had obtained the semester prior to enrolling in this course. Completed hours were used to categorize a student as a *new* or *experienced* learner in the field of adult education. There were 20 students identified as new to the content domain, having completed zero hours prior to the semester of this study, and 19 students were considered to have at least basic to extensive knowledge of the content domain having completed between 6 and 34 prior graduate hours. In terms of semester hours earned prior to entering this course, the mean for this sample was 8.36 semester hours with a standard deviation of 10.17.

The traditional F2F participants ranged in age from 23 to 67 with a median age of 31. The web-enhanced (Web) participants ranged from 23 to 58 years old with a median age of 36. There were 4 males and 19 females in the F2F group and there were 2 males and 14 females in the Web group.

### *Procedure*

At the first class meeting, both student sections were provided with a needs assessment tool which allowed them to evaluate targeted course outcomes in terms of their current level of proficiency. It also allowed for students to reflect upon course outcomes in terms of importance to their personal and professional development. Upon completion of the tool, participants were encouraged to select identified gaps which could be translated into individual learning objectives for their learning contracts. This self-rated paper and pencil assessment was adapted from a template for a similar introductory course designed by Knowles (1980). Adaptations to the original tool were made by the instructor to encompass the current course goal, purpose, and objectives.

F2F students were given two weeks and Web students were given one week to complete the first draft of their learning contracts (see Appendix A for the learning contract template). To complete the initial learning contract drafts, students were required to specify the strategies and resources that they intended to employ in meeting each identified learning objective. These draft contracts also required the student to describe the evidence that they would collect to confirm the objective had been met. Additionally, students were required to stipulate how this evidence would be validated including identifying the judge, means, and criteria to be used. Feedback was offered by the facilitator and students were encouraged to adjust their contract as they progressed through the course.

### *Data Collection*

#### *Learning Contract Grades*

For the last class meeting, students prepared a portfolio containing the final learning contract, supporting documentation, and their graded reflection guide. The graded reflection guide was a metacognitive reflection tool constructed specifically for this course which posed critical questions linking each participant's learning effort to course activities and learning contract components. Its purpose was to help a participant to think critically about and self-evaluate their learning process. Typical reflection items were these: (a) Rate your learning contract strategies in terms of how well they produced the desired outputs. What strategies might have been more effective for you in producing your desired outcomes?; and (b) Rate the resources you used as outlined in your learning contract. What resources might have been more effective for you or what additional resources do you think would have helped you in producing your desired outcomes?

Learning contract grades for the portfolios were assigned by the instructor according to the following criteria:

- Learning contract was properly written, accurate, and meaningful for the student
- Learning objectives were related to course content, of value for the student to possess, and were achievable within the time frame stipulated
- Evidence collected was appropriate for the stated learning objective
- Validation of evidence was meaningful with proper judges, criteria, and means
- The graded reflection guide exhibited that the student had considered potential future ways of self regulation within the content domain and had exhibited metacognitive skills and/or development.

#### *Self Report Survey*

A written survey was completed by students during the final class; this survey asked students to rate satisfaction and success with SDL using the learning contract and graded reflection guide format. The scale for survey responses ranged from 1 to 5, with 1 representing extremely unsatisfying, extremely unsuccessful and 5 representing extremely satisfying, extremely successful. Students were also asked if they used the Internet in preparing or researching their learning contract objectives or other areas specific to the learning contract. Additionally, the

survey requested they respond to five questions designed to qualify their situation as they worked through the process of self-direction within the context of the graduate course.

*Data Analysis*

To address the research questions, three unbalanced, factorial ANOVAs were conducted. The independent variables associated with these research questions included the following: (a) use of the Internet when developing learning contracts; (b) experience in the content domain; and (c) the instructional format associated with each course section. This final independent variable had two qualitative values: traditional classroom and web enhanced instruction.

RESULTS

The dependent variables were derived from student-reported, quantitative course assessments and the instructor's grading rubric. For the study purposes, important grading rubric aspects included only those sections dealing directly with learning contracts and graded self-reflections. The dependent variables included the learning contract portfolio grade, stated satisfaction with self-direction, and a self report of success using the learning contract. Table 1 provides Pearson Product Moment Correlation Coefficients among the dependent variables examined in this study. At the  $\alpha = .05$  level, the correlation between self-reported success and self-reported satisfaction was statistically significant ( $r = .60$ ). However, the other two correlation coefficients, for learning contract grade and self-reported satisfaction ( $r = .15$ ) and learning contract grade and self-reported success ( $r = .26$ ), were not significantly different from zero.

*Table 1.* Pearson Product Moment Correlation Coefficients Among Dependent Variables

	1	2	3
1. Learning contract grade		.15	.26
2. Self-reported satisfaction			.60
3. Self-reported success			

$N = 39$

Each of the three dependent variables was analyzed using a 2X2X2 analysis of variance. Because of unequal cell sizes, the analysis of variance was conducted using the classical experimental design approach to unbalanced, factorial analysis (Stevens, 1990). In addition to tests of statistical significance conducted with the ANOVA, estimates of the effect sizes were also computed (Cohen, 1988; Stevens, 1990). Effect sizes provide indices of the extent of group differences or strength of relationship with the impact of sample size removed (Wilkinson & Task Force on Statistical Inference, 1999). Because the present study uses a relatively small sample, results may suggest substantial differences among means (i.e., large effect sizes) without being able to rule out sampling error as a plausible explanation for the differences (i.e., failure to find statistically significant relationships). Such results suggest the need for additional research employing larger samples.

The results of the analysis of variance of the learning contract grades (Tables 2 and 3) indicate that neither of the main effects or interaction effects is statistically significant. However, three of the sample effect sizes fall within the range that Cohen (1988) describes as medium effect sizes. The effect size for the main effect of Internet use ( $F = .26$ ) indexes the substantial difference between the marginal mean grade of students who reported use of the Internet in developing their learning contract ( $M = 37.51$ ) and those who reported no use of the Internet ( $M = 30.79$ ).

