The self–directed learning readiness and self–efficacy of nursing students in synchronous learning: A cross–sectional study

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Abstract

Background: Beyond the pandemic, synchronous online learning was found to be a reliable approach in undergraduate nursing education. The students' self-directed learning readiness and online self-efficacy are key to the successful implementation of this approach. Readiness determines the learner's needs based on contextual education, while efficacy refers to the students' confidence when completing online learning tasks.
Purpose: The current study aims to investigate the relationship between self-directed learning readiness and self-efficacy among undergraduate nursing students.
Methods: A descriptive correlational study was carried out to measure the undergraduate nursing students' readiness and efficacy using the Self-Directed Learning Readiness (SDLR) Scale and the Online Learning Self-Efficacy Scale. Upon completing data collection using a web-based survey, univariate descriptive and bivariate analysis with Pearson correlation were conducted.
Results: A total of 188 undergraduate nursing students participated in this study with an average age of 20.12 years old. The majority of nursing students (72.9%) within the program had a moderate SDLR level, while the mean (SD) SDLR was 149.95 (±12.24). Similarly, moderate self-efficacy was reported by the present study participants. The self-efficacy subscale of strength was categorized as high, while moderate levels of generality and magnitude were interpreted from the findings. The bivariate statistical analysis indicated a significant correlation between SDLRS and online self-efficacy ($r=0.298$, $p<0.001$). SDLR had significant correlations with each online self-efficacy subscale, including strength ($r=0.259$, $p<0.001$), generality ($r=0.259$, $p<0.001$), and magnitude ($r=0.259$, $p<0.001$).
Conclusion: In synchronous learning, the undergraduate nursing student's SDLR was found to have a positive relationship with self-efficacy. Provisioning the students' individual learning skills is necessary to enhance their readiness and consequently improve their acquisition of the educational outcomes.

Keywords: nursing students, self-directed learning readiness, self-efficacy, synchronous learning

Introduction

The COVID-19 pandemic has disrupted traditional modes of education and forced many countries to adopt online or hybrid learning models (Harjanto et al., 2023). This has posed many challenges and opportunities for synchronous learning in different contexts and settings. Synchronous learning refers to a method of learning where instruction and interactions occur in real-time, allowing for live communication between instructors and learners. This can take place through various technologies, such as video conferencing,

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webinars, and instant messaging platforms, enabling participants to engage simultaneously (Warden et al., 2013). While often facilitated in an online format, synchronous learning can also occur in classroom settings where immediate interaction is possible. This contrasts with asynchronous learning, where interactions do not happen in real-time, and students learn on their own schedule using tools like emails and recorded lectures (Zeng & Luo, 2023).

In the context of nursing education, synchronous online learning has become increasingly prevalent because it accommodates learners who are geographically dispersed or have other commitments, offering flexibility and accessibility (Meng et al., 2019). Additionally, it fosters opportunities for social presence, immediate feedback, and collaboration, which can lead to higher levels of engagement and satisfaction among learners (Noh & Kim, 2019). Despite its advantages, synchronous learning poses challenges such as managing technical issues, maintaining effective communication, and requiring learners to exhibit strong time-management and self-regulation skills.

Self-directed learning and self-efficacy are important factors in successful synchronous learning (Stephen & Rockinson-Szapkiw, 2021). Self-directed learning (SDL) is a process in which learners take the initiative and responsibility for their own learning by setting goals, selecting strategies, monitoring progress, and evaluating outcomes (Hwang & Oh, 2021). It is considered to be an essential competency for lifelong learning and professional development in nursing where the healthcare environment is constantly evolving (Soliman & Al-Shaikh, 2015). SE, the belief in one's ability to perform specific tasks or achieve certain goals, influences motivation, effort, persistence, and coping skills when facing challenges (Meng et al., 2019).

However, nursing students may have varying levels of self-directed learning readiness (SDLR) and SE for different subjects or topics, potentially affecting their engagement and achievement in synchronous learning environments (Hwang & Oh, 2021). This variability can be particularly problematic if students are not given sufficient flexibility to tailor their learning experience (Warden et al., 2013). Moreover, the relationship between SDLR and SE in the context of synchronous learning for nursing students remains understudied, representing a significant gap in the current knowledge.

