Nursing Students' Self-regulated Learning Skills for Online Learning

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Abstract

Background

Universities have been working to adopt more flexible approaches to teaching and learning. New approaches have been accelerated by the coronavirus pandemic whereby university nursing programs have moved more learning into online environments to continue delivering education and supporting nursing students to progress in their study. However, there is significant evidence to suggest that many students remain comfortable with traditional methods of learning. Nursing students in particular prefer to learn by experience and reflection. An important attribute for online learning is related to students' self-regulated learning (SRL) skills. The aim of the study was to explore nursing students' SRL readiness for online learning environments.

Methods

A convenience sample of one hundred and fifty undergraduate nursing students who were enrolled in the first year of nursing program participated in an online survey. The survey instrument was a Self-Directed Learning Instrument which had previously been used to measure the students' readiness for self-regulated learning.

Results

Results indicated that students were motivated to improve in their learning and enjoyed finding answers to questions. They also agreed that they continued learning even when they faced difficulties. In contrast, they often did not know what they had to learn; they struggled to manage their learning time, find learning resources, monitor their progress, and self-evaluate their learning outcomes.

Conclusions

Providing opportunities to develop nursing students' metacognition is important. Activities such as goal setting and planning, developing time management and assessment strategies, and making explicit support channels for online learning, as well as providing opportunities for self-reflection and self-evaluation strategies to enhance SRL can support this.

Background

It is widely reported that student engagement with online learning in university is inconsistent and is associated with complex factors.[1] This study was conceptualised and planned to support progress to online learning approaches in a nursing program at a university in Australia. Locally, it was evident from data extracted from formal course evaluations (both quantitative and qualitative), and from online learning platform analytics, that nursing students struggled to engage with content delivered in online environments. Subjects delivered via online platforms were consistently ranked noticeably lower than subjects delivered face to face. These local observations are well supported in the literature, which

suggests students find online learning 'boring' and disengaging and they lack motivation to learn.[2] Additionally, nursing students are considered to have predominantly divergent learning styles, that is, they are learners who learn through experience and reflection.[3,4]

While an extensive review of the literature highlighted multi-faceted issues associated with providing online learning, an important factor, regardless of learning styles that impacts effective online learning is related to students' self-regulated learning skills.[5,6] For this reason, the study described focused on identifying the self-regulated learning skills held by nursing students at a large university.

Data were collected in February 2020, just prior to the proclamation that the novel coronavirus had reached pandemic proportions, and before the implementation of online teaching and learning strategies designed in reaction to the pandemic, or as Pace, Pettit, and Barker[7] suggest, the 'crisis learning strategies'. The timing of the data collection was particularly meaningful, as it provided a baseline from which to understand the self-regulated learning skills of the students who had been thrust into this environment.

Prior to the emergence of the novel coronavirus, universities were already in the process of further developing opportunities for students to engage with online learning. However, since the devastating effects of the coronavirus have become apparent, universities have moved the majority of learning into online environments in order to continue to deliver education, and support students to progress through their programs of study.[8] However, this has been a significant change for many students, in that while teaching has continued, students may not be equipped with appropriate skills to self-regulate their learning.[9]

Much of the recent literature addressing online learning focuses on process issues. For example, Carey[10] suggests that the main issue is not whether online learning can provide quality education, but whether universities can adopt large scale online learning. Similarly, Ligouri and Winkler[11] highlight the issue of distance and scale in mass delivery of online learning. There is also literature that highlights issues such as accessibility (including affordability), and issues related to learning pedagogy.[12]

The adoption of online learning opportunities effectively assumes students have a skill set for learning in these environments. However, it is recognised that students may not have appropriate skill sets, nor are they prepared, to engage with learning in online environments.[8] As noted earlier, nursing students' preferred learning styles are associated with experience and reflection. Additionally, there is evidence to suggest more broadly that much of current teaching at university still reflects a top down approach, whereby the 'expert' academic delivers content to students who will hopefully absorb and learn from the academic in a face to face environment.[13] To engage nursing students in effective on-line learning environments requires a cultural shift in how curriculum is designed and delivered, and how students are prepared to engage in this type of learning environment. It is not clear how the 'crisis learning strategies' that emerged from managing the pandemic response will support this cultural shift without data on students' current self-regulated learning skills. [7]

