

The Self-Directed Learning Readiness Survey as a Predictor of Success in a Problem-Based Learning Environment

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SESSION C1: Integration of theory and practice in the learning and teaching process

CONTEXT Charles Sturt University (CSU) launched a new engineering degree in 2016, with a strong focus on self-directed and self-motivated learning. Admission to the programme was based on ATAR, a secondary application form, and a candidate interview. Staff reflections at the conclusion of the first year showed that these three metrics alone did not sufficiently identify candidates able to complete topics, i.e. engineering content learning and assessment modules, at a sufficient pace to progress on to the latter stages of the course. In an effort to improve the recruitment and candidate evaluation process the staff decided to trial a survey measuring student perceptions of their readiness to partake in a self-directed learning environment.

PURPOSE The purpose of this study is to see whether students' scores on the Self-Directed Learning Readiness Scale (Guglielmino, 1977), or the Learning Preference Assessment (Guglielmino & Guglielmino, 1991), are predictive of eventual academic success specific to topic completion.

APPROACH The Self-Directed Learning Readiness Survey was administered on a volunteer basis amongst the student cohort in the first week of the first semester; the outcomes of the survey were compared to topic completion data and a student reflective prompt on the experience.

RESULTS Neither the quantitative or qualitative data showed any conclusive evidence connecting student perceptions of self-directed learning and topic completion. When controlling for sex, cohort, or school-leaver versus mature-aged, no strong correlations emerged between SDLRS scores and the number of topics completed. This is potentially a result of a small sample size, self-selection bias of participants, or lack of longitudinal analysis beyond the first 6 months.

CONCLUSIONS With neither student SLDRS scores, or written perceptions of self-directed learning, showing anything conclusive explaining topic completion in the CSU programme, other methods of administration or tools will need to be implemented in the future to better target the desired outcomes.

KEYWORDS Self-Directed Learning, Problem-Based Learning, Topic Completion

CONTEXT

Charles Sturt University launched its engineering programme in 2016 on the foundation of a self-directed learning paradigm coupled with a series of engineering challenges and industry placements. The admissions procedure involves potential candidates submitting their transcripts, ATAR, and take part in an interview with CSU staff. The results of this process have shown a wide range in academic performance by admitted students, made particularly visible in their rates of topic completion (Sevilla, Senevirathna, Li & Lindsay, 2016). As a result of the breadth of academic performance between the first and second cohorts, additional predictive mechanisms have been trialled.

PURPOSE

The purpose of this study was to analyse if student perceptions of self-directed learning readiness translated into academic performance, particularly in regards to topic completion. Self-directed learning as an educational phenomenon has many different definitions and interpretations (Chi, 2009). For this study, we used Gureckis and Markant's definition of self-directed learning which states "allowing learners to make decisions about the information they want to experience" (Gureckis & Markant, 2012, p. 465). This distinction has implications for both what is learned and what is learnable. The central premise of the self-directed paradigm is agency in choice of content, along with the ability to situate oneself within their existing knowledge schema, as opposed to passive learning in which the choice of information selected is limited and directed by the instructor (Rehder & Hoffman, 2005). The combination of agency of choice of learning material along with objective metrics to assess one's progress have both been shown to be powerful tools in supporting students' efficacy beliefs (Schunk & Pajares, 2002) and act as a theoretical backbone for the CSU programme.

CSU's engineering programme was founded in 2016 under a self-directed learning paradigm in which students have access to a wide array of pre-requisite-free content from Day 1 of the programme and can progress through additional content at a pace of their choosing. This method of progression through an engineering degree is unique in that once students begin the degree, they are required to guide their own pathway and rate of topic completion as there are only two major milestones at 18 months, and again after four years of placement.

Given the self-directed nature of the programme, the Self-Directed Learning Readiness Scale (SDLRS) was administered to both the first and second cohorts to assess if there exists a correlation between their SDLRS scores and their topic completion performance. The SDLRS is a 58-item survey instrument that was developed by Guglielmino (1977) and modified later to the Learning Preference Assessment (Guglielmino & Guglielmino, 1991) in an attempt to remove respondent biases associated with the previous instrument name. Given the self-directed nature of the CSU programme, the results of the SDLRS were used to see if any trends emerged that could explain student performance towards topic completion in the programme.

