

Title:

**AN INITIAL INVESTIGATION OF THE STUDENT LEARNING PREFERENCES
AT ADFA**

Theme:

Teaching and Learning in the Sciences

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ABSTRACT

The paper presents the rationale behind the selection of the Student Orientation Questionnaire to survey student learning preferences at the Australian Defence Force Academy (ADFA). A brief review of the literature's position on depended versus independent learning and a critical review of two learning preference survey tools is followed by a recitation of initial findings on the learning preferences of the students at ADFA.

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INTRODUCTION

Over the last few years, I have been trying to understand what factors lie behind my information systems (IS) students resisting my attempts to encourage deep learning. By observation, it appears that their dependent learning preferences are countering my independent learning-based teaching strategies. I came to this conclusion through a review of the literature and by observation of my students, and through their feedback, both informal and formal, over several iterations of different courses.

I have previously outlined (Turner, 2004) that the environment in which I teach my students, the Australian Defence Force Academy (ADFA), tends to promote dependent learning preferences, particularly through the military training that students receive while studying for their undergraduate degrees. I have also outlined an approach that I have now adopted (Turner, 2005) to encourage students to move from that dependent learning preference to more independent learning strategies, based on the Staged Self-Directed Learning model of Gerald Grow (1991/1996). However, as I noted in those earlier publications, I have been trying to counter forces that I only know to be present anecdotally. This paper introduces my initial attempts to establish a factual grounding for my assumptions in this area and to discover whether students develop more independent learning preferences over time.

The paper discusses my current research in the following manner. Firstly, it briefly re-iterates the problem I believe that I am facing and why the current research is important. It then describes the alternative research instruments from which I have selected and why the selection was made. The paper then outlines the details of the research method before presenting initial results from my first survey of student learning preferences at ADFA. The paper concludes with a brief summary and the outline of further research.

THE STUDENT LEARNING PREFERENCE PROBLEM

First, I should note that I use the terms ‘dependent learning’ and ‘independent learning’ deliberately. While investigating the issues originally, I thought in terms of ‘pedagogy’ and ‘andragogy’. Subsequently, the literature and various anonymous reviewers have emphasised that these terms are not clearly defined nor commonly accepted as distinct. Delahyde, Limerick and Hearn (1994) provide a useful summary of this debate (citing Pratt (1988)): “while andragogical practice has been seen as particularly appropriate for the teaching of adults, recent debate has abandoned the andragogy-pedagogy dichotomy which claims that teaching adults is significantly different from the teaching of youths” (Delahyde, Limerick & Hearn, 1994, p187). Consequently, I use the term ‘dependent learning’ for students who prefer to be directed and instructed on the material about which they are learning (Turner, 2005). I use the term ‘independent learning’ to represent student preferences for determining their own strategies for learning a subject and their independent (although possibly negotiated) selection of learning strategies (including, potentially, teacher-directed learning) (Turner, 2005).

Let me now introduce the ‘problem’ that I am attempting to address. 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 independent learning approaches dominate; when learners construct and coordinate their learning.

The message in recent literature on adult learning is clear: the distinction between dependent learning and independent learning is not a simple dichotomy; one is not wholly a dependent learner or an independent 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 independent 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.

In Turner (2005), I established the idea that dependent and independent learning strategies were not a continuum, but rather more like (magnetic) polarities that one can 'flip' between depending on the subject, one's motivation, and opportunity. Delahyde, Limerick and Hearn (1994) also discredit the continuum representation, saying that dependent and independent learning orientations are orthogonal. They note that one could demonstrate strong preferences for either orientation, or for both, or for neither. This view is not in conflict with mine.

My objective still is to encourage students to adopt and maintain independent learning preferences as much as possible. I use two approaches to achieve this. Firstly, I try to make students cognisant of their preferences and the advantages of independent learning approaches. Secondly, I attempt to 'teach' them to prefer independent learning approaches by leading them through course material using increasingly independent learning oriented teaching strategies. I have adopted the Staged Self-Directed Learning (SSDL) Model by Gerald Grow (1991/1996) for this purpose. The next section outlines why and what that means.