Within universities there remain concerns among academic staff about students' attitudes and satisfaction with online learning, students' achievement of learning outcomes, potential changes in interactions between academic staff and students, and with academic staff satisfaction of teaching in online environments.[14] Indeed, Webb et al[15] report barriers to adoption of online learning related to academic staff not having time to develop skills, or poor recognition of the time it takes to develop skills, and students who lack literacy in online learning. Other concerns centre round evidence of the effectiveness of online approaches to learning.[16]

It should be noted however, that there is emerging evidence to suggest that learning outcomes for students who engage in online learning are as good, if not better, than with traditional approaches. Several authors report positive outcomes which may include improved test results and lower dropout rates, improved engagement with content and a strong sense of academic community.[17] There is further evidence to support the development of effective online learning opportunities regarding student satisfaction in terms of engagement, active and deeper learning and in critical thinking.[13,17–19] This is turn develops metacognition, and suggests better academic outcomes.[20]

Despite the emerging evidence that students can embrace online learning, the weight of evidence confirms they prefer high levels of interaction with teaching staff, and face to face learning is considered important.[6] McGarry et al[21] argue that it is critical that learning is designed to promote socialisation, rapport building and relationship maintenance. A compounding issue is that many learners may not be equipped with skills to learn in online environments and struggle with technology, which hinders their learning.[22] This is particularly important for future registered nurses who are required to adopt lifelong learning approaches for continued professional development to maintain capability to practice.[23]

Developing online learning opportunities has been challenging and remains challenging for nursing academics. The university teaching and learning environment is underpinned by tenets of andragogy as a way of understanding how students, as adults, learn. Andragogical approaches to teaching shift the focus from education being teacher-focussed, to education that is learner-focussed.[24] Knowles[25] identifies six principles that underpin andragogical approaches to teaching. The principles include recognising adult learners as having an intrinsic motivation and readiness to learn, recognising the significance of their prior experience to their learning, acknowledging orientation to learning is through using problem-solving approaches, and that adults learn best when they are self-directed in their learning and value the relevance of the learning experiences.[26] Relating these skills to online learning environments, Lawanto et al[14] suggest that a critical skill for learners is self-regulated learning (SRL).

SRL is characterised by awareness of thinking (metacognition), use of strategies to enact learning, and motivation to learn, and reflects the characteristics of adult learning.[27]

SRL sits in parallel with and overlaps concepts of self-directed learning (SDL), which is where the learner takes initiative to manage their own learning.[25] In this study we use the term SRL. The self-regulated

learner is motivated and self-directed, has a strong internal locus of control, and strong communication and skills in technology. Importantly, self-regulated learners are prepared to embark on challenges and develop deeper understanding of content.[28] However, there is significant evidence to suggest that in university environments many students remain comfortable with traditional, passive methods of learning, and do not demonstrate adult learning characteristics or skills.[29]

This study will identify strategies to enhance self-regulation, monitoring performance and providing feedback and developing methods of meaningful engagement between staff and students using technology.[30]

Methods

Aim

The aim of the study is to explore nursing students' SRL readiness to identify opportunities that might enhance their learning skills in online learning environments.

Design

This study employed a quantitative survey design to measure nursing students' readiness for self-regulated learning.

Sample

A convenience sample of undergraduate nursing students who were first enrolled in their program of study in the first semester of the academic year at an Australian University was chosen for participation.

Data Collection

Students were recruited at the beginning of semester 1, 2020. Participants were sought by advertising the study via student emails and online learning platforms. Potential participants were provided with study information and a survey link. Students provided consent online prior to undertaking the survey. Students were also informed they could contact their subject coordinator via email if they had any questions about the study.

