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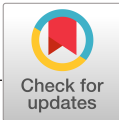
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Nursing students' views and satisfaction of their clinical learning environment in Singapore

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Abstract

Aims: This study aims to investigate final-year nursing students' actual perception of their clinical learning environment in Singapore.

Design: Descriptive cross-sectional survey.

Methods: An online survey based on the clinical learning environment inventory (CLEI; "Actual" version) was administered to final-year (third year) nursing students ($N = 301$) in a polytechnic in Singapore between May–July 2018.

Results: Most nursing students reported moderate satisfaction with their clinical learning environment, reflecting their positive (although not strongly positive) perceptions. Among the six constructs of the CLEI, the higher scores of the constructs of "Personalization" and "Task orientation" implied their greater contribution to the positive view. Conversely, the lower scores of "Individualization" and "Innovation" implied their lesser contribution. Additionally, the positive correlation between "satisfaction" and the other five CLEI constructs was found to be statistically significant.

KEYWORDS

clinical learning environment, nurses, nursing students, perceptions, satisfaction, Singapore

1 | INTRODUCTION

Clinical education provides essential and irreplaceable learning opportunities for nursing students in their pre-registration nursing education. A plethora of studies had contended the importance of clinical education that contributes to their valuable learning experiences from two perspectives. Firstly, clinical education facilitates the integration and translation of nursing students' theoretical knowledge from academia to practice, thereby enabling apprenticeship-based learning in a realistic clinical setting. This develops clinical skills crucial to their real-life professional practices (Chan, Tang, Choi, Liu, & Taylor-Piliae, 2018; Dunn & Burnett, 1995; Newton,

Jolly, Ockerby, & Cross, 2010; Sundler et al., 2014). Secondly, clinical education enables nursing students to gain exposure to the reality and demands of the job responsibilities of a full-fledged nurse and the wider healthcare environment. This enables them to form opinions and refine their expectations of nursing that prepare them for their future professional role (Egan & Jaye, 2009; Henderson, Cooke, Creedy, & Walker, 2012; Tang & Chan, 2019). Accordingly, a successful clinical education programme should aim to deliver a constructive and realistic learning experience to nursing students to ensure their competence and confidence in future practice. To this end, a supportive and favourable clinical learning environment is critical for promoting their optimal learning during clinical placements.

Institution where the work was conducted: Ngee Ann Polytechnic, Singapore.

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Clinical education is an inherent component of the pre-registration nursing programme in Singapore. Such pre-registration education is available in two tracks: the 3-year Diploma in Nursing offered by two local polytechnics and a private educational institution and the 3-year Bachelor of Nursing and the 4-year Bachelor of Nursing (Honours) by a local university (Singapore Nursing Board, 2019A, 2019B). On graduation from any of the institutions, the students earn the eligibility to practice as Registered Nurses. In both tracks, however, it is mandatory to incorporate clinical education lasting minimally 32 weeks (1,280 hr) into the nursing curricula (Singapore Nursing Board, 2019A, 2019B). In this regard, this study aims to elucidate nursing students' perception of their clinical learning environment in the context of Singapore. It is envisaged that such findings would support the local nursing students' clinical learning experiences, thereby enhancing the preparation for their professional nursing career.