Synchronous learning, while offering benefits such as real-time interaction and immediate feedback, also presents challenges for nursing students (Edelbring et al., 2020). These may include the need for high levels of SE to maintain motivation during live sessions, the requirement for effective time management skills, and the potential for technical difficulties that can disrupt the learning process (Al-Abyadh & Abdel Azeem, 2022). Understanding how SDLR and SE interact within this learning format is crucial for developing effective educational strategies (Wong et al., 2021).

Given these considerations, there is a clear need to investigate the relationship between SDLR and SE among undergraduate nursing students, particularly in the context of synchronous learning. This study aims to address this knowledge gap by examining how these factors are related to and potentially influenced by different modes of learning. The findings could inform the development of more effective synchronous learning experiences that cater to the diverse SDLR and SE levels of nursing students, ultimately enhancing their educational outcomes and preparing them for the demands of the nursing profession.

Materials and Methods

Design

A correlational descriptive research design was used in this study.

Sample and setting

This study included all eligible undergraduate nursing students from the School of Nursing, Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia, using the total sampling method. The study was conducted from May to November 2022. To determine the appropriate sample size, we used the G*Power 3.1.9.7 software for correlation analysis. Assuming a small effect size ($r = 0.25$), $\alpha = 0.05$, and power $(1-\beta) = 0.80$, the calculated minimum sample size was 123 participants. To account for potential non-responses or incomplete data, we aimed to recruit all eligible students. A total of 188 students participated, comprising first-year (n=67), second-year (n=62), and third-year students (n=59). The inclusion criteria were undergraduate nursing students who participated in online lectures and were willing to be research respondents. The exclusion criteria were students who were unable to attend due to illness, working class students, students on leave, and students who participated in the instrument's reliability testing. Students who participated in the reliability testing were assigned unique codes and subsequently excluded from the main study to prevent potential bias. All remaining eligible students were invited to participate in the main study.

Variables

In this study, the variables examined include self-directed learning (SDL) as the dependent variable and self-efficacy as the independent variable. SDL refers to the process in which students take the initiative, with or without the help of others, to diagnose their learning needs, formulate objectives, identify learning resources, select and implement appropriate learning strategies, and evaluate their learning outcomes. SDL is assessed using the Self-Directed Learning Readiness Scale questionnaire (SDLRS). Self-efficacy, the independent variable,

Table 1. Frequency distribution of students' demographic characteristics during synchronized learning (n=188)

Demographic characteristics	N	%
Gender		
Male	12	6.4
Female	176	93.6
Study Years		
First year	67	35.6
Second year	62	33.0
Third year	59	31.4
Age (Mean ± SD)	20.12 ± 0.91	
Video conference frequency		
≤ 3 times	96	51.1
>3 times	92	48.9
Video conference duration		
≤ 60 minutes	19	10.1
> 60 minutes	169	89.9
Type of devices used		
Smartphone/Tablet/iPad	17	9.0
Computer/laptop	169	89.9
Both	2	1.1
Turn on/off camera		
On	183	97.3
Off	5	2.7

Table 2. Frequency and Percentage Distribution of Students' Self - Directed Learning Readiness

SLD Readiness categories based on mean (149.95±12.24)	No	%
Low level SDL readiness	28	14.9
Moderate level SDL readiness	137	72.9
High level SDL readiness	23	12.2

Low: < Mean – SD; Moderate: Mean – SD < x < Mean + SD; High: > Mean + SD

Table 3. Mean score of nursing students' self – efficacy during synchronized learning

Student Self – Efficacy	Mean	SD	Interpretation
Student Self – Efficacy	39.13	6.88	Moderate
Domain 1: Strength	15.05	2.98	High
Domain 2: Generality	14.13	2.31	Moderate
Domain 3: Magnitude	9.96	3.04	Moderate

Student self – efficacy: low (9 – 26); moderate (28 – 45); high (46 – 63)
Domain: low (3 – 8); moderate (9 – 14); high (15 – 21)

is defined as an individual's belief in their capability to successfully engage in and complete the synchronous learning activities. It is measured using the Online Learning Self-Efficacy Scale (OSES).