Table 2. Learning Contract Grades by Course Format, Experience, and Use of the Internet

Graduate Experience	Internet Use	N	Course Format				
			Traditional		Web Enhanced		
			M	SD	N	M	SD
Novice	Internet user	11	41.54	5.43	6	31.75	9.97
	Non-Internet user	2	25.25	13.78	1	25.50	--
Experienced	Internet user	7	36.28	11.69	8	37.38	8.42
	Non-Internet user	3	31.67	14.78	1	44.50	--

Table 3. Analysis of Variance of Learning Contract Grades

Source	df	SS	MS	F	p	Effect Size
Course format (A)	1	64.68	64.68	0.73	.40	0.14
Graduate Experience (B)	1	20.79	20.79	0.24	.63	0.08
Internet use (C)	1	237.93	237.93	2.70	.11	0.26
AB	1	280.511	280.511	3.18	.08	0.28
AC	1	142.69	142.69	1.62	.21	0.20
BC	1	204.96	204.96	2.32	.14	0.24
ABC	1	0.86	0.86	0.01	.92	0.02
Within groups	10	2736.20	88.26			

$N = 39$

The sample means that produced the medium interaction effect size between course format and graduate experience ( $F = 0.28$ ) are graphed in Figure 1. These data suggest higher mean grades for novice students in the F2F course format ( $M = 39.04$  and  $34.90$ ) for the novice and experienced students, respectively, but lower grades for novice students in the web format ( $M = 30.86$  and  $38.17$ ) for the novice and experienced students, respectively. Finally, the interaction between graduate experience and use of the Internet also produced a medium effect size ( $F = 0.24$ ). A graph of these means is presented in Figure 2. These data suggest a very small mean difference between Internet users and non-users for experienced students ( $M = 36.87$  and  $34.88$ , respectively). Conversely, for novice students the Internet users ( $M = 38.09$ ) scored substantially higher on average than the non-users ( $M = 25.33$ ).

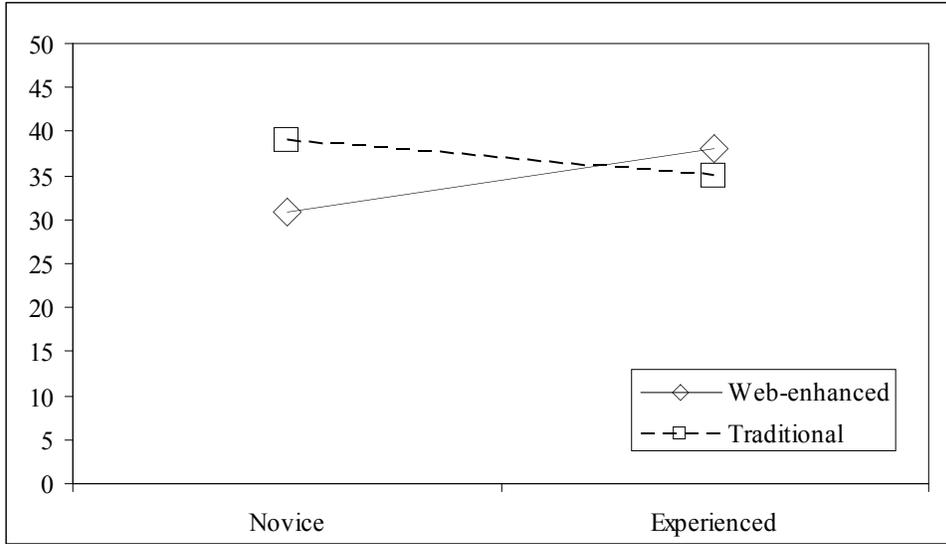


Figure 1. Interaction Between Course Format and Graduate Experience

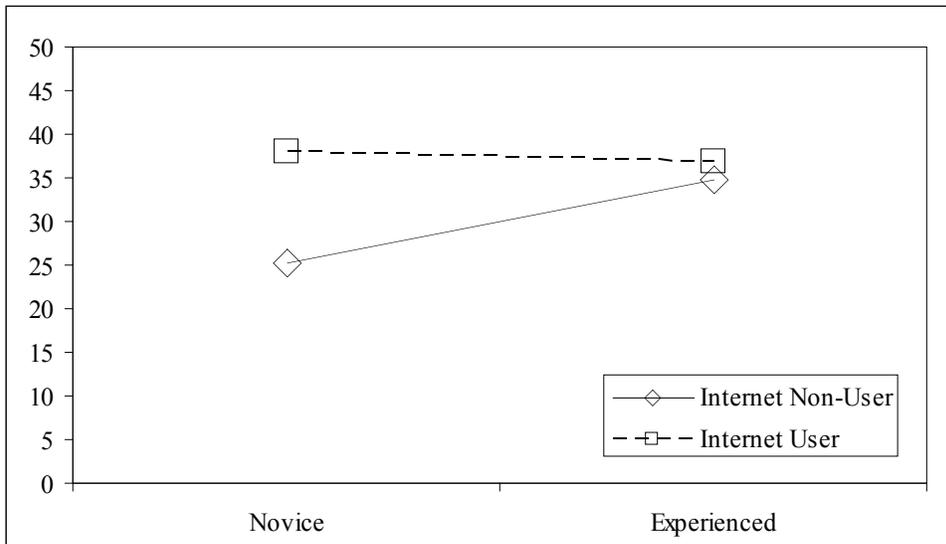


Figure 2. Interaction Between Internet Use and Graduate Experience

Descriptive statistics for the self-reported satisfaction scores by course format, graduate school experience, and use of the Internet in development of the learning contract are presented in Table 4. As is evident in this table, the mean satisfaction ratings ranged from  $M = 3.0$  (for both the experienced and novice non-Internet using students in the web-enhanced course format) to  $M = 4.25$  (for experienced, Internet using students in the web-enhanced format).