2 | BACKGROUND

As nursing is a practice-based discipline, clinical placement is a fundamental approach to vocational-style learning: hence, learning opportunities should be maximized for nursing students to develop their confidence and competency in clinical performance. The clinical setting is an authentic platform to support nursing students in experiential learning by enabling them to apply theories from classroom-based teachings in realistic nursing practice (D'Souza, Karkada, Parahoo, & Venkatesaperumal, 2015; Newton et al., 2010). It also enables them to actively engage and interact with real-life healthcare professionals to achieve behavioural changes in preparing them for future professional practice (Bjørk, Berntsen, Brynildsen, & Hestetun, 2014; Thomas, Jinks, & Jack, 2015). The social dimension has been posited to underpin apprenticeship-based learning (Ramsbotham et al., 2019). Despite a paucity of relevant study in Singapore, a plethora of international literature have reported that nursing students' learning and professional socializing experiences, processes and outcomes are influenced by two aspects: the quality of the clinical learning environment and their perception of it during clinical placements (Erlam, Smythe, & Wright-St Clair, 2018; McBrien, 2006; Payne, Glaspie, & Rosser, 2014). This can, in turn, shape their professional identity and influence their choice of pursuing their future career paths as Registered Nurses (Courtney, Edwards, Smith, & Finlayson, 2002; Edwards, Smith, Courtney, Finlayson, & Chapman, 2004; Flott & Linden, 2016).

Some studies have revealed nursing students' tendency to view their clinical environments to be both stressful and challenging (Pulido-Martos, Augusto-Landa, & Lopez-Zafra, 2012; Timmins & Kalisz, 2002), while others have found their experiences to be rewarding and satisfying (Hartigan-Rogers, Cobbett, Amirault, & Muise-Davis, 2007; Perli & Brugnolli, 2009). The clinical learning environment has been described as "an interactive network of forces in the clinical setting that influences the students' clinical learning outcomes" (Dunn & Burnett, 1995, p. 1167). As the area where learning predominantly occurs, the environment is influenced by the complex dynamics with

other healthcare professionals, clinical teachers, patients and families (Liljedahl, Boman, Fält, & Laksov, 2015; Moos, 1974). Such dynamics, intertwined with the students' learning efficacies (Ramsbotham et al., 2019), contribute to their perceptions of the environment as either positive or negative (Smedley & Morey, 2010). Positive learning experiences have been cited by nursing students to originate from a favourable clinical learning environment: opportunities to participate in ward activities; clinical staffs' and teachers' commitment to maximize learning opportunities; their open communication and cooperation with their students (Lambert & Glacken, 2006; Perli & Brugnolli, 2009; D'Souza et al., 2015; Doyle et al., 2017); and good clinical supervision (Tiwaken, Caranto, & David, 2015). Conversely, negative experiences have originated from an unfavourable environment: under-appreciation; negative feedback; pressure from high expectations; being chastised and embarrassed by clinical staffs during clinical placements even for slight mistakes (Anthony & Yastik, 2011; Chernomas & Shapiro, 2013; Elcigil & Sari, 2007); and poor clinical supervision (Skaalvik, Normann, & Henriksen, 2011). These collectively imply that a supportive environment is instrumental in promoting and sustaining positive learning and workplace enculturation for nursing students to prepare themselves for practice.

Evaluation of a clinical learning environment, particularly the clinical setting, is central to assessing the effectiveness of clinical education components in the pre-registration nursing programme (Papastavrou, Dimitriadou, Tsangari, & Andreou, 2016). An understanding of nursing students' perceptions of the environment aids in formulating practical initiatives to meet their learning needs to improve their experiences in clinical placements (Serçekuş & Başkale, 2016). Despite having a plethora of overseas literature also researched on similar study interests, the variation of findings, as reported by these international studies, would imply generalizability of findings from one study to other contexts, which includes Singapore must be exercised with caution. This is because of the cultural and linguistic differences, and the peculiarities of the clinical environments and the wider nursing educational systems across different countries (Chan et al., 2018; Serçekuş & Başkale, 2016). To the best of our knowledge, such studies have been lacking in Singapore: only one such study has been identified for nursing undergraduates (Suen, Lim, Wang, & Kowitlawakul, 2016) and none for students at the diploma level. As most Registered Nurses in Singapore hold diplomas (O'Brien & Arthur, 2007), it is critical to examine the perception of students pursuing such credentials. These findings can aid both nursing faculties and healthcare institutions in promoting a conducive clinical learning environment that considers their learning and socializing needs.