The Self-Directed Learning Instrument (SDLI) developed by Cheng et al[31] was employed to measure the students' readiness for self-regulated learning. The tool consists of 20 items that include four subscales: learning motivation, planning and implementing, self-monitoring, and interpersonal communication, and has been found to be a valid and reliable tool for identifying self-regulated learning abilities. The instrument uses a five-point Likert scale with scores from 1 (strongly disagree) to 5 (strongly agree); these scores represent the individual student's assessment of their own abilities (readiness). The *strongly disagree* represent a very low level of ability (readiness), whereas *strongly agree* represents a very high level of ability (readiness). The total possible score on the SDLI ranges from 20 to 100. Cronbach's alpha

for the total scale was .92. In the current study, Cronbach's alpha (α) showed the survey questionnaire as reaching acceptable reliability, α = .90.

Data Analysis

The data were entered and analysed using IBM SPSS Statistics 22.0. The datasets derived from the demographic information and the SDL readiness were initially analysed descriptively. Bivariate correlations were explored using independent t-test and one way ANOVA as appropriate. The significance level for all the analyses was set at $P < 0.05$.

Ethical Considerations

This study was approved by the institutional ethical committee. Participation was strictly voluntary. Informed consent was obtained when recruiting participants. All student participants were provided written information regarding the study. They were also made aware of their right to withdraw their participation at any time without any consequences. Data collection instruments did not contain information that could identify participants.

Results

A total of 250 questionnaires were initially sent to the potential participants, n=150 responses were received (the overall response rate: 60.0%), and of those, 136 responded and completed all the items in the questionnaires (valid response rate 54.4 %). The average age of the students was 20.69 years old ranging from 17 to 46 years old. The majority of participants were female (93.4 %) and 76 students (55.5%) were enrolled in only first year courses. Regarding their study experience, more than a third of the respondents had been studying at university for less than one year (n=50, 36.5 %).

Table 1

participant demographic data (n = 136)

Characteristics		n (%)
Age (year ± SD)		20.69 ± 5.18
	< 20	83 (61.0)
	Between 20 and 24	34 (25.0)
	25 ≤	19 (14.0)
Gender	Female	128 (94.1)
	Male	8 (5.9)
Enrolled in	Full time	135 (99.3)
	Part time	1 (0.7)
Enrolled only first year courses	Yes	75 (55.1)
	No	61 (44.9)
Experience studying at a university	Less than 1 years	50 (36.8)
	1 -3 years	67 (49.3)
	More than 4 years	19 (14.0)

This survey was undertaken to explore students' readiness for self-regulated learning. As reported in table 2, the average of the overall self-directed learning score was 80.49 (*SD* = 9.73). This suggested that nursing students were well-prepared and motivated to learn. The top four highest scoring items reported by students were related to learning motivation; the students hoped strongly to improve in their learning (*M* = 4.72) and enjoyed finding answers to questions (*M* = 4.30). They strongly agreed that they would not give up learning because they faced some difficulties, and their successes and failures also inspired them to continue learning. However, students scored lower in some items related to interpersonal communication and planning and implementation. The two lowest scored items were ability to arrange and control their learning time (*M*= 3.70), and ability to express messages effectively in oral presentations (*M* = 3.70). Of interest, the students also scored lower in monitoring their own progress and self-evaluating their learning outcomes.