Instruments

The Self-Directed Learning Readiness Scale (SDLRS) questionnaire consists of 40 items divided into three subscales: self-management, desire to learn, and self-control. The questionnaire items are assessed using a 5-point Likert scale, ranging from 1 for "strongly disagree" to 5 for "strongly agree." The students' SDL readiness is determined based on their total score on the questionnaire, with higher scores indicating greater SDL readiness. According to a previous study, the validity (r value) and reliability

Table 4. Correlation between self – directed learning readiness and self – efficacy during synchronized learning

Student Self – Efficacy		SDL readiness
Student Self – Efficacy	r	0.298**
	p	0.000*
Domain 1: Strength	r	0.259**
	p	0.000*
Domain 2: Generality	r	0.259**
	p	0.000*
Domain 3: Magnitude	r	0.259**
	p	0.000*

** r Pearson correlation is significant at the 0.01 level (2-tailed)
*P is significant at P < 0.05

(Cronbach's alpha) of this instrument is 0.268 and 0.90, respectively (Suryani et al., 2022).

The Online Learning Self-Efficacy Scale (OSES) instrument was adapted from the Online Learning Value and Self-Efficacy Scale developed by Artino in 2008. The instrument underwent cross-cultural adaptation before use. The main instrument consists of 27 items, including 18 items that measure the value of online learning and 9 items that measure the students' self-efficacy level in online learning. For this study, only the 9 items measuring the students' self-efficacy level were used to develop the 'self-efficacy scale on online learning' questionnaire. This scale used a 7-point Likert scale, where 1 represents "strongly disagree" and 7 represents "strongly agree." The scale is divided into three dimensions — strength, generality, and magnitude — each consisting of 3 items. To determine the overall self-efficacy score, the scores from all 9 items are summed, resulting in a total score ranging from 9 to 63. This total score is categorized into levels of self-efficacy: scores from 9 to 27 indicate low self-efficacy, 28 to 45 signify moderate self-efficacy, and 46 to 63 reflect high self-efficacy. Each dimension is scored by summing the 3 items associated with a given domain, with the scores then categorized into low, moderate, and high based on dividing the possible range into three equal parts (low: 3 – 8; moderate: 9 – 14; high: 15 – 21). The interpretation of the score is that higher scores indicate higher self-efficacy. A validity test was conducted involving six experts, selected based on their expertise in developing the learning processes in nursing and technology and e-learning programs (Yusoff, 2019). The results of the validity test showed an index value of 0.93. A reliability test was also conducted on the research instrument with 33 professional students (Wahyuningrum et al., 2021). The results of the analysis showed a Cronbach's alpha value of 0.72, indicating that the instrument was valid and reliable for use in research.

Data collection

The data collection technique used by the researcher was a questionnaire made using a Google Form. The Google Form contained questions related to the respondent's characteristics, such as their full name, class year, age, gender, and attitude towards participating in synchronous online learning, as well as core questions from the SDLRS and OSES instruments. After all respondents had completed the questionnaire and confirmed receipt of the completed questionnaire via email, the researcher closed the survey. During the data collection, the researcher monitored the Google Form database to ensure that the number of respondents met expectations, that all answers from the respondents were complete, and that each respondent's answer to each question was valid.

Data analysis

The data collected in this study was analyzed using the IBM SPSS software package, version 26 (IBM, 2019). To verify the normality of the data, the Kolmogorov-Smirnov test was employed. The categorical data was presented using numbers and percentages, while the quantitative data was described using means and standard deviations. In this study, categorical data included the demographic variables including gender and year of study. Numerical data comprised the primary outcomes of the research, specifically self-directed learning readiness (SDLR) and self-efficacy (SE). Both SDLR and SE were measured as continuous scores. The level of significance for the results obtained was set at ≤0.05. Additionally, the Pearson correlation coefficient was used to determine the relationship between the two normally distributed quantitative variables. This statistical method measures the strength and direction of a linear relationship between two variables, providing valuable insights into the associations between them.

