

Encouraging Self-directed Learning by Spiralling Through a Course

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Abstract: *The paper outlines the results of a personal journey to reconcile the preference for developing adult learning approaches in undergraduate IS students with their preference for more dependent approaches. The introduction of Grow's Staged Self-Directed Learning model and an innovation by the author involving deliberately repeating the course material is shown to provide a powerful means of developing adult learning preferences.*

Keywords: *Pedagogy, Adult Learning, Self-Directed Learning*

Introduction

I have previously reflected (Turner, 2004) that my apparent lack of success encouraging information systems (IS) students to adopt deep learning approaches might be because their learning preferences were resisting my teaching strategies. Here, I work through my students' responses to my teaching to discover a means of encouraging students to leave behind dependent learning strategies developed in childhood to adopt the independent learning approaches of mature learners.

The paper firstly presents a brief review of the education literature on learning approaches to frame my new perspective on teaching/learning models. Then the Staged Self-Directed Learning (SSDL) model (Grow, 1991/1996) is outlined to connect the learning approaches of dependent students with those of adult learners. An IS course that I have been using as a benchmark while developing these ideas is compared with the SSDL. Finally, the lessons from that comparison are extended into the whole IS curriculum (my benchmark course is no longer offered).

What kind of learners am I trying to develop?

Students attend my course in an environment that appears to reinforce surface learning (Turner, 2004) and, as Ramsden (1992) warns, probably with a pre-disposition towards dependent learning from their secondary education. As a constructivist, I view deep learning (Marton & Saljo, 1997) as the only valuable result of education. Consequently, I encourage my students to adopt a deep learning approach. From the education literature and personal experience, I believe that deep learning is best achieved when adult learning approaches dominate; when learners independently construct and coordinate their learning.

The message in recent literature on adult learning is clear: the distinction between dependent learning and adult learning is not a simple dichotomy; one is not wholly a dependent learner or an adult learner (Dale & Beverly, 1988; Kerka, 2002; Parkinson & St George, 2003).

Rather the different modes of learning are drawn upon by learners according to the situation and their motivation (Kerka, 2002; Parkinson & St George, 2003). When the subject is not aligned with learner interests or the situation constrains the student's approach to learning, the dependent learner mode will tend to dominate. The learner will be inclined to relinquish control of the process to the teacher and he or she will demand carefully articulated structure, clear guidance and clearly-defined assessment (Kerka, 2002; Parkinson & St George, 2003). This aligns with my personal experiences. If the subject *must* be learned, then let the teacher teach me! Similarly, when first exposed to new material, a structured recitation of the subject is frequently essential to allow me to understand what 'world of knowledge' I might then independently navigate.

In contrast, the literature says that when the subject is aligned with the learner's interests and the situation allows them to adopt their preferred learning styles, they will tend to display adult learning behaviour (Dale & Beverly, 1988; Kerka, 2002; Parkinson & St George, 2003). The learner will prefer to design their approach to the material and will focus on the salient points that address their needs rather than attempting a survey of the broader subject (Baumgartner, 2003a; Kerka, 2002; Parkinson & St George, 2003). Again, personal experience reinforces this message. When I *want* or feel a *need* to learn the subject, I will design my approach to learning. That approach might include teacher-directed elements, but usually as one part of a broader whole.

Initially, the distinction drawn in education literature between dependent and adult learning appeared to form two ends of a continuum along which one moved in response to different learning stimuli. This raised the questions: What stimuli would move the learner towards the adult learning end of the continuum? Is there some fulcrum point past which one tends to routinely adopt one style over the other (imagine a see-saw with dependent and adult learning on each seat)? If so, why do adults seem to readily return to dependent learning despite the apparent 'uphill' effort this analogy implies? (It could just be a weak analogy!)