Table 2

Self-directed learning index scores

Sub-scale	*Items*	*Mean*	*SD*
LM	I strongly hope to constantly improve and excel in my learning	4.72	0.47
LM	I enjoy finding answers to questions	4.30	0.87
LM	I will not give up learning because I face some difficulties.	4.24	0.81
LM	My successes and failures inspire me to continue learning.	4.23	0.72
SM	I can connect new knowledge with my own personal experiences.	4.21	0.73
IC	My interaction with others helps me plan for further learning.	4.17	0.79
PL	I set the priorities of my learning.	4.12	0.79
SM	I understand the strengths and weakness of my learning.	4.09	0.68
IC	I would like to learn the language and culture of those whom I frequently interact with.	4.09	0.89
IC	I am able to communicate messages effectively in writing	3.99	0.85
LM	Regardless of the results or effectiveness of my learning, I still like learning.	3.98	0.83
PL	I can pro-actively establish my learning goals.	3.90	0.88
PL	I know what learning strategies are appropriate for me in reaching my learning goals.	3.88	0.88
LM	I know what I need to learn.	3.86	0.82
PL	Whether in the clinical practicum, classroom or on my own, I am able to follow my own plan of learning.	3.85	0.87
PL	I know how to find resources for my learning.	3.82	0.93
SM	I can monitor my learning progress.	3.82	0.83
SM	I can evaluate my learning outcomes on my own.	3.81	0.86
IC	I am able to express messages effectively in oral presentations.	3.70	0.99
PL	I am good at arranging and controlling my learning time.	3.70	1.02
	Total	80.49	9.73

Note: LM: Learning Motivation, PI: Planning and implementation, SM: self-monitoring, IP: Interpersonal communication

The results revealed no statistically significant difference between the mean scores of overall and each subscale in any of the demographic variables (Table 3). However, the mean score of overall self-directed learning and the subscale of learning management, planning and implementation, and self-management

subscale were higher. This was most likely related to more experience at university. Additionally, the mean score of interpersonal communication in female students was higher than male students, and the mean scores of interpersonal communication of those enrolled in the first year of the program were higher than those enrolled in the second year of the program.

Table 3

Self-directed learning score according to demographic data

	Mean ± SD				
	Overall	Learning Motivation (LM)	Planning and Implementing (PI)	Self-Management (SM)	Interpersonal Communication (IC)
All students	80.49 ± 9.73	25.30 ± 3.00	23.24 ± 4.18	15.90 ± 2.37	15.93 ± 2.35
Age					
<20	80.35 ± 10.06	25.23 ± 3.05	23.41 ± 4.23	15.73 ± 2.42	15.98 ± 2.35
Between 20 and 24	80.29 ± 8.64	25.53 ± 2.62	22.79 ± 3.96	16.26 ± 2.25	15.71 ± 2.43
25 ≤	80.63 ± 10.21	25.21 ± 3.51	23.32 ± 4.23	15.95 ± 2.40	16.16 ± 2.27
AVOVA	F = 0.008, p= 0.992	F = 0.130, p= 0.878	F = 0.262, p= 0.770	F = 0.605, p= 0.547	F = 0.258, p= 0.773
Gender					
Female	80.54 ± 9.74	25.27 ± 3.03	23.29 ± 4.24	15.95 ± 2.38	16.02 ± 2.28
Male	77.75 ± 8.71	25.75 ± 2.55	22.50 ± 3.12	15.00 ± 2.14	14.50 ± 3.02
t-test	t = 0.79, p = 0.430	t = -0.435, p = 0.664	t = 0.517, p = 0.606	t = 1.106., p = 0.271	t = 1.797., p = 0.075
Enrolled only first-year courses					
Yes	80.37 ± 9.84	25.15 ± 3.17	23.15 ± 4.61	15.80 ± 2.37	16.28 ± 2.23
No	80.38 ± 9.55	25.49 ± 2.78	23.36 ± 3.62	16.02 ± 2.38	15.51 ± 2.54
t-test	t = -0.002, p = 0.990	t = -0.667, p = 0.506	t = -0.303, p = 0.762	t = -0.529, p = 0.598	t = 1.928, p = 0.056
Experience studying at a university					