Ethical consideration

In this study, the researchers adhered to research ethics with the primary goal of protecting the rights and well-being of the research subjects. As an ethical requirement, the data collection was only conducted after receiving approval from the ethics committee of the Faculty of Medicine, Public Health,

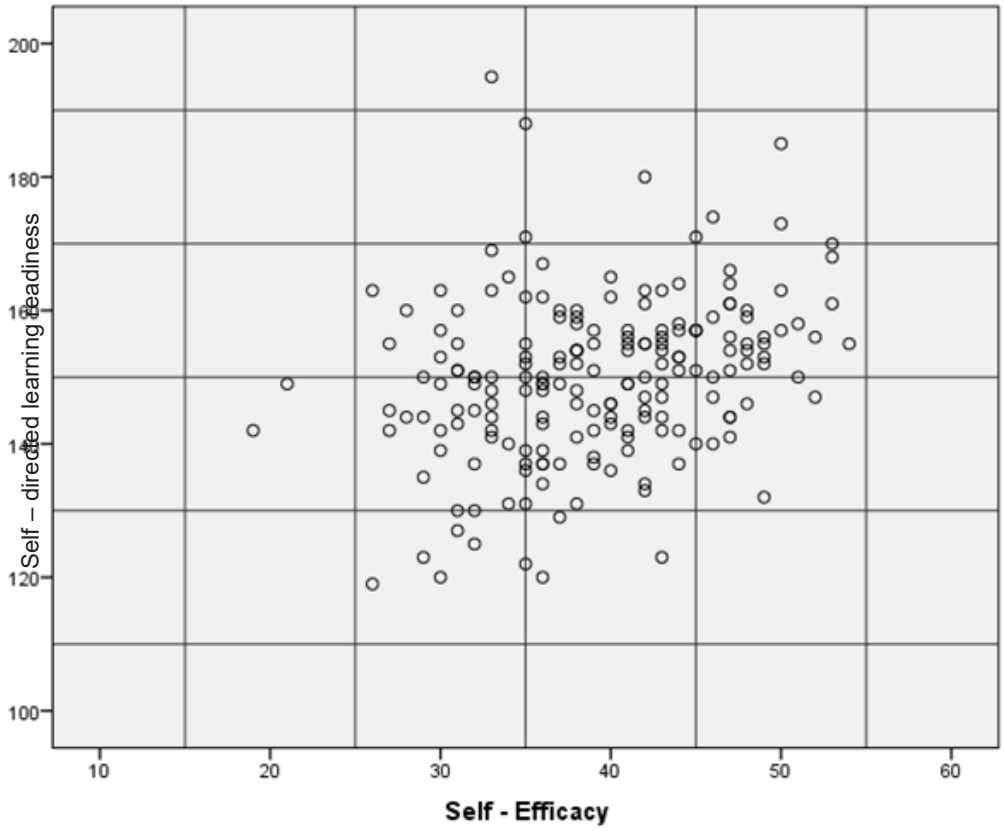

Figure 1. Correlation between self – directed learning readiness and self – efficacy during synchronized learning

and Nursing at Universitas Gadjah Mada – Dr. Sardjito General Hospital Yogyakarta. This research received ethical clearance from the Medical and Health Research Ethics Committee (MHREC) of FMPHN UGM, as indicated by clearance number KE/FK/1041/EC/2022.

Results

Characteristics of the respondents

According to Table 1, this study had a total of 188 respondents. The respondents were from three different grade years: 59 students (31.4%) from third year, 62 students (33%) from second year, and 67 students (35.6%) from first year. The majority of the respondents were aged between 20-22 years (72.3%), with a mean age of 20.12 (0.91) years old. The majority were female, coming to a total of 176 students (93.6%).

Self – directed Learning Readiness

According to Table 2, the majority of nursing students (72.9%) exhibited a moderate level of self-directed learning (SDL) readiness, with 137 respondents falling into this category. In contrast, 23 nursing students (12.2%) demonstrated a high level of SDLR, while 28 nursing students (14.9%) exhibited a low level of SDL readiness. The data suggests that the distribution of SDLR among the nursing students is skewed towards the moderate level.