APPROACH

In addition to the SDLRS survey data, we collected qualitative data obtained from student responses to a reflection prompt. Students completed written reflections, where they reflected on their a) understanding of self-directed learning and b) identified areas for improvement in the following weeks of the semester. The reflections on self-directed learning were completed in participants' first-year, first-semester of the programme in the context of a design and project-based course.

Students selected to use the self-directed learning themed reflection from several options, which focused on other themes such as teamwork, service learning and ethics. At the time of

this study, six students who participated in the SDLRS survey also utilised the self-directed learning reflection prompt.

To utilise students' written reflections, we extracted responses regarding their perceptions of self-directed learning. In this paper, we qualitatively analysed the response data from the first prompt: *"What does self-directed learning mean to you?"*

The study collected qualitative data from six of the 15 total participants, where the written reflections were best used to get further insights into students' perspectives on self-directed learning at this stage in their engineering studies.

RESULTS

Quantitative: SDLRS and Topic Completion

In total, 14 students completed the SDLRS survey which reports scores of 58-201 as below average, 202-226 as average, and 227-290 as above average with a mean of 214. Table 1 illustrates the results of the survey and the corresponding number of topics completed by each participant. The classifications from left to right designate male (M) or female (F), first (1) or second cohort (2), school-leaver (S) or mature-aged (M), and which student within this category (a, b, c, d, e).

Table 1: SDLRS vs. Topic Completion

Participant	Percentile	SDLRS Score	Topics at 6 Months
M1Sa	18%	193	7
M2Sa	66%	227	189
M2Ma	92%	254	125
F1Sa	60%	223	97
M2Sb	83%	241	112
F1Sb	63%	225	62
M2Sc	74%	233	70
F2Sa	76%	236	81
M1Sb	8%	181	107
M2Sd	69%	230	68
M1Ma	92%	253	15
M1Mb	76%	235	69
M2Se	69%	230	121
M2Mb	33%	205	122

In addition to the raw data shown in Table 1, a graphical representation illustrates these results in Figure 1.

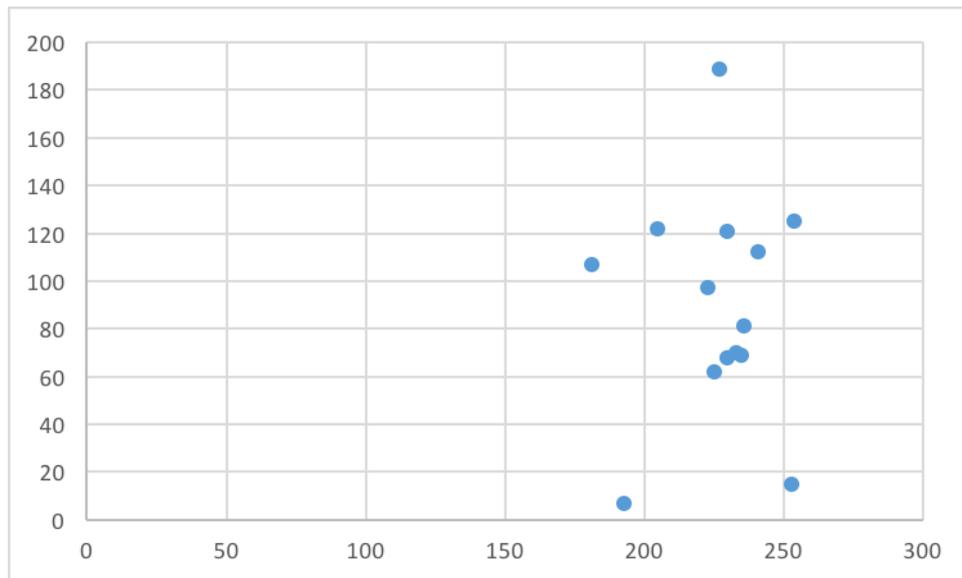


Figure 1: SDLRS Score vs. Topic Completion Across Cohorts

As shown in Figure 1, the statistical analysis was inconclusive. When controlling for sex, cohort, or school-leaver versus mature-aged, no strong correlations emerged between SDLRS scores and the number of topics completed. This is potentially a result of a small sample size, self-selection bias of participants, or lack of longitudinal analysis beyond the first 6 months. Given that CSU's first major topic completion milestone occurs at 18 months into the programme, this may be a better measure of the effects of students' perceptions of their readiness to embark on a self-directed learning curriculum.