Less than 1 years	79.74 ± 9.94	24.78 ± 3.29	23.30 ± 4.33	15.66 ± 2.23	16.00 ± 2.19
1 -3 years	79.72 ± 10.08	25.36 ± 2.95	22.78 ± 4.40	15.79 ± 2.53	15.79 ± 2.60
More than 4 years	84.37 ± 6.38	26.47 ± 1.93	24.74 ± 2.47	16.89 ± 1.97	16.26 ± 1.79
AVOVA	F = 1.907, p= 0.152	F = 2.268, p= 0.108	F = 1.653, p= 0.195	F = 2.036, p= 0.135	F = 0.328, p= 0.721

Discussion

Developing nursing students' skills in SRL requires attention to each phase of self-regulation, that is, forethought which includes goal setting and planning; performance which includes providing time management strategies, strategies for managing academic tasks such as assessment, and strategies to help students monitor their progress; and lastly, providing opportunity for self-reflection and self-evaluation.[32]

While nursing students in this study appeared to have some useful SRL skills, there were areas of self-regulation that would benefit from more support. The discussion focusses on four main areas - learning motivation, study planning and implementation, self-monitoring of progress and interpersonal communication.

Learning motivation

Learning motivation is defined as the inner drive of the learner, as well as the external stimuli that drive the desire to learn and to take responsibility for one's learning, and is critical in initiating and maintaining students' learning behaviours.[33,34] Motivation is essential for developing self-regulation in learning, and supports students to implement, monitor and evaluate their knowledge acquisition.[35] Additionally, when students are motivated it sets up a cycle whereby motivation leads to further engagement with online learning activities, and students develop the cognitive abilities to achieve in their academic work.[36]

Motivational processes include learners' self-perception of their own competence, confidence and autonomy in learning, and the use of strategies related to behavioural processes to create students' ideal learning environment.[37] While the nursing students in this study were generally motivated to learn online, and in particular improve their learning, knowing what to learn was identified as an area for improvement.

Strategies that can help develop students' motivation include providing conceptual supports such as embedding teaching processes that equip students with self-regulatory knowledge and skills into curricula. This includes helping to support the development of students' metacognition. Metacognition is defined as thinking about thinking or learning to learn.[38] Supporting students to develop metacognitive

strategies is particularly useful during forethought and performance stages of self-regulation, and include developing approaches such as providing educator and peer feedback, and strategies to promote goal setting, self-monitoring and self-evaluation. This can include students setting consequences for their learning behaviours (rewards or punishments), and ensuring appropriate learning environments to minimize distractions, and developing goal-directed and positive self-talk.[36,39] Nursing educators can support this by ensuring learning is relevant to future careers, and by providing mastery experiences for students. Metacognitive strategies are also important for promoting activities that support the third stage of self-regulation, that is, self-reflection. The final support is instrumental support which mainly refers to tools that inform and maintain students' metacognitive strategies such as checklists, learning diaries or learning tools.[32] These may be particularly useful for the divergent learning nursing students, and provide the opportunity for reflection.

Study planning and implementation

In supporting students to develop self-regulatory skills in planning and implementing their learning, it is important for nursing educators to make explicit where support channels are for online learning. This includes channels to seek clarification and feedback, but also channels for technical support.[40]

Supporting students to be focused on the present can help to increase their attention and maintain effort in studies.[41] Strategies to support students to manage their own learning can include utilizing non-academic student services who can help students understand and develop good study habits such as developing note taking skills, planning for assessment, organizing study loads and evaluating their performance.[6,42,43]

Nursing educators can support students to plan and implement self-regulated learning strategies by including assessment-focused learning activities so that students can understand their involvement in assessment.[44,45] Providing formative assessment opportunities has also been found to be important for supporting students to plan and implement their study.[6] Vonderwell and Boboc[4] and Perera-Diltz and Moe[45] suggest including rubrics in formative feedback as a way of guiding learning, developing students' skills, and providing opportunities for self-evaluation. Peer feedback can also be effectively used to promote learning, and to help students plan and implement their learning.[4] However, Knight and Steinbach[46] caution that promoting peer feedback is complex, and the process by which it is provided should be well thought out in advance.