Nursing students' self – efficacy during synchronous learning

Table 3 presents the mean score of self–efficacy among nursing students during synchronous learning, categorized by domain. The strength domain exhibited the highest mean score (15.05 ± 2.98), indicating a high level of self-efficacy in this domain. The generality and magnitude domains demonstrated moderate levels of self-efficacy, with mean scores of 14.13 ± 2.31 and 9.96 ± 3.04, respectively. Overall, the mean score for self-efficacy among nursing students was 39.13 ± 6.88, indicating a moderate level of self-efficacy across all domains.

The correlation between self–directed learning readiness and self–efficacy during synchronous learning

As shown in Table 4, a significant positive correlation was observed between SDLR and self-efficacy among nursing students during synchronous learning ($r = 0.298$, $p < 0.001$), highlighting that students who are more prepared for self-directed learning tend to also possess higher self-efficacy. This correlation, while statistically significant, is considered weak to moderate in strength based on the common

interpretations of correlation coefficients. The r-value of 0.298 indicates a modest positive relationship between SDLR and self-efficacy. This suggests that while there is a connection between these two variables, other factors likely contribute to both SDLR and self-efficacy. Furthermore, weak positive correlations were found between each domain (strength, generality, and magnitude) of self-efficacy and SDLR, with all domains exhibiting a correlation value of 0.259 ($p < 0.001$). These r-values also indicate weak relationships, suggesting that while strengthening both SDLR and self-efficacy could be beneficial for the students' learning success, other factors likely play significant roles in determining these outcomes.

Discussion

The present study aimed to investigate the SDLR and self-efficacy among nursing students during synchronous learning. The results revealed that the majority of nursing students exhibited a moderate level of SDLR, with a smaller proportion demonstrating high or low levels of readiness. In terms of self-efficacy, the nursing students demonstrated moderate levels across all domains, with the strength domain exhibiting the highest mean score. A significant positive correlation was observed between SDLR and self-efficacy, suggesting that higher levels of SDLR are associated with higher levels of self-efficacy among this population.

The majority of nursing students exhibited a moderate level of SDLR, indicating that they possess some degree of autonomy and motivation to engage in self-directed learning. However, there is still room for improvement, as a smaller proportion of students demonstrated high levels of SDLR. In terms of self-efficacy, nursing students demonstrated moderate levels across all domains, with the strength domain exhibiting the highest mean score. This suggests that nursing students have a moderate level of confidence in their ability to perform tasks and achieve their goals during synchronous learning. The significant positive correlation observed between SDLR and self-efficacy further supports the importance of these factors in the success of nursing students during synchronous learning. This is in line with a previous study that examined the relationship between self-directed learning readiness and online learning self-efficacy among undergraduate nursing students in Saudi Arabia. The findings of this study can be used to develop interventions to improve the students' self-directed learning readiness and online learning self-efficacy, which can ultimately lead to better academic performance, self–confidence and success in online learning environments (Broadbent & Poon, 2015; Harjanto et al., 2023; Idrizi et al., 2021).

A recent study investigated the efficacy of online-synchronous clinical simulation in relation to the learning and performance of medical students and the management of patients with COVID-19 in simulation centers in three Latin American countries (Díaz-Guio et al., 2021). The study found that online-synchronous clinical simulations improved the students' knowledge, skills, and attitudes regarding the care of patients with COVID-19. Another study explored the implementation of active learning methods by nurse educators in undergraduate nursing students' programs (Pivač et al., 2021). The study revealed that the use of various active learning methods in simulation settings improved the nursing students' critical thinking and communication skills. These studies suggest that synchronous learning and active learning methods can be beneficial for nursing education, as they can foster the development of SDLR and self-efficacy among nursing students (Geng et al., 2019). However, these studies also have some limitations, such as the small sample size, the cross-sectional design, and the reliance on self-reporting measures. More research is needed to examine the effectiveness and best practices of synchronous learning and active learning methods in nursing education, as well as other disciplines that require high levels of SDLR and self-efficacy.