Table 4. Self-reported Satisfaction Scores by Course Format, Experience, and Use of the Internet

<u>Graduate Experience</u>	<u>Internet Use</u>	<u>N</u>	<u>Traditional</u>		<u>Web Enhanced</u>		<u>SD</u>
			<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	
Novice	Internet user	11	3.91	0.94	6	4.17	0.75
	Non-Internet user	2	3.50	0.71	1	3.00	--
Experienced	Internet user	7	3.14	0.69	8	4.25	0.71
	Non-Internet user	3	3.67	1.53	1	3.00	--

The analysis of variance of these satisfaction ratings are provided in Table 5. As with the analysis of learning contract grades, none of the mean differences are statistically significant, but two of the sample effect sizes suggest differences large enough to merit further study with a larger sample. Specifically, the main effect for course format ( $F = .26$ ) results from the overall higher satisfaction scores of the web-enhanced group ( $M = 4.06$ ) relative to the mean satisfaction scores of the traditional course format ( $M = 3.61$ ). The interaction between course format and student reported Internet use in developing their learning contracts also yielded a medium effect size ( $F = .26$ ). These sample means are graphed in Figure 3. As is evident in this figure, for the traditional course format, the mean satisfaction scores were nearly identical for the Internet users ( $M = 3.61$ ) and non-users ( $M = 3.6$ ). In contrast, for the web-enhanced course format, the mean satisfaction score of students who did not use the Internet to develop their learning contracts ( $M = 3.0$ ) was substantially lower than that of students who did use the Internet ( $M = 4.21$ ).

Table 5. Analysis of Variance of Self-reported Satisfaction Scores

Source	df	SS	MS	F	p	Effect Size
Course format (A)	1	2.05	2.05	2.73	.11	.26
Graduate Experience (B)	1	0.83	0.83	1.10	.30	.17
Internet use (C)	1	0.52	0.52	0.70	.41	.13
AB	1	1.08	1.08	1.43	.24	.19
AC	1	1.98	1.98	2.64	.44	.26
BC	1	0.51	0.51	0.68	.41	.13
ABC	1	0.31	0.31	0.41	.53	.10
Within groups	31	23.27	0.75			

$N = 39$

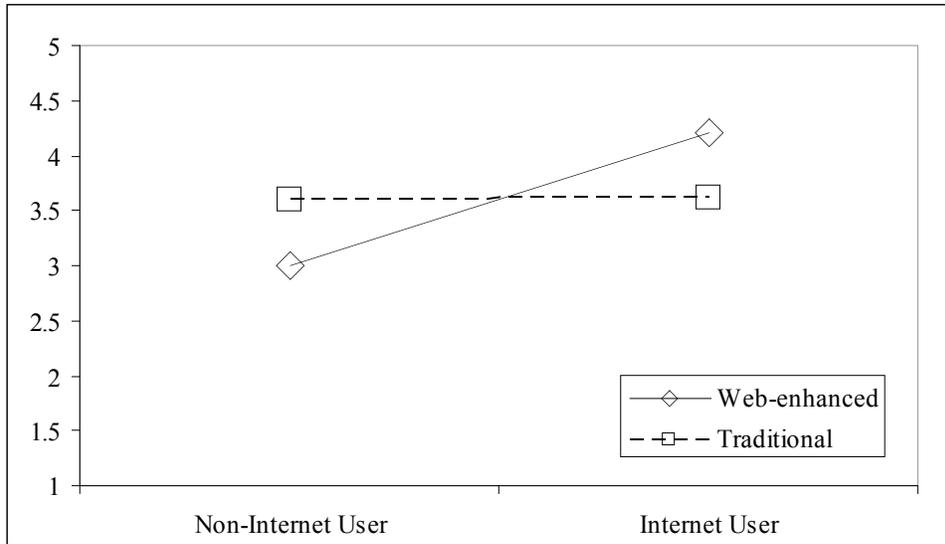


Figure 3. Interaction Between Course Format and Internet Use

Table 6 provides descriptive statistics for the self-reported success scores by course format, graduate school experience, and use of the Internet in developing a learning contract. The mean success ratings ranged from  $M = 3.0$  (for the experienced, non-Internet using students in the web-enhanced course format) to  $M = 5.0$  (for novice, non-Internet using students in the web-enhanced format).

Table 6. Self-reported Success Scores by Course Format, Experience, and Use of the Internet

<u>Graduate Experience</u>	<u>Internet Use</u>	<u>N</u>	<u>Course Format</u>				
			<u>Traditional</u>		<u>Web Enhanced</u>		
			<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>
Novice	Internet user	11	4.00	0.89	6	4.17	0.75
	Non-Internet user	2	3.50	0.71	1	5.00	--
Experienced	Internet user	7	3.57	0.53	8	4.00	0.00
	Non-Internet user	3	3.33	2.08	1	3.00	--

Table 7 presents results of the analysis of variance for these success ratings. As seen in the previous ANOVA results, none of the mean differences is statistically significant. For these data, none of the sample effect sizes reaches the medium size suggested by Cohen (1988). The largest effect size observed with this outcome variable is  $F = .22$  (observed for the graduate experience main effect and the second-order interaction effect).

Table 7. Analysis of Variance of Self-reported Success Scores

Source	df	SS	MS	F	p	Effect Size
Course format (A)	1	0.99	0.99	1.42	.24	.19
Graduate Experience (B)	1	1.38	1.38	1.91	.17	.22
Internet use (C)	1	0.42	0.42	0.60	.44	.12
AB	1	0.01	0.01	0.01	.91	.02
AC	1	0.07	0.07	0.10	.76	.05
BC	1	0.22	0.22	0.32	.57	.09
ABC	1	1.31	1.31	1.87	.18	.22
Within groups	31	21.71	0.70			

*N* = 39

Finally, the student reaction survey suggested notable changes in student perceptions from the beginning to the end of the course. Considering students’ initial responses to the method of learning contract use, 19 of 23 students (83%) in the F2F class, and 13 of 16 (81%) in the web-enhanced class marked either one or both of the following statements as true:

“(It) seemed confusing, because I didn’t know what was expected of me.”

“I was fearful I wouldn’t write enough objectives to get the grade I wanted.”

Upon completion of the course, students were asked if they were satisfied or not with their learning process as described in the learning contract. In the F2F course 22 of 23 (96%) indicated they were satisfied and in the web-enhanced course 100% reported satisfaction.