3 | THE STUDY

3.1 | Aim

This study aimed to examine the perception among nursing students in Singapore of the clinical learning environments based on their experiences from past clinical placements.

3.2 | Study design

This study adopted a descriptive cross-sectional survey design in a polytechnic in Singapore from May–July 2018.

3.3 | Participants

This study recruited only final-year (i.e. third year) nursing students. The reason was the projected timeline of the data collection to be in the first semester of the academic year, by which time only final-year students would have completed minimally 480 hr of clinical placements. Conversely, in this period, the first-year students would not have had any placements and the second-year students would have undertaken only one placement. This choice would thus ensure a cohort relevant to the aim of the study since they could pertinently share their perception of the clinical learning environment.

The participants were final-year nursing students ($N = 480$) of the April 2016 cohort engaged in their 3-year pre-registration nursing education programme. They were currently pursuing their Diplomas in Nursing qualification in a local polytechnic with the second-largest intake of nursing students. The appropriate statistical sample size, determined through the Raosoft sample-size calculator, reflects that a minimum response rate of 214 would be needed to ensure a 95% confidence level and a margin error of 4.99%.

3.4 | Data collection

Two weeks before the data collection, prospective participants were contacted through their school emails by the principal investigator (first author). The email and the attached electronic version of the participant information sheet detailed the study and principal

investigator's contact. For ease of participation, an electronic version of the 42-item questionnaire (CLEI) was mounted onto Google survey. The data collection took place in the lecture theatres of the polytechnic, where the final-year nursing students attended their weekly lessons. It was undertaken at four separate timings to maximize the outreach to the entire cohort ($N = 480$). Prospective participants were then briefed on the study and provided with a QR code directing them online to complete the survey.

3.5 | Questionnaire survey

The clinical learning environment inventory (CLEI) developed by Chan (2001, 2002) was adopted for this study. Its underlying theoretical principles were based on Moos (1974, 1979), which focused on three dimensions that characterized the human environment to influence learning: relationship dimension, personal dimension and system maintenance and system change dimension (Moos, 1974). Moos (1979) asserted that all three dimensions must be incorporated in an instrument used to determine the learning climate. The CLEI is a common tool widely adopted by various international researchers to examine nursing students' perceptions of the clinical learning environment from perspectives of nursing students from different countries. This list of countries includes but not limited to Italy (Perli & Brugnoni, 2009), Australia (Henderson et al., 2012; Smedley & Morey, 2010), Greek (Papathanasiou, Tsaras, & Sarafis, 2014), Norway (Berntsen, Bjørk, & Brynildsen, 2017) and Ireland (Shivers, Hasson, & Slater, 2017), implying the international utility of the CLEI.

The CLEI is a 42-item Likert-scale questionnaire available in two versions: the "Actual" version and the "Preferred" version. The "Actual" version measures how nursing students rate their actual perceptions of and experiences with the clinical learning environment based on past clinical placements, whereas the "Preferred" measures how they

TABLE 1 Description of the clinical learning environment inventory (actual) subscales

Scale name	Scale description	Example of item	Correlation to Moos's dimension
Individualization	Extent to which students are allowed to make decisions and are treated differentially according to ability or interest	It is the clinical teacher who decides the student's activities in the ward	System maintenance and system change
Innovation	Extent to which clinical teacher/clinician plans new, interesting and productive ward experiences, teaching techniques, learning activities and patient allocation	The clinical teacher thinks up innovative activities for students	System maintenance and system change
Involvement	Extent to which students participate actively and attentively in hospital ward activities	There are opportunities for students to express opinions in this ward	Relationship
Personalization	Emphasis on opportunities for individual student to interact with clinical teacher/clinician and on concern for student's personal welfare	The clinical teacher goes out of his/her way to help students	Relationship
Task Orientation	Extent to which ward activities are clear and well organized	Students know exactly what has to be done in the ward	Personal development
Satisfaction	Extent of enjoyment of clinical field placement	Students look forward to coming to clinical placement	Personal development

Source: Chan (2003).