Independent 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 independent learning view of students 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).

The work of Gerald Grow (1991/1996; 1993) describes 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).

Tennant (1992) notes that Grow does not suggest when the teacher should move from one stage of the SSDL to the next, and furthermore, that there’s no guide as to whether the teacher should move ahead of the students or behind them. He also notes that Grow does not describe how to assess students for their level of self-directedness, and this has implications in deciding where on the model the teaching should be aimed (Tennant, 1992). Tennant (1992) concludes that the SSDL is not a sufficiently robust model because of internal inconsistencies and an apparent inability to handle a wide range of observations.

Nevertheless, Grow's model does offer at least a framework for staging teaching strategies to lead students from dependent to independent learning approaches. My experience with implementing the SSDL has produced positive results. So, despite Tennant's (1992) reservations, I intend to keep using it.

In summary, I believe that I have a well-articulated path by which to lead dependent learning preference holders towards independent learning preferences. However, can I be sure that my students are truly dependent learners? Their behaviour and feedback usually suggest so, but I have no empirical, testable evidence of that. If I pitch the initial stages of the SSDL as overly dependent, I am just as unlikely to engage the students in their learning development as if I start to far along the path. Or, to rephrase the problem, as Tennant (1992) suggests, I must supplement Grow's model with some means of assessing the students for self-directedness to effectively use the SSDL. This question forms the basis for the current research. I must try to establish whether my students are truly dependent learners, as I assume, and if so, just how dependent they are (if possible).

IDENTIFYING STUDENT LEARNING PREFERENCES

My earlier research has identified two particular instruments aimed at determining learning preferences that I thought I might adopt: the Self-directed Learning Readiness Scale (SDLRS) by Lucy Guglielmino (1977) and the Student Orientation Questionnaire (SOQ) by Carl Christian (1982). Both attempt to measure where a student's learning preferences lie. The SDLRS attempts to establish whether and to what extent a student is ready to pursue self-directed learning (Guglielmino, 1977). This is important given the use of Grow's SSDL. The SDLRS may be able to determine where on the SSDL the student 'sits'. The SOQ more fundamentally attempts to measure whether the student has dependent or independent learning preferences (Christian, 1982). The SOQ was built using students in a military educational setting. This aligns well with my circumstances. My initial view was that if I could blend the two instruments, I could simultaneously measure where the students' preferences currently lay and how ready they were to move to more independent learning preferences.

I went back to the literature for guidance on the applicability of these instruments and any possibilities for using them simultaneously. I discovered that there has been a quite substantial debate about the efficacy of the SDLRS in repeated uses and whether it actually measures what it claims to measure. I present here a brief review of that debate.

In 1989, Lawrence Field published an article that systematically considered each of Guglielmino's claims for the SDLRS, repeating the statistical analysis of the PhD thesis in which the SDLRS was constructed, and considering the analysis that Guglielmino presented. He concluded that Guglielmino's arguments either supported his position (that the scale did not measure self-directed learning readiness) or where mis-directed or weak (Field, 1989).

Field's article ignited a storm of argument with two authors and Guglielmino providing defences of the SDLRS. McCune (1989) argued that Field too narrowly defined his analysis of statistical approaches and then applied the statistics incorrectly, invalidating his findings. Field later acknowledged the weakness in his statistical treatment but pointed out that it was not central to his argument (Field, 1991). Long (1989) describes a small number of (apparently) critical references that Field did not consider, which Long feels would have addressed many of the issues that Field raised about broader claims to the efficacy of the

SDLRS. Guglielmino (1989) directly refutes some of Field's comments about her thesis study, particularly over the Delphi technique. She also cites collections of unpublished data that (apparently) support the stronger statistical claims for item efficacy than Field obtained in his one study (Guglielmino, 1989).