## DISCUSSION AND CONCLUSIONS

The purpose of this study was to examine learner graduate school experience, course format (traditional or web-enhanced), and student Internet use as they related to the dependent variables: (a) instructor grade for a learning contract portfolio; and (b) student self report of success and student satisfaction when using the self-directed method of learning contracts and graded reflections. Pearson Product Moment Correlation Coefficients among the dependent variables examined indicated a statistically significant correlation ( $r = .60, p < .05$ ) between the two student self report measures of success and satisfaction. It was anticipated that students who felt successful would also have a sense of satisfaction. The moderate strength of the correlation,  $r = .6$ , further indicates that there is enough difference in the two variables that both were worth exploring. There was no statistically significant correlation found between instructor grade and either of the two student self report measures of satisfaction or success. This suggests that the criteria used by the students in judging their success and satisfaction were quite different from the criteria used by the professor in judging the quality of the learning contract portfolios.

Three research questions were posed in an attempt to determine if a learner’s graduate school experience, course format, or Internet use made a difference in the satisfaction or performance success when learning contracts and graded reflections were a primary instructional

methodology. Because of the relatively small sample size in these analyses, estimates of the effect sizes were computed to augment statistical tests in an effort to determine if the observed mean differences might warrant additional research which employed larger samples. Effect sizes provide indices of the magnitude of group differences or the strength of relationship which are independent of sample size (in contrast to statistical testing which uses an amalgam of effect sizes and sample sizes; see, for example, Carver, 1978 or Cohen, 1992). Although the availability of a small sample is an acknowledged limitation of this research, an analysis of the effect size in conjunction with statistical testing suggests relationships that may be worthy of further research. The results of the three ANOVA's indicated that none of the main effects or interaction effects was statistically significant. However, five of the sample effect sizes fell within the medium range which would merit further study with larger samples.

In response to the first research question examining learner graduate experience, relationships were found between this variable and grades earned on the learning contract portfolios. Specifically, a medium effect size ( $F = .28$ ) was found for the interaction between graduate experience and course format. Little difference in mean grades was found between experienced and novice students in the traditional F2F class, but a substantial difference in mean grades was found between experienced ( $M = 38.17$ ) and novice students ( $M = 30.86$ ) in the web-enhanced format. Additionally, the interaction between graduate experience and the use of the Internet to develop and process learning contracts produced a medium effect size ( $F = .24$ ). Data suggested a very small mean difference in grades between Internet users and non-users for experienced students, but novice students who used the Internet scored substantially higher ( $M = 38.09$ ) on average than novice non-users ( $M = 25.33$ ). This result supports the assertion that availability of the Internet may reduce the need for learners' prerequisite content domain experience in order to make learning contracts a viable educational strategy.

The second research question sought to determine if there was a difference between the traditional F2F delivery and a web-enhanced format when learning contracts and graded reflections were used. Relationships were observed in this sample between course format and both students' earned grades on their learning contract portfolios and student self-reported satisfaction. The main effect for course format ( $F = .26$ ) reflected the higher reported mean satisfaction scores for the web-enhanced group ( $M = 4.06$ ) relative to the traditional F2F format ( $M = 3.61$ ). Web-enhanced courses appeal to some students more than others and successful completion requires a certain amount of self discipline on the part of the participant. Additional research is needed to determine if the higher participant satisfaction noted in this sample was due in part to the following: (a) the use of self-directed tools, learning contracts, and graded reflections; (b) offering more matched techniques to the self-regulated web-enhanced format and characteristics of web-enhanced students; and (c) other variables such as the accelerated nature of the course or convenience of asynchronous participation. Research using larger sample sizes is suggested to examine the possibility that novice students in web-enhanced environments may require more support and direction than experienced students to be successful.

The final research question examined learner Internet use when learning contract and graded reflections were employed. This independent variable was also related to both students' earned grades and students' self reported satisfaction. For the earned grades, a medium effect size for the main effect of Internet use ( $F = .26$ ) indexes the substantial difference between the mean

grade of students who reported Internet use in developing learning contracts ( $M = 37.51$ ) and those who reported no Internet use ( $M = 30.79$ ). However, the interaction between graduate school experience and Internet use ( $F = .24$ ) suggests that the impact of Internet use in developing learning contracts is noticeable in novice learners, but not in experienced graduate students. For student satisfaction scores, Internet use interacted with course format to yield an effect size of .26. In the traditional F2F course, mean satisfaction scores were nearly identical between Internet users and non-users; whereas, in the web-enhanced format, mean satisfaction scores of students not using the Internet ( $M = 3.0$ ) were substantially lower than those of students who did use the Internet ( $M = 4.21$ ). There is the implication, which also needs further research, that the Internet should be considered a resource tool and practitioners should consider facilitating critical assessment of Internet resources when teaching in a web-enhanced environment. Further, as the Internet becomes a major resource for students and a means of enhancing course delivery, additional studies are needed to determine the appropriate levels of support and direction necessary for success particularly with learners new to the content domain.

Finally, in the student reaction survey a large majority of students (82%) reported emotions of confusion and fear upon initially being asked to use a learning contract to take responsibility for their own learning. Learning contracts require a role change where the student instead of the instructor is in charge of not only what is to be learned, but how the process of learning is to be accomplished and assessed. Even with the majority of the students indicating initial confusion and fear with the learning contract, upon completion of the course 97% indicated satisfaction with their learning process through the learning contract. Some students added notes about their ability to explore areas of interest, others indicated that the experience was not as intimidating as they initially thought, and one student mentioned looking forward to using learning contracts again in other courses. While it appeared this methodology was initially challenging for the students in the sense that they had to alter their way of thinking about their learning process responsibilities, most ultimately were satisfied with their accomplishments.