Qualitative: Student Perspectives on Self-Directed Learning

We utilised student perspectives on SDL, based on their qualitative feedback, to provide context for the SDLR survey responses. We extracted responses from participants that completed both the SDLR survey and SDL reflection, "*What does self-directed learning mean to you?*" The qualitative findings support the context of SDL in this study, and provide possible comparisons with the existing definition, and models of SDL.

Participants reflected on the meaning and application of self-directed learning in various ways. The student responses suggest qualitatively different perceptions of self-directed learning, and how it applies to their own studies. When asked about the meaning of self-directed learning students responded:

P2: "Self-directed learning involves several aspects including, self-motivation and self-discipline. When a balanced is attained productive self-directed learning can be achieved."

P5: "Self-directed learning is the process in which an individual has the responsibility to identify their learning needs and to act in a manner that meets all learning needs. This means that the certain person must be willing to self-learn content, although help may be provided upon requesting, and ensure that they have learnt what's required."

The responses from participants P2 and P5 display an awareness of self-directed learning as a framework to utilise self-motivation, and discipline, in order to identify and learn content. These participants also linked self-directed learning to an interest in 1) learning, 2) possessing an interest in the material, or 3) acknowledging the material is applicable to their current work, e.g. design projects. Participant P2, goes on to describe that "I am more driven to learn the subject content of topics when I am interested in the topic, or when the topic is relevant to the design challenge that I am working on [sic]." Participant P5 forecasts that the

motivation to “self-learn content” is due to needing this skill in the workforce, e.g. “...that out in the workforce, no one will be next [to] an engineer telling them how to do their job.”

Other participants responded with their perspectives of self-directed learning:

P1 “ Self-directed learning involves an individual being able to learn without the assistance of an academic or peer. Work is completed entirely by the individual without any help.”

P6: “Self-directed learning means that an individual is able to learn, reflect and improve regarding events constantly without anybody explicitly informing the individual the result. Individual is aware of the environment and able to process what is required that are not yet acquired, then proceed to leaning the information with credible sources, thus requirement could be met in a professional manner.”

These types of responses focus on learning from a more independent approach. Self-directed learning is also without the assistance of peers or academics, or someone explicitly directing the student. Participant P6 expanded on the role of the individual in the learning experience, where the individual also needs to acknowledge what they know, do not know, and how to acquire the relevant information for learning.

We point out that the participants are first-year students (first-year technically within the identified curriculum in this study), and acknowledge that inexperienced students are more challenged with minimal guidance. Participant one (P1) highlights the possible difficulty in understanding how self-directed learning can be utilising more than the individual component related to learning, i.e. support from instructors and peers.

Participants P3 and P4 chose to reflection on how they could improve their approach to self-directed learning, including how to seek better resources or document their learning process. In these instances, the respondents placed responsibility on the individual on the way information is acquired and how it it can be used to help them progress in their degree.

P3 “My goal [for self-directed learning] is to seek better resources when researching a topic.”

P4: “The element of self-directed learning that I wish to improve upon is the documentation of learning, an aspect that I perceive as integral within the [course] curriculum.”

The definitions and perspectives varied from participant to participant, however statements made by participants expose some elements related to the learner making decisions about what they chose to experience, which aligns with the Gurecki & Markant (2012) definition of self-directed learning.

CONCLUSIONS

Based on the data collected for this study, the SDLRS cannot be used as a sole predictor of academic success in a primarily self-directed learning environment nor students’ perspective on the meaning of self-directed learning. While this study is greatly limited by sample size, larger participation in the future would likely provide greater clarity as to the value of the SLDRS as a predictor of performance in a self-directed learning programme. What is clear at this junction is that with a small sample size, the data is susceptible to strong outliers, and further, with the data being collected in the first 6 months of the programme, that various types of behavioural changes pertinent to topic completion soon emerged prior to the 18 month-240 topic deadline were not represented.

Moving forward it will be important to trial the methods outlined in this paper on a wider sampling of students across cohorts and triangulate this data with further performance metrics across the active cohorts in the programme. Lastly, beyond student perceptions of ability, it will also be valuable to explore various methods of scaffolding students to adjust to

the realities of a self-directed paradigm so that they can be successful within the context of the programme and beyond.

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