Field had supporters for his position. In 1991, at the same time that Field responded to his critics, Adrienne Bonham (1991) offered her critique of Guglielmino's SDLRS from her own analysis. Bonham develops her position by considering what the opposite of self-directed learning is, when viewed through low scores on the SDLRS. She finds that rather than 'other-directed' (dependent) learning, the opposite appears to be a dislike for learning. Consequently, the instrument is probably only really measuring the person's enjoyment of learning, not their readiness to learn in a self-directed manner (Bonham, 1991). Field concluded his response to his critics with the telling comment: "...the most significant issue in this debate may not be about the use of this particular scale at all but about whether, as Guglielmino (1989) and some of her associates imply, readiness for self-directed learning is a stable, context-independent construct that can be measured by a pencil-and-paper instrument (Field, 1991, p102-103)

In contrast to this vigorous debate on the efficacy of the SDLRS, Christian's (1982) Student Orientation Questionnaire (SOQ) receives little attention in the literature, at least of a critical nature. Several studies have used the SOQ and validated its effectiveness at discerning a pedagogic (dependent) preference from an andragogic (independent) preference.

In 1994, Delahyde and Smith (1995) compared the SOQ with the SDLRS (now renamed to the Learning Preference Assessment—LPA) and found that the SDLRS did have validity as a measure of andragogical preference, and consequently (they asserted), of self-directed learning readiness. They did caution that the SDLRS appeared to be more suited to 'mature age' students (over 20 years of age) and that this may be related to the idea that younger students have not yet full-developed their learning preferences (Delahyde & Smith, 1995). Importantly for this study, Delahyde and Smith found a strong positive correlation between the andragogical score of the SOQ and the overall score on the SDLRS. Although not close to a correlation of +1, which would indicate a replication of the measures and a redundancy in the instruments, the SOQ and the SDLRS appeared to provide similar indicators of independent learning preference.

However, despite Delahyde and Smith's (1995) support for the SDLRS and their refutation of Field's criticisms, they did not address a key issue raised by Field (1991): whether self-directed learning readiness can be measured using a survey instrument. Nor did they address Bonham's (1991) findings that the SDLRS actually measures a like or dislike of learning, rather than a readiness for self-directed learning. Consequently, in balancing the fact that the independent learning preference score of the SOQ was a correlate with the overall SDLRS score, the need to keep the actual instrument to a reasonable size, and some uncertainty about what exactly the SDLRS measured, I decided to proceed with only the SOQ for this research. We will now turn our attention to the research method as a prelude to presenting the initial findings.

SURVEYING STUDENT LEARNING PREFERENCES

As the SOQ was developed in 1982, I first reviewed the questions in the instrument to accommodate any language changes or teaching method changes from the last 20 years. I

also circulated the survey to my peers on the ADFA Teaching and Learning Committee for their ‘expert’ review. Small adjustments were made to two questions (Q23 and Q42) to improve their clarity without changing their intent. Question 6 was also reworded from a question about exams to one on assessment more broadly. The survey was then loaded into an online web-based survey tool and all questions were checked twice for accuracy of transcription.

The survey was then offered to a small focus group of students. The intent was to find if the students had any difficulty using the online survey tool or found any of the questions confusing. Focus group feedback showed that the survey was understandable but some limitations in the demographic questions I preceded the survey with were identified and subsequently corrected.

INITIAL FINDINGS

Survey Sample

The survey was offered to continuing students at the end of the academic year in 2005 as part of their online re-enrolment process. Students were provided with a brief introduction to the survey and its objectives by me at an enrolment assembly at which handouts giving detailed project information and seeking formal consent to participate were distributed. Students were also offered a small incentive (a \$10 lunch voucher at the campus café) to participate. Those students that chose to participate visited the survey website and completed the survey online after completing their online enrolment for 2006. This activity took place in their own time, with a deadline set for the completion of enrolment used as the closing date for survey responses (three days from the introduction of the survey). Forty-six respondents from a student body of approximately 500 completed the survey (9%).

In January 2006, the same survey was offered to new students to ADFA. The same approach was used and the same incentive was offered. Initial enrolment at ADFA is also conducted online, however, students are asked to enrol online in computing labs supervised and supported by Student Administration staff. Consequently, reminders of the existence of the survey and the incentive to participate were made prominent to the students during their enrolment. One hundred new students participated in the survey from an enrolment class of approximately 373 (27%).