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APPENDIX A  
Learning Contract Template (Knowles, 1980)

LEARNER \_\_\_\_\_ Learning Experience \_\_\_\_\_

What are you going to learn? (objectives)	How are you going to learn it? (resources & strategies)	Target date for completion	How are you going to know that you learned it? (evidence)	How are you going to prove you learned it? (verification by judges)

**Suzanne Kirkman** was recently an instructor and coordinator of the Adult Education master's program at the University of South Florida. Her research interests include self-regulation, metacognition, transformation, and instructional methodologies and deliveries as related to the adult learner. ([Skirk217@aol.com](mailto:Skirk217@aol.com))

**Kevin Coughlin** is a PhD student in the Department of Educational Measurement and Research at the University of South Florida. His papers have been presented at the Florida Association of Educational Research, the American Association of Educational Research, and the International Self-directed Learning Symposium. Mr. Coughlin is skilled in the use of SAS software for data analysis purposes. ([kevinc@spadmin.usf.edu](mailto:kevinc@spadmin.usf.edu))

**Jeffrey Kromrey** is Professor and Chair, Department of Educational Measurement and Research, at the University of South Florida. His specializations are applied statistics and data analysis. He has a general interest in the behavior of numbers, and summaries of numbers, in the context of research. His work has been published in numerous journals. He was the associate editor for *Review of Educational Research* and is currently editor of the *Florida Journal of Educational Research* and executive editor of *Journal of Experimental Research*. ([kromrey@tempest.coedu.usf.edu](mailto:kromrey@tempest.coedu.usf.edu))

## SELF-DIRECTED LEARNING REVISITED: A PROCESS PERSPECTIVE

Virginia B. Ricard

Over a period of time, patterns can be seen in adult learning development and implementation that are especially helpful in determining new learning directions. In this study, key elements for learner success were identified following a case study review of nine successful formal and informal adult programs with self-directed learning components. The relationships between the facilitator and learners, settings in which learning occurred, and available or needed resources were seen as primary concerns for learners in the self-directed learning process. They were depicted as central to a learner's movement within a developed model entitled the Self-Directed Learning Wheel.

One of the pleasures during an aging process is the opportunity to look back at life patterns unrecognized during those years when the nature or content of experiences occupied personal attention. Such reflective reviews may be especially helpful during the adult years when learners, facilitators, and others consider new life or learning directions. For persons familiar with the process of self-directed learning (SDL)—whether learners, facilitators, or administrators—these periods of reflection may be focused on successes or failures, problems or solutions, and frequent questioning.

Examples of such questions are as follows: What made for success in those self-directed settings? What problems arose and why? What problems often recurred and why? Who was usually involved and why? Such questions can be extensive and answers may frequently appear elusive. The search for answers becomes challenging when the focus is process centered. This article examines the role of process in SDL.

### PROBLEM STATEMENT

Simply stated, process is a systematic group of actions aimed toward a particular end. In the case of SDL, learners should understand process in terms of the following: (a) It is related to what occurs within themselves, in formal or informal settings, that is under their control; (b) the entire educational process is not solely under their control; and (c) the relationship of themselves as learners to the settings and resources experienced during the learning process is complex. Tough (1971) described the ability of learners not only to choose and carry out their own learning projects but the need for instructors to increase the freedom of choice regarding how learning occurs. Brockett and Hiemstra (1990) referred to self-direction in adulthood as a learning process with specific phases and they cited two distinct but related dimensions: The first is “a process in which a learner assumes primary responsibility for planning, implementing, and evaluating the learning process,” and the second is “learner self-direction” (p. 25). They viewed self-direction in learning as both external characteristics of the instructional process and internal learner characteristics including an assumption of learner responsibility.

Although the SDL process has been reviewed from a number of perspectives, one observation consistently appears: SDL as personal characteristics (internal or learning process centered) and social relationships (external or education process centered) often remains misunderstood. Overcoming such misunderstanding requires a concerted effort to provide orientation or interpretation at all levels of program involvement and to deliver consistent messages. This is especially important in formal learning settings.

In essence, what is understood by learners who accept responsibility for self-direction outside of an institution may differ greatly from what is expected within an institution. Learners typically can set goals and objectives, determine related activities and resources, and evaluate their learning experiences outside of formal learning settings. They may or may not have recognized, however, the phases present in such processes. It is important for learners to be well informed regarding process as well as content for successful learning engagement to occur regardless of setting.

## PURPOSE

This case study was designed to identify elements necessary for the success of adult learners as they direct the movement of their learning within or outside of formal settings through a three dimensional focus on process. The purpose of this article is to present an initial learning resource or model that can be helpful in clarifying a learner's role in the SDL process.

This effort was based not only on related portions of the literature regarding SDL, but also on the researcher's past and ongoing experiences in a number of formal and informal learning circumstances, such as coordinator, designer, developer, facilitator, evaluator, and learner. A multi-dimensional assessment was considered necessary during the case study because the following dimensions repeatedly surfaced regarding learner success or difficulty: (a) the persons involved in the learning process, (b) the settings in which the process occurred, and (c) the resources available during the learning period.

It appeared important, therefore, to revisit the learner as central in terms of a process of moving through various learning activities. Because learning is personal, it is primarily under the learner's control whatever the setting or nature of any interactions with facilitators and others. Thus, the need for a model was envisioned that depicted a learner's major concerns and that clarified relationships to key elements within the learning experience.

## RESEARCH ACTIVITIES

### *Persons in the Process*

One observable element of any learning process is best described as movement through various learning activities. This involves movement on the part of the people involved, especially the learner and any key facilitators. Such movement can be affected by the knowledge, attitudes, and

skills participants gained through any prior learning experiences. Tough (1982) observed and described this movement as follows:

I am struck by the wide variety of techniques, approaches, psychologies, learning principles, and discussion styles that the same person will use from one change to another. One key to successful change may be the person's wide repertoire of strategies from which to choose in particular situations. (p. 63)

Particular changes, however, may occur with varying degrees of difficulty. Cross (1981) described the dispositional, institutional, and situational barriers commonly present in learning endeavors. These potential impediments to adult learning often include those focused on such areas as the following: (a) attitudes or self-concepts, perceptions about age, and interest factors; (b) course locations and fees, course schedules, and non-relevant courses; and (c) home, family, job, and transportation concerns.

Relationships between learners and facilitators are especially important when considering process movement and change. Although the self-directed learner often assumes various planning, designing, and implementing roles, for effective movement to occur the facilitator must accept more responsibility for helping learners "turn the learning wheel." Figure 1 depicted later in this article provides more information about this wheel turning notion. It requires a team relationship between facilitators and learners, but such journeys together aren't always smooth.

Knowles (1973) highlighted this concern when he stated the following: "For some time now I have been aware of the fact that the products of our educational system don't know how to learn—they only know how to be taught" (p. 173). He noted that educators had an obligation to help students learn proactive ways of learning for, as he saw it, in adult life "learning will take place for the most part only if the learner takes the initiative; teachers are not as omnipresent" (p. 173). In an SDL process, facilitators must not only be proactive, but comfortable with learners taking an initiative in navigating the process.