However, further reflection and reading has led me to now view the continuum as two different learning polarities (analogous to magnetic polarities). Students can be 'charged' to either polarity depending upon the subject, their motivation and other environmental factors (teacher, timing, approach, etc) and the 'flip' between the two polarities is instantaneous and effortless. But it is not automatic! The evidence from running a variety of IS courses, is that just having a learning environment that is properly 'charged' for adult learning does not 'flip' the dependent learner into that 'polarity'. To stretch the analogy further, the dependent learner must be 'rubbed with a silk hanky' to build the appropriate 'charge' to 'flip' them to the adult learning 'polarity'. If dependent and adult learning are not a continuum but polarities, then is there a means of building in the reluctant learner a tendency to favour the adult learning 'pole'?

I recognise that this is a somewhat simplistic view and that learners' responses to learning environments are more subtle. However, the simple model has underpinned my initial thinking and produced some positive results. Future research will increase the subtlety of my understanding and the corresponding teaching approaches.

How can I move learners from dependence to independence?

Adult learning has a range of 'flavours' (Baumgartner, 2003a; Dale & Beverly, 1988; Kerka, 2002). In reviewing the education literature I have recognised a parallel between my personal goals and the techniques aligned with the adult learning view of adults as self-directed

learners (Baumgartner, 2003b; Grow, 1991/1996). In the conceptual framework of self-directed learning, the learner determines the need for some education, decides on a preferred approach to learning, identifies and accesses learning resources and draws on the assistance of educators as a part of that overall strategy rather than as a central element (Baumgartner, 2003b; Grow, 1991/1996). Ideally, self-directed learners apply this approach to all aspects of their lives; the so-called life-long learner (Grow, 1991/1996).

Conveniently, through the work of Gerald Grow (1991/1996, 1993), there is a model that describes the stages of growth to a ‘fully’ self-directed learner from the passive, dependant learner borne of typical didactic education. Grow (1991/1996) describes the Staged Self-Directed Learner (SSDL) model involving four stages of learning from passive reliance on the teacher to active independence of formal education structures (see Figure 1).

	Student	Teacher	Examples
Stage 1	Dependent	Authority, Coach	Coaching with immediate feedback. Drill. Informational lecture. Overcoming deficiencies and resistance
Stage 2	Interested	Motivator, Guide	Inspiring lecture plus guided discussion. Goal-setting and learning strategies.
Stage 3	Involved	Facilitator	Discussion facilitated by teacher who participates as equal. Seminar. Group projects.
Stage 4	Self-directed	Consultant, Delegator	Internship, dissertation, individual work or self-directed study-group.

Figure 1: The Staged Self-Directed Learning Model (from Grow, 1991/1996)

Grow (1991/1996) says that ‘Stage 1’ self-directed learners “need an authority-figure to give them explicit directions on what to do, how to do it, and when.” The similarity with the descriptions of dependent learners is clear; and with my students, uncanny. Grow (1991/1996) notes that being a Stage 1 learner is not in itself bad, as there are numerous reasons why the learner may be dependant, including deliberate choice. Grow (1991/1996) states that by the time self-directed learners have reached Stage 3, they are functioning as adult learners. His Stage 4 takes the adult learning tendencies out of formal education and into self-directed education. He goes on to describe the means to encourage students to become increasingly self-directed (Grow, 1991/1996). He also advocates that this progression is mandatory. He sees his Stage 4 learner as best able to cope with life’s learning requirements (distinct from the structured environment of formal education) (Grow, 1991/1996).

The equivalence between the SSDL and my desire for a means to build a certain ‘polarity’ in students is clear. Dependent learners are at Stage 1, adult learners are at Stage 3 (at least) and so I have a roadmap with which to encourage students to progress to adult learning approaches. This does not mean that I have reverted to the continuum view of dependent and adult learning styles. Rather that I have now identified a progressive mechanism for increasing the frequency of the adult learning ‘polarity’ response in my students.

Are my efforts to date in line with this new approach?

It is pertinent to review the alignment of my previous course design with my new ideas of achieving the progression I wish for my students. This review will ‘close the loop’ on a series of attempts to build an IS course that will encourage students to become independent, questioning learners.