Survey returns were downloaded from the survey database and analysed using Microsoft Excel 2003. Table 1 presents the demographic data for respondents.

Table 1: Summary Demographic Data for Survey Respondents (from project data)

	Survey	UNSW@ADFA
<i>Overall</i>	146 (14.7%)	992 (100%)
<i>Gender</i>		
Male	119 (81.5%)	795 (80.1%)
Female	27 (18.5%)	197 (19.9%)

<i>Progress</i>		
First Year	111 (76.0%)	373 (37.6%)
Second Year	17 (11.7%)	261 (26.3%)
Third Year	15 (10.3%)	237 (23.9%)
Fourth Year	3 (2.0%)	95 (9.6%)
Other	0 (0.0%)	26 (2.6%)
<i>Service</i>		
Air Force	64 (43.8%)	353 (35.6%)
Army	59 (40.4%)	406 (40.9%)
Navy	23 (15.8%)	192 (19.4%)
Civilian	0 (0.0%)	1 (0.1%)
Not Indicated	0 (0.0%)	40 (4.0%)
<i>Degree</i>		
Arts	35 (24.0%)	278 (28.0%)
Business	15 (10.3%)	94 (9.5%)
Engineering	43 (29.5%)	287 (28.9%)
Science	25 (17.1%)	229 (23.1%)
Technology	28 (19.2%)	104 (10.5%)
<i>Age</i>		
Under 18	34 (23.3%)	0 (0.0%)
18	60 (41.1%)	106 (10.7%)
19	22 (15.1%)	211 (21.3%)
20	12 (8.2%)	259 (26.1%)
21	11 (7.5%)	170 (17.1%)
22	1 (0.7%)	81 (8.2%)
23	2 (1.4%)	49 (4.9%)
24	2 (1.4%)	19 (1.9%)
25-29	0 (0.0%)	36 (3.6%)
30-34	0 (0.0%)	44 (4.4%)
35-40	2 (1.4%)	14 (1.4%)
Over 40	0 (0.0%)	3 (0.3%)

Table 1 illustrates that the survey has, on many levels, captured a fairly representative sample of the overall population. A 14.7% return rate is quite good, given the voluntary nature of the survey, and particularly the lack of ability to prompt re-enrolling students to participate. The gender balance in the survey sample and the overall population are essentially the same. The ability to remind students works well for response rates, as indicated by the relatively high return rate for First Year students, who completed the survey as part of their supervised online enrolment process. The lower return rate from the latter year students is a little disappointing. However, the intent is to use the survey longitudinally, so the real issues will arise if I cannot maintain a good return rate amongst new Second Year students during re-enrolment. The same skewed distribution arises in the age categories too. Again, a large number of 18 year olds (and younger) is symptomatic of a large response rate for First Year students because of the additional prompting to participate. (I cannot explain why 34 respondents self-categorised as Under 18 where the Student Administration figures show the lowest age as 18.)

The distribution of respondents across the three forces is acceptable, although slightly loaded to the Air Force (compared to the overall student body). In this initial survey execution, it is difficult to say if this is a problem or not. Similarly, responses are slightly down in the Arts and Science degree and slight up in the Technology degree (compared to the overall student body) and the effect of this is difficult to determine with only the single survey offering. It should be noted that the Technology degree is predominantly undertaken by Air Force cadets and so the larger proportion of them in the survey sample and the relatively large proportion of Technology degree candidates are two views of the same phenomenon.

Overall then, the survey sample is skewed towards younger, First Year students, which is a result of the additional impetus for those students to participate. While this might detract from the analytical potential of the first survey administration, it does set a useful benchmark for future longitudinal comparisons. I will be cognisant of the need to encourage latter year students to participate in the survey in the hope of getting a high proportion of the First Year respondents to repeat the survey next year. There is also a slight bias towards Air Force cadet respondents, but I am uncertain of the likely effect of that in this (and future) analyses. It will be monitored and, where appropriate, suitably controlled for in statistical analyses.