As in supporting motivation, time management tools and checklists can also be useful to support students' self-regulation by providing clear information about course content, time commitments and due dates, as well as a way of monitoring their management of learning over a period of time.[47,48] Promoting the use of time management tools at the start of each semester, for example, course calendars, can help students organise study around other commitments such as other courses or employment.[40,49]

Self-observation

Self-observation is a critical process which includes the ability to evaluate one's learning processes and outcomes, and to make progress and allows students to track their performance and review their student environments and conditions.[32] Self-observation should focus on goals, expectations and interests.[18,34] There are two important components of self-observation: 1. self-recording and 2. self-monitoring. During self-observation students evaluate their performance and identify personal and causal factors related to performance. They also evaluate self-satisfaction and make adaptive or defensive decisions about their performance.[32,50] This can be facilitated by encouraging students to self-reflect or keep records of their performance and reviewing assessment performance and notes taken.[51]

Interpersonal communication

Related to interpersonal communication, there is significant evidence to highlight that mechanisms providing for student feedback to educators[52–54], educators' feedback to students, and student-educator interaction[55], is critical to effectively engaging students.[8] Trout[8] and Bawa[56] suggest that while online channels have been available to support students and provide opportunities for communication for a considerable time period, they have traditionally been used for students to initiate contact with educators. However, as noted by Krupnick[57], and Mantravadi and Snider[55] posting materials on online systems with no interaction or communication for the sake of it, is not effective in communicating with students. Fryer and Bovee[58], Mantravadi and Snider[55] and Swafford[59] suggest that providing clarity around assessment promotes the value of the assessment task, and then providing formative feedback to students is more effective in promotion of self-regulation and enhancing students' motivation to learn. Other strategies to enhance communication include responding quickly to students' emails and providing synchronous online class sessions and online office hours for consults.[52,59,60] Importantly, educators should recognise that students may also need to source other communication channels such as peer communication or channels that assist with technical support such as internet access or computer issues.[40]

Conclusion

Over recent years in universities there has been a concerted drive to deliver more learning via online environments. This was hastened exponentially in 2020 as a result of the novel coronavirus whereby students transitioned into fully online learning in a very short time period to enable them to continue to progress in their programs of study. It has long been recognised that many students struggle to engage with online learning, and lack of skills in SRL are an important factor. This study explored nursing students' SRL skills prior to moving to fully online environments and found there were areas of self-regulation in which students required support. Supporting development of SRL skills includes considering each phase of self-regulation, and includes attention to forethought, particularly interventions that help with goal setting and planning; performance which includes interventions to support time management, undertaking assessment tasks and monitoring progress and lastly developing interventions to support self-reflection and self-evaluation.

Declarations

Abbreviations

N/A

Ethics approval and consent to participate

The research and all research methods were conducted in accordance with the Declaration of Helsinki and ethical approval was provided by University of Queensland ethics committee (HREC2019001878) prior to the commencement of the study. Consent to participate from students was electronic and was sought by providing students with an information sheet via their online learning platforms, with a link to the study. After reading the information sheet students were asked to click on the electronic link to the survey provided if they consented to participation.

Consent for publication

N/A

Availability of data and material

Data has been stored in accordance with university ethical requirements. All data is presented in the main manuscript.

Competing interests

MT has a competing interest as she is an editorial board member for BMC Nursing. The remaining authors have no competing interests.

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Authors contributions

All authors have read and contributed to the manuscript and approve its submission.

MT – conception of study and design, writing of ethics application, data interpretation, drafting of manuscript

AH – development of study design, data analysis and interpretation, drafting of manuscript

BW – conception of study, writing of ethics application, recruitment of students by announcement, drafting of manuscript

AB – conception of study, proof reading ethics application, recruitment of students by announcement, drafting of manuscript

JD – conception of study, proof reading ethics application, recruitment of students by announcement, drafting of manuscript

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