Self-directed learning and self-efficacy can foster learner engagement, motivation, and satisfaction in synchronous learning, which are crucial for achieving positive learning outcomes. Engaged learners are more likely to participate actively and interactively in synchronous learning activities, such as lectures, discussions, and assignments. Motivated learners are more likely to persist and complete their synchronous learning courses. Satisfied learners are more likely to enjoy and appreciate their synchronous learning experiences.

Nursing educators can promote self-efficacy and self-directed learning readiness among students in several ways. One effective method is through the use of blended learning, which combines face-to-face instruction with online learning (Geng et al., 2019). This approach has been shown to improve the students' social involvement in the class and enhance their teaching presence. Prior training in learning technologies can also help to enhance student self-efficacy and self-directed learning readiness (Geng et al., 2019; Jowsey et al., 2020). Another way to promote self-efficacy and self-directed learning readiness among nursing students is by providing them with opportunities to engage in self-directed learning activities. This can be achieved by teaching self-directed learning skills to the students via training courses (Nazarianpirdosti et al., 2021). Self-directed learners control their learning experiences using a variety of cognitive or metacognitive strategies that lead to active participation in the learning process (Helen & Lorraine, 2012). In addition, nursing educators can promote self-efficacy among students by providing positive reinforcement and encouragement (Aras & Çiftçi, 2021). Verbal persuasion from teachers is an important source of self-efficacy in nursing education, and can help to boost the students'

confidence in their abilities and motivate them to achieve their goals (Harjanto et al., 2023; Robb, 2012).

Implications for practice

The implications of these findings are that synchronous learning could be a beneficial mode of delivery for nursing education as it could foster the development of SDLR and self-efficacy among nursing students. SDLR and self-efficacy are important competencies for nursing professionals, as they enable them to cope with the changing demands and challenges of the healthcare environment, and to pursue lifelong learning and career development. By enhancing these competencies, synchronous learning could improve the quality and outcomes of nursing education and practice. The findings also suggest that instructors should consider the individual differences in SDLR and self-efficacy, and provide appropriate feedback and support to facilitate learning.

Our study findings indicate that synchronous online learning is a highly effective modality for nursing education, particularly when fostering SDLR and self-efficacy among students. This approach allows for real-time interactions and immediate feedback, creating an environment that closely mirrors the collaborative and interactive nature of clinical practice. Synchronous learning promotes active engagement and helps nursing students develop confidence in their ability to participate in discussions, solve problems collaboratively, and apply theoretical knowledge to practice. These findings align with the prior research demonstrating that synchronous online sessions enhance interpersonal communication and engagement, both of which are critical for nursing competencies (Fabriz et al., 2021; Nwamu & Ni, 2023).

Additionally, our study supports the notion that synchronous learning, when implemented with appropriate instructional strategies and technological support, is comparable to and even more effective than traditional face-to-face learning in certain areas. This is particularly true when synchronous sessions are structured to include active learning components, such as live case studies or simulations. The combination of immediacy and interaction in synchronous learning provides a unique advantage for nursing students, enabling them to develop critical skills in a controlled yet dynamic, environment (Fabriz et al., 2021). Based on these findings, synchronous learning can be considered one of the best methods for nursing education, although its success relies on effective design, instructor preparedness, and institutional support (Nwamu & Ni, 2023).

Furthermore, the findings could inform future research on the effectiveness and best practices for synchronous learning in nursing education, as well as other disciplines that require high levels of SDLR and self-efficacy. Future studies should be also considered to explore the impact of other factors, such as motivation and learning styles, and to conduct longitudinal studies to examine the changes in self-directed learning readiness and online learning self-efficacy over time among nursing students.

Conclusion

In conclusion, this study found that the sample of nursing students exhibited moderate levels of self-directed learning SDLR and self-efficacy during synchronous learning. A smaller proportion of students demonstrated high and low levels of SDLR. The strength domain had the highest mean score among all domains of self-efficacy. A significant positive correlation was observed between SDLR and self-efficacy, indicating that higher levels of SDLR are associated with higher levels of self-efficacy. These findings suggest that promoting SDLR may enhance the self-efficacy found among nursing students in synchronous learning environments.

Declaration of Interest

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Data Availability

All data underlying the results are available as part of the article and no additional source data are provided.

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