Tennant and Pogson (1995) addressed how important it is to consider the experiences adults bring to any learning setting: "Indeed, experience has to be mediated and reconstructed (or transformed) by the student for learning to occur. A crucial issue is this: How and under what conditions people reconstruct their experiences and thereby learn" (p. 151).

Vella (2002) noted the need for "a sound relationship between mentor and adult learner" which she described as productive in the promotion of learning. She placed emphasis on the importance of teachers honoring their own need to learn and offered suggestions for building effective learner-facilitator relationships.

Thus, the strengths and weaknesses that learners and facilitators bring to the SDL setting affect movement. Such strengths and weaknesses may also be related in varied degrees to knowledge, attitudes, and skills. Each of these areas is discussed in the following sections.

### *Knowledge*

In this study knowledge was viewed from the following perspectives: (a) What was brought by learners to the experience or program; (b) the information necessary for success in any program; and (c) any learning acquired through program participation. Recognition of family practices and values also was considered important, as was community experiences, cultural backgrounds, earlier school patterns transferred to the learning setting, learning styles, and work patterns.

Adult educators have long been concerned about learner readiness in relation to SDL programs; especially readiness in terms of the knowledge necessary to engage as a learner. As SDL programs became increasingly more popular over time, they resembled the multi-dimensional configuration of adult education in general. That is, program focus was on various adult learner needs and content often reflected the field's cross-disciplinary aspects. Knowledge across disciplines was, and continues to be, represented in program designs. The thoughts of experts across disciplines were also welcomed and their expertise was reflected in program content.

For example, Hall (1983) has been concerned about culture in relation to learning, believing there is still much to be learned from "the proper study of other cultures. My picture of the future is not so much one of developing new technologies as it is of developing new insights into human nature" (p. 90). His research on cultural patterns, proximity, and use of time has been useful not only in the design but the implementation of many programs across cultures.

In a practical summary related to the importance of adult experience, Ron and Susan Zemke (1984) observed that in adult learning settings, new knowledge should be integrated with previous knowledge and that having conceptual overlap with what is known may be acquired slowly. Process focused, Merriam, Caffarella, and Baumgartner (2007) not only concentrate on learning in general but SDL in particular. They describe three models representing a mixture of conceptual, empirical, and experientially derived views of process: Linear, Interactive, and Instructional. Whatever the source or configuration, however, evidence of knowledge is important for learners and facilitators.

In some cases knowledge can be obscured or development delayed by a special problem as noted by Knowles and Associates (1985):

. . . even though adults may be totally self-directed in every other aspect of their lives . . . the minute they walk into a situation labeled 'education,' 'training,' or any of their synonyms, they hark back to their conditioning in school, assume a role of dependency, and demand to be taught! (p. 9)

For many, learning how to learn in a new way can be difficult even when interest is high. The question of learner and facilitator interest or attitudes is another important concern.

### *Attitudes*

The attitudes of people involved in a SDL process are important in this study as each of nine programs described later included such a process component. A presence of positive or negative

attitudes was considered directly related to the movement of learners through their educational endeavors.

The effect of attitudes on participant behavior has not gone unnoticed. Wlodkowski (1999) described emotions as both giving meaning to and influencing behavior. He has cited “relevance and choice” as “two of the most important criteria for developing a positive attitude among *all* learners” (p. 74). Further, Smith (1982) highlighted the relationship of attitudes to skill development as they learn how to learn.

### *Skills*

In this study, participant success was viewed not only from the perspective of what learners believed, felt, or knew, but also on what they were able to do. Process movement in SDL can be seen as dependent on a number of factors but especially participant skills. None were considered more important than those related to general readiness for the experiences supporting an ability to succeed. However, the need for creativity was soon realized as design elements of the process were discovered. That is, learners must be able to think divergently as well as linearly, to see in a different way, and to imagine and create.

Kidd (1969) described the need for imagination in learning: “Learning means change. Moreover, learning that is deep and is constant is usually moved by two characteristics—a growth in affection and in imagination . . . the pursuit of learning is really the pursuit of fine living” (p. 97). Recently, Vella (2002) urged facilitators to practice dialogue and “listening without interruption as a simple structure for ensuring respect” (p. 92). With increasing globalization, the need for cultural competence has been highlighted by adult educators, particularly those involved in cross-cultural training or with international development experience.

Learning from experience has also been increasingly emphasized in SDL programs and the development of related skills was evident in a literature review from various perspectives. The experiential learning process was particularly highlighted by Kolb (1976, 1983) when his translation of theory into practice resulted in the creation of such items as the Kolb Model and the Kolb Learning Style Inventory. Emphasis on experiential learning continued as assessment of prior learning approaches and programs sponsored by the Council for Adult and Experiential Learning (CAEL) (2000) expanded. Practitioner designed materials were also developed to meet learner needs in programs emphasizing experiential learning and skill development.

Some early efforts by adult educators to address learner readiness and the related skills resulted in development of the Self-Directed Learning Readiness Scale (SDLRS) [and the subsequent Learning Preference Assessment] (Guglielmino, 1977) and the Oddi Continuing Learning Inventory (OCLI) (Oddi, 1984). These resources were designed to help learners and facilitators recognize known and needed skills in SDL programs.

The influence of self-directed learning experience on skill development has also been examined, although frequently from a more theoretical than practice base. One example is the development of the Staged Self-Directed Learning (SSDL) Model by Grow (1991). Braman (1998) also found a significant relationship between SDL readiness and individualism. Hammond and Collins

(1991) looked at the promotion of emancipatory learning and social action as central to SDL. Vann (1996) suggests, too, that some research shows self-direction has been learned through socialization. Finally, Kerka (1999) noted that whether the SDL experience is “individual or collective, emancipatory or oppressive, inevitable or not, the biggest misconception may be in trying to capture the essence of SDL in a single definition. It is clearly a multifaceted concept that should not be approached through one perspective” (p. 4).

### *Settings and the Learning Process*

The question of learning settings in SDL programs must be considered. Grow’s model (1991) reflected a concern for the immediate setting. Focused on the need for structuring by four levels of learner self-directedness, his approach was to be employed following learner assessment. Adult educators in general have been aware of the need to establish a climate conducive to learning whatever the setting. Besides more well known higher education undergraduate and graduate programs where adults can obtain degrees or experience other types of learning experiences, three programs are described here that demonstrate different types of settings where adults have opportunities to take some initiative in their own learning efforts.