Figure 2 summarises the characteristics of good teaching at each of the different stages of self-directed learning, according to Grow (1991/1996):

Coaching	Motivating	Facilitating	Delegating
Disciplined and directed; backed by real mastery in subject; specific identifiable skills, practiced regularly with immediate, frequent, task-oriented, impartial feedback; teacher makes decisions about what to learn and when.	Clear explanations of why what is learned is important; aim for concrete results in activity; Get students to set learning goals; encourage them to achieve/excel; teacher negotiates assignments to meet student interests.	Teachers and students share in decision-making; teacher acts as a “local guide’...through terrain that is well-studied but richly various.”; teacher offers tools, methods, techniques and support; student chooses approaches to achieve goals set against standards of interest to them.	Teachers no longer teach subject matter but cultivate the student’s ability to learn; consult and negotiate on learning objectives, approaches, evaluation criteria and timing.
Stage 1	Stage 2	Stage 3	Stage 4

Figure 2: Summary of Good Teaching Practice at Different SSDL Stages

My benchmark course was a core second year course for an IS major; Databases and Database Design. Through earlier reading and reflection, I have developed the course to have a series of components. The course ‘spirals’ through the key knowledge and skill areas, first visiting them with only the student’s intuitive understanding, then re-visiting them with formal lecture material on key subjects, and finally re-visiting the knowledge and skills again in the context of resolving the major assessment in a group assignment. The spiral idea is discussed further below.

Briefly, the components of the course are:

- Weekly problem sheets—each week’s topic is framed by a problem sheet distributed to students (this encapsulates the key learning objective for the lesson) and describes a strategy for achieving the objective and resources that might assist; the strategies and resources are less helpful with each iteration to encourage students to take charge of their learning.

- Weekly tasks and labs—the tasks are relatively detailed assignments with immediate feedback that require the students to explore the next week’s topic to answer a simple question or problem. The labs are self-paced instructions to achieve key skill goals.
- Seminar-style class activity—my presentations are generally short, usually interactive, and are interspersed with short exercises through which the students practice what has just been discussed. Class periods in the last spiral iteration are given over wholly to the students to work in groups on their major assessment with me there to offer assistance, if asked.
- A thrice-repeated skills test—this assessment device validates the students’ acquisition of a minimum set of skills. The test is offered at the conclusion of each revolution of the spiral. (Only their best mark counts towards their final grade.)
- The major assignment is a group project for a ‘real-world’ client—organisations from outside the ADFA act as ‘clients’ for my class and present real and pressing requirements. The teams analyse the requirements and design a solution using the skills and knowledge they acquire during the course.

Figure 3 illustrates how I see the different components of course structure when overlaid on the SSDL.

‘Spiral’	Second Iteration	First Iteration	Third Iteration
Assessment	Skills Test(s)	Group Assignment (Initial phase)	Group Assignment (Main development period)
Regular Activities	Weekly Lab Tasks	Weekly Tasks (Early in Session)	Weekly Tasks (Later in Session)
Learning Guidance	Detailed Problem Sheets	‘Patchy’ Problem Sheets	‘Empty’ Problem Sheets
SSDL	Stage 1	Stage 2	Stage 3

Figure 3: Comparison of Course Components with the SSDL (Grow, 1991/1996)

It appears that the pieces are in place for students to be led through the staged self-directed learning model, even though they were not built with that understanding. However, there are areas where refinement would strengthen the intent to lead students to more self-directed learning.

The problem sheets are specifically tailored (coincidentally) to the progression inherent in the SSDL. However, to date I have not emphasised the problem sheets as a learning tool, expecting the students to draw on them as they need. On reflection, I plan to emphasise the value of the problem sheets more at the beginning of each class and to guide students through the completion of some of the ‘patchy’ problem sheets to reinforce the need for a strategy to learn.

The weekly tasks and labs appear to be well aligned. I am comfortable with the labs being dominantly Stage 1 level; they are teaching a range of skills that are usually best introduced in this manner (Dale & Beverly, 1988; Gordon & Zemke, 2000; Grow, 1991/1996; Thompson, 1991) and are offered as self-paced tutorials. There is room for some early weekly tasks to be framed for Stage 1 learners to reinforce the learning development of the problem sheets and

the spiral overall. Another change would be to have the weekly tasks extend the material examined that week, not to preview next week's topic, which would also address feedback from students.