Initial Results

Christian established that respondents whose score fell into the first quartile overall were thought to demonstrate ‘pedagogic’ (dependent learning) preferences and respondents whose score fell into the fourth quartile were demonstrating ‘andragogic’ (independent learning) preferences. In these results, the first quartile for the whole sample included scores up to 146, and the fourth quartile included scores greater than 159.75. With these parameters in mind, Table 2 presents the mean scores when results are categorised by various demographic groups.

Table 2: Means and Deviations of Various Demographic Groups (from project data)

Overall	First quartile < 146 Fourth quartile > 159.75 X = 153.42; $\sigma = 9.93$
Gender	
Male	X = 153.35; $\sigma = 9.88$
Female	X = 153.74; $\sigma = 9.99$
Progress	
First Year	X = 153.82; $\sigma = 9.44$
Second Year	X = 154.18; $\sigma = 11.36$
Third Year	X = 149.73; $\sigma = 10.21$
Fourth Year	X = 153.00; $\sigma = 12.08$
Service	
Air Force	X = 151.72; $\sigma = 10.07$
Army	X = 154.90; $\sigma = 8.73$
Navy	X = 154.39; $\sigma = 11.40$
Degree	
Arts	X = 156.03; $\sigma = 11.11$
Business	X = 149.67; $\sigma = 8.30$
Engineering	X = 153.30; $\sigma = 8.15$
Science	X = 154.36; $\sigma = 9.29$

Overall	First quartile < 146 Fourth quartile > 159.75 X = 153.42; $\sigma = 9.93$
Technology	X = 151.54; $\sigma = 10.97$
<i>Age</i>	
Under 18	X = 152.41; $\sigma = 9.02$
18	X = 153.37; $\sigma = 8.28$
19	X = 153.73; $\sigma = 10.51$
20	X = 162.58; $\sigma = 13.17$
21	X = 152.73; $\sigma = 9.85$
22	X = 143.00; $\sigma = 0.00$
23	X = 145.00; $\sigma = 4.00$
24	X = 142.00; $\sigma = 3.00$
25-29	No respondents
30-34	No respondents
35-40	X = 143.00; $\sigma = 3.00$

Inspection of Table 2 reveals that this execution of the survey has not revealed any reliably notable groups among the survey sample. Importantly, gender is clearly not a differentiator in student learning preferences (consistent with several other surveys, for example (Christian, 1982; Delahyde & Smith, 1995)). Indeed the means and standard deviations of the two gender groups are effectively identical and closely mimic the overall sample suggesting an extraordinarily consistent response between genders.

The First Year group, being easily the largest single group in the survey sample, also reflects a distribution of responses very similar to that of the population overall. The Third year group appears to be more ‘pedagogically’ inclined than other years, but with such a small number of respondents, it is difficult to be definitive. They also do not actually fall into the first quartile as a group either.

When considering the different services, only the change in distribution of responses is noteworthy, with the Army respondents more closely clustered around their mean than their Air Force or Navy peers.

Looking at the different educational careers selected, it appears that Arts students are more inclined to ‘andragogic’ preferences and Business students more inclined to ‘pedagogic’ preferences, but neither score is definitively within the respective quartile. Also, Engineers and Business students appear to have more consistent views of their preferences as a group than other degree candidates.

When the sample is considered along age groups some more interesting results appear; however, the apparently ‘andragogic’ 20-year olds and the apparently ‘pedagogic’ older students cannot be relied upon as the numbers of respondents in these groups, particularly the older age brackets are too small to be statistically reliable.

SUMMARY

Overall, then, the survey has captured data which, at the overall analysis level is not immediately insightful. The survey sample is appropriately representative given the expected

bias towards First Year respondents. There appears to be no difference in student learning preferences between genders. Other than those two statements, little else definitive can be said. However, the survey is still potentially useful. Further research will analyse the different groups in more detail, for example, breaking age groups and year of study down by Service and/or Degree to see if there are any clusters of preferences at that more detailed level.

More importantly, though, the survey has established a benchmark against which future executions of the same instrument can be compared to see if student body learning preferences change over time, and if particular cohorts of students change their preferences over time. This is the fundamental purpose of the survey and a good start has been made.

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