One such setting is the John C. Campbell Folk School (2008). The school is located in Brasstown, North Carolina, and was started in 1925 as an experimental program patterned after the folk high schools (folkehøjskole) of rural Denmark. In this setting instruction has always been non-competitive. A description in their most recent course catalog provides some detail:

There are no credits, no grades, no pitting of the individual against another. This method of teaching is what the Danes called ‘The Living Word.’ Discussion and conversation, rather than reading and writing are emphasized—and most instruction is hands-on. (p. 2)

The Highlander Folk School at Monteagle, Tennessee, is another type of setting. Founded in 1932, it was also modeled partially after the Grundtvigian folk school in Denmark. The school “played an important role in educating union leaders and members in the southern labor movement in the 1930s and 1940s,” and gained its “greatest visibility in the civil rights movement of the 1950s and 1960s” (Stubblefield & Keane, 1994, p. 224).

A third setting is Elderhostel, initiated in 1975, that is focused on non-credit learning experiences on and off campus in community, national, and international settings. As Stubblefield and Keane (1994) observed, Elderhostel “has continued to grow and expand and is now considered an educational movement, demonstrating that older adults will commit time and money to serious study of liberal arts and other education directed toward self-actualization” (p. 286).

In the case study effort for this article, nine programs resembling some of the settings described above, as well as other settings for working with adult learners, were examined. The programs were selected not only on the basis of their individualized approaches that required self-direction on the part of learners, but also because of my varied involvement with each of them during my professional career beginning in 1975. I continue an involvement with three of them (numbers 4, 5, and 9 as depicted in the table shown below; the latter program is now called the Union

Institute and University in Cincinnati, Ohio). This familiarity provided me an opportunity to observe and evaluation the various programs' strengths and weaknesses. I also gave attention to learner interactions, their satisfaction with program activities, and the outcomes they achieved. In essence, I believe that productive comparisons of the various learning processes were possible because several of the programs have been viewed over a long period of time.

Although the majority of these programs were formal, offered academic credits, and were at a university site, there were programs in other settings as well. Some offered certificates of participation or achievement, while others simply had long-standing reputations for supporting adult learners in their personal enrichment or skill building efforts. Most reached adult learners at the local level, but some served students at national and even international levels.

Table 1 illustrates this setting diversity as well as a predominance of university related programs with grading and credit considerations. A description of the SDL process level (the 3<sup>rd</sup> column) is provided in the next section. [Contact the author for more information on each of the nine sites.]

*Table 1. Programs and People Studied*

Program	Type and Audience	Level	Site(s)
1. Adult Competency Training	Undergraduate and graduate courses for adult educators in the DHEW	3	CSU (H) and cooperating universities
2. Model Education Program	Graduate courses for adult educators in the DOL	4	Regency Hotel (H), Denver, and University of Utah
3. University Without Walls	Undergraduate courses for adults	3	Loretto Heights College, Denver
4. Options Innovative	Undergraduate courses for adults	4	CSU
5. Adult Learning, Training, and Development	Graduate courses for adults	4	Regis University, Denver
6. Girl Scouts of the USA	Training for adult females	4	Edith Macy Conference Center, Briarcliff Manor, NY, and other national and international locations
7. Las Mujeres Activas	Informal education for non-literate, Hispanic, older females	3	Volunteers Clearing House, Fort Collins, CO
8. English as a Second Language	Informal education for Filipino, Hispanic, and Vietnamese adult females	3	Old St. Mary's Church, Oakland, CA
9. Union for Experimenting Colleges and Universities	Graduate experiences for doctoral candidates	5	Union Graduate School, Yellow Springs, OH (H), and other national and international locations

*Legend:* CSU = Colorado State University, Fort Collins; DHEW = Department of Health, Education, and Welfare, Region 8; DOL = Department of Labor, Region 8; (H) = Headquarters for a program carried out in multiple geographical locations

*The Research Process*

The program designs and formative and summative evaluations of the nine programs were reviewed. All had SDL components, active participation of learners and facilitators, effective facilitator-learner (team) relationships, and satisfaction as evidenced on the part of participants. Learning process patterns were noted in relation to the role of learners and facilitators, available and needed resources, and the learning settings.

The criteria established for the SDL process ratings were as follows:

1. *Level 1* – Goals, objectives, activities, resources, and evaluation were determined by persons other than learners involved in the process; SDL activities were included. Active participation was expected of learners. Facilitators supported, prescribed, and demonstrated learning activities, but essentially controlled the process.
2. *Level 2* – Learners and facilitators set goals and objectives and determined some activities collaboratively. Such action occurred at the beginning of courses or programs. Facilitators determined the necessary resources and evaluated the experience.
3. *Level 3* – Learners and facilitators set goals and objectives, determined activities, and identified resources collaboratively. Facilitators evaluated the experience, especially in formal settings where letter grades were required.
4. *Level 4* – Learners and facilitators set goals and objectives, determined activities, and identified resources collaboratively. Learners may or may not have engaged in self-evaluation.
5. *Level 5* – Learners set goals and objectives, determined and carried out activities, identified and used resources effectively, and then evaluated their learning experience. Facilitators supported learners in a non-adversary manner, suggested and guided as necessary, and shared control of the process.

As shown in Table 1, none of the programs were rated as Level 1 or Level 2. Based on participant satisfaction reports that I studied, all of the Level 3 to 5 programs were considered successful. For purposes of this study, it was important to review successful rather than unsuccessful attempts at self-directed learning, especially in terms of process. In essence, the research process most closely resembled a multi-program case study resulting in the development of a self-directed learning process model.

Process components and patterns were observed in relation to the role of learners and facilitators, available and needed resources, and the various learning settings. However, most program evaluations or participation satisfaction reports highlighted content and the achievement of outcomes versus process. That is, what occurred during the learning processes was documented, rather than how participants moved through the learning processes. The relationship of the process components to SDL success was not well documented. Observation of this omission, plus what I had experienced over the years as a learner or facilitator within the nine programs, served as the basis for the model's design that is presented in the next section.