The assessment pieces are also aligned with the SSDL. Although the Skills Test does occur at the end of each spiral revolution, and therefore might be seen as needing to evolve through the stages, it tests specific skills that are fundamental to the subject area. The students are informed that the test is of their capacity to perform particular skills.

The major assignment works well at leading students from Stage 2 (a big early step, perhaps) into Stage 3 of the SSDL. I work with the students during the first spiral revolution to guide them through analysing the major assignment requirements. By the time the class moves into 'development' of the assignment solution the teams are adopting Stage 3 learning approaches to meet their own desires for addressing the client requirements. Woven into this period are in-class reviews of progress, system demonstrations, and interviews with the client. The client's requirements are unmodified by me, although sometimes interpreted to limit the scope to attainable goals. The students determine what they will design and develop. The academic requirement and assessment is framed in terms of standards to be met.

There are no Stage 4 learning opportunities in this course because of its location in the overall program. I believe that at second year, students still need encouragement to move away from Stage 1 learning approaches. It is only with the basic knowledge, experience and maturity that the third year of a degree brings to most students that successful Stage 4 learning might be encouraged. This is reflected in my curriculum design, below.

The major refinement that this analysis introduces is in the concept of the spiral and its three revolutions. The first time the students rely upon their existing knowledge and look for places for the new subject to 'fit'. The second time, the students are formally provided with the subject matter. It is hoped that they will more readily connect with that information because they have a sense of where it fits in their world-view. Only this iteration is devoted to didactic *teaching*. The third time, the students are asked to apply what they now know to deliver a concrete solution to the client's problem.

Juxtaposing the 'spiral' and the SSDL highlights immediately the differences between the two approaches. Most significantly, the SSDL's Stage 1 accommodates the 'immature' learner's preference for dependent approaches and provides the time for the educator to lead the students to more 'mature' learning approaches (Grow, 1991/1996, 1993). In contrast, the spiral assumes a minimum level of maturity by asking the learners to investigate their previous understanding immediately and only on the second iteration does it provide the basic fuel of new knowledge. The contrast is a weakness in the assumptions of the spiral. By reversing the order of the first two iterations of the spiral, the SSDL is more accurately reflected. Importantly, this will address concerns received from students in informal feedback; they feel it takes too long to get to the bit where they learn something (new). By commencing the spiral with a Stage 1 presentation of the basic subject knowledge and then guiding the students to find where that knowledge fits into their already-understood world-view on the second iteration, they will be more comfortable that they are learning something. This will allow them to develop more robust learning skills through the 'higher-order' learning experiences that reinforce the initial introduction.

How Do I Deliver My Insights Into the New Curriculum?

The new spiral appeals to my growing understanding of bringing adult learning approaches out of reluctant students. Unfortunately, the circumstances of the curriculum change-over in my school prohibit me testing the new approach in offerings of the course from which I have drawn these insights. But that same curriculum change inspires me to consider how to blend the SSDL and my spiral of learning into the broader IS curriculum. Whether or not such a blend is complicated by the team-teaching approach our IS staff is using in the new curriculum is also an issue.

Grow (1991/1996) stipulates that the progression from his Stage 1 to Stage 4 learner is something that can be promulgated at the micro-level (i.e. in any individual course) and at the macro-level (i.e. within an entire curriculum). By incorporating his staging in my 'spiral', the model can be introduced at an even finer level of granularity, that of the topic (within a course). This allows the SSDL to be woven throughout the IS major offered by our school. Figure 4 provides a visual summary of the following discussion.

First Year	Introduction to Information Systems S1 → S2/S3	Information Systems in Organisations S1/S2 → S3
	Second Year	Designing of Information Systems S2 → S3
Third Year	Systems Strategy S2/S3 → S3/S4	Applications of IT S2/S3 → S4
	Management Information Systems S2/S3 → S3/S4	Project S3 → S4
	Week 1 Week 13	Week 1 Week 13

Figure 4: Weaving the SSDL (Grow, 1991/1996) into ADFA's IS Curriculum

The curriculum allows us to structure courses to encourage progression through the stages, commencing at Stage 1 with traditional lecture-format education (at least briefly) to draw the students in to the subject. The first year courses would then move onto guiding students into Stage 2 and, by the end of the first year, even some of Stage 3. The second year courses would begin at Stage 2 and move through to Stage 3 approaches (particularly in assessment) during the period of each course. Deliberately reverting to Stage 2 at the half-way mark reinforces in students the progression that they are making in their learning approaches. By third year, the courses are structured to encourage Stage 3 learning as the baseline with some encouragement, particularly in the capstone project course, to adopt Stage 4 learning approaches. Students finishing the major should be well-prepared for the Stage 4 style of Honours study.

There are important, over-arching, implications to adopting the SSDL across the curriculum:

- The intent of the process must be made clear—the students must understand that not only are they being taught a specific (computing) subject, but they are developing a different approach to learning.
- The course material must be structured to reflect the students' changing approaches—early materials will be detailed, explanatory, and appear 'safe' to students, but will transform over time into those that encourage and facilitate independent learning through a reduction in detail and increasing sophistication in problems.
- The course assessment must be aimed at requiring adult learning approaches to achieve best results—assessment remains the principal motivating factor for most students, so it should be used to achieve educational outcomes.

As noted above, this progression through the SSDL stages was described by Grow (1991/1996) and is simply applied here to the particular curriculum at my school. The innovative element to my proposed re-framing of the curriculum to align with the SSDL is the introduction of learning spirals running through each course. Furthermore, these spirals occur in three forms to accommodate the team-teaching approach.

Whereas my original spiral had dominated the benchmark course's timetable, spirals within the new curriculum will be run over a whole course, over two or three lesson periods, and within a single lesson. A spiral over the whole course would be aimed at grounding the students in the fundamental elements of each course. This would appear much like the spiral described for my benchmark course. Multiple teachers would be involved in delivering each revolution of the spiral.

A spiral over three lessons is reasonably obvious: the first iteration is simply a lecture with some in-class activity on which students receive immediate feedback. The second lesson is then more like a tutorial or seminar where the teacher provides guidance through a review of the subject matter and the completion of more complex tasks (possibly setting a final task as 'homework'). These tasks would be more detailed problems that require some pre-planning to complete, and might involve small groups or other team configurations. The second lesson would reinforce the material detailed in the first lesson and work to connect it with the students' established knowledge by bringing realistic scenarios to bear on the dry facts presented in the first lesson. The third lesson would then see the students applying the knowledge they have (hopefully) integrated by this time with little input from the teacher to achieve the learning outcomes. A complex case study to analyse or a substantial problem to solve would suit here. Students would have to navigate through background material to identify the problem and plan a solution to address it. In this case, the same teacher, or a small number of teachers, would be involved in presenting the material. It seems likely that each revolution of the spiral would be best presented by a single teacher, but different teachers might best present different revolutions.

A spiral within a single lesson (say, 30 minutes in duration) would involve something like a 10-minute presentation, followed by a 10-minute self-assessed exercise, wrapped-up with a 10-minute guided discussion about how this concept might be implemented in real-world situations. A single teacher would present all three spirals in this case, as changing teachers in a 30-minute exercise is likely to simply confuse students; even motivated, mature, self-directed ones.

What Does My Future Hold?

The plans that arise from this analysis are clear. First, the actual preferences of the students must be tested to validate the premise on which the plan is built. If results from such research suggest that our students are more mature learners than the plan supposes, then further consideration will be needed. Otherwise, the plan can be implemented and its success monitored through regular surveys (say).

Implementing the approach will require careful negotiation with colleagues in the IS discipline in my School. Not all of them agree with my preferred teaching approaches, nor have they spent the time recently considering the theories of student motivation or learning approaches. Bringing an iterative structure to the nature of the curriculum will be more easily said than done.

But I believe that combining the SSDL and an iterative, spiralling nature to instruction is essential. The likely reduction in the range of things that the teachers will teach is sacrificed to achieve a greater understanding of the core material and the greater learning development. The more mature learners emerging from our courses will be able to address the wider range of knowledge areas with their more mature learning skills. Ultimately, their range of knowledge will not be within the control of the teachers; they will be self-directed, independent, adult learners.

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