With process as the focus, what was done by participants in the programs reviewed was as important as what was intended. The impact of language skill development, for example, in a group of Spanish-speaking older adults lacking English as well as Spanish writing skills, can be profound if the program design is structured to use learner strengths in meeting needs. As another example, in one of the programs reviewed, cooking was the content area and facilitators were bi-lingual/bicultural, English-speaking, adults of varying ages. The setting was a neighborhood based facility equipped for cooking and serving. Approaches were primarily experiential, self-directed, and appealed to visual, tactile, olfactory, and taste senses. In another setting, if learners had difficulty holding pencils (e.g., those with arthritis), they traced letters and words in shallow boxes of sand. Resources included shelf paper mounted above the working space with color-coded illustrations of ingredients, utensils, and words.

Necessary resources in SDL projects and programs can be viewed from many perspectives: What are they? Where can they be found? How should they be used? What happens if they are needed but unavailable? For purposes of this study, resources were viewed as the people, places, or things considered necessary for self-directed learners to succeed. Because the movement of the learner depends on knowledge, attitudes, and skills, as well as the settings in which learning occurs, the connection between learner skills and resources was seen as especially important in relation to a SDL process.

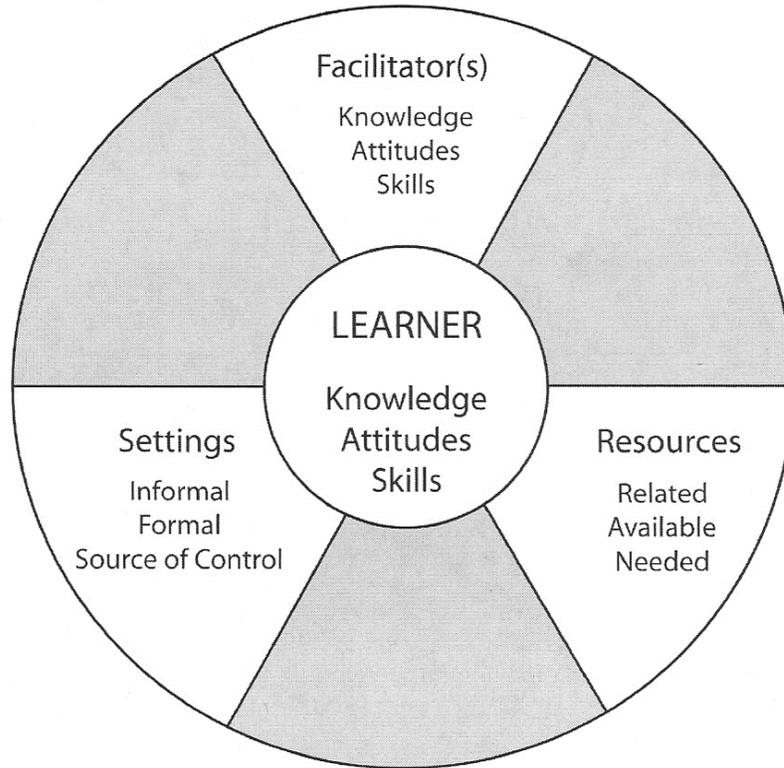
Although self-directed learners must be able to identify, access, use, and evaluate available resources effectively, attention has not been generally focused on specific actions related to those skill areas. If resources are needed, the planning, designing, creating, or sharing of necessary skills has not been viewed in relation to the actions required for effective performance, nor how they need to fit within the various learning processes.

## DISCUSSION

Although SDL participants, resources, and sites were highlighted in this study, process in relation to resources appears to have been given the least amount of attention. Today, with the impact of technology ever present, this underdeveloped area in program design and implementation needs to be addressed. People having access to the Internet, for example, can find more learning content, resources, or options than ever before.

Such changes in the face of learning documentation would appear to support the need for more learning options, both online and classroom-based, versus single or limited choices. Learning takes place when and where it occurs and having such limited choices impacts on the processes and the movement of learners through those processes. We are living in an era when other-initiated formal and informal SDL program providers should strive to increase learners' access to information and resources, especially at the graduate level.

The SDL Wheel (see Figure 1) was designed to help learners identify key elements of concern to be addressed in the SDL process. In this model, the learner is depicted as central to movement within the learning process in relation to three components: (a) the facilitator (as distinguished from other aspects of the process); (b) the learning setting; and (c) necessary learning resources.



*Figure 1. Self-directed Learning Wheel*

Learners should note that as central to the learning process, their knowledge, attitudes, and SDL skills are essential in terms of functioning within the learning process. The facilitator—a key human resource in the process—is presented as separate from the resources. This distinction is necessary not only because of the knowledge and skills pertaining to SDL required for the role, but also because a learner-facilitator team relationship is required for success.

Finally, the use of resources is important. Learners must be able to determine not only those related to their learning needs, but those available and those missing. The learner also must recognize characteristics of the learning setting that may support or hinder self-direction in learning. Movement within the learning processes necessary for success are related to the learner's SDL readiness and focused skill building potential.

## CONCLUSION

Learners can succeed in SDL projects and programs. The need remains, however, for increased learner awareness of the purposes and processes associated or necessary for SDL success. To function effectively, learners must recognize the multiple components present in learning situations as depicted in the SDL wheel. The wheel as shown in Figure 1 is at an initial stage in

its development. More research is obviously needed with additional groups and in a variety of settings. It is my hope that the model can be piloted with a group of learners willing to use the wheel as a mechanism for monitoring both process and progress during learning experiences. The author welcomes feedback and dialogue as crucial in further evolution of the SDL wheel.

The vigorous presence of theory and practice differences—if based on critical thinking, creativity, and the needs of a changing multicultural population—will speak well for the health of SDL. The image or face of SDL may be changing, just as it should, and our understanding of how best to work with learners and learning processes must keep evolving, too. The learner is and must remain, however, central to such efforts.

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**Virginia B. Ricard** holds a Ph.D. from the Union Institute and University. Her interests include self-directed learning, experiential activities design, and international/intercultural adult education. She facilitates learning in the Adult Learning, Training, and Development Program, School for Professional Studies, at Regis University in Denver, Colorado. ([vbriard@msn.com](mailto:vbriard@msn.com))

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