Category	Demographic characteristics	% of respondents (n)
Gender	Female	84.10% (253)
	Male	15.90% (48)
Age	18–20	50.80% (153)
	21–29	42.20% (127)
	30–39	5.00% (15)
	40–49	0.33% (1)
	50–59	0.66% (2)
	60–69	1.00% (3)
Are you currently sponsored by any healthcare institution?	Sponsored	53.80% (162)
	Not Sponsored	46.20% (139)

TABLE 2 Distribution of the study participants across demographics

rate their preferred (or ideal) environment (Chan, 2001). Both versions comprise six psycho-social constructs (Table 1): task orientation, individualization, personalization, teaching innovation, student involvement and satisfaction (Chan, 2003). Each construct consists of seven questions followed by four choices: “Strongly Disagree,” “Disagree,” “Agree” and “Strongly Agree.” The description of each construct, sample questionnaire related to each construct and its correlation to each dimension of Moos was shown in Table 1.

For this study, the “Actual” version was used for data collection, with written permission from the author (Chan, 2001, 2002). This version is appropriate for evaluating the participating nursing students' actual perceptions of their clinical environment based on their past experiences with clinical placement, hence would match the study's aim.

3.6 | Ethical considerations

This study was reviewed and approved by the Institutional Review Board (IRB) of the polytechnic (project code: NPIRB-P0016-2018-HS-WMW2). While written consent was not sought (the study involved online participation), the students' voluntary completion of the survey implied their consent to participation. Besides, for anonymity, demographical information that could identify the participants was not collected.

3.7 | Data analysis

The Statistical Package of Social Sciences (SPSS) version 22 was used in data analysis. All data were screened for missing responses and central tendencies. The normality and distribution of data were determined through the skewness and kurtosis. Descriptive statistics were used to summarize the students' demography and the six constructs of the CLEI. To delineate the students' overall satisfaction with the learning environment, Spearman's rank correlation coefficient and multiple linear regression were adopted to examine the relationship between the construct of “Satisfaction” and the other

five CLEI constructs (Chan, 2002). Statistical tests were performed with a two-tailed p -value of $<.05$, reflecting an acceptable level of statistical significance set.

3.8 | Validity, reliability and rigour

The validity and reliability of the CLEI (“Actual” version) were affirmed by the values of Cronbach α ranging from 0.73 to 0.84 (Chan, 2003). Prior to this study, a pilot study had been conducted with 50 final-year nursing students (not participants of this study) to assess the internal consistency of the instrument, with the values of Cronbach α ranging from the minimum of 0.47 (“Individualization”) to the maximum of 0.92 (“Satisfaction”).

4 | RESULTS

Out of the cohort of 480 final-year nursing students, 301 completed the online CLEI survey, giving a response rate of 63%. Data-cleaning techniques deployed to screen the raw data in the Excel spreadsheet for any missing or incomplete responses affirmed the validity of all the data sets. Given the 63% response rate, the Raosoft sample-size calculator revealed a 3.45% margin of error with a 95% confidence level.

The demographic profile of this study (Table 2) revealed that most of the participants (84.10%) were female, while 15.9% of them were male. Approximately half of the participants (50.8%) were aged between 18–20 years, 42.2% of them were aged between 21–29 years, and the least of the participants (0.33%) were aged between 40–49 years. Conversely, 0.66% of the study participants were aged between 50–59 years and only 1% of them were aged between 60–69 years, as shown in Table 1. Most of the participants (53.8%) had received sponsorship from their sponsored healthcare institution for pursuing their pre-registration nursing programme, while 46.2% are not sponsored.

The one-sample Kolmogorov-Smirnov test was deployed to evaluate the probability of normal distribution of the responses in

the survey. The data (Table 3) across all constructs are skewed to the left (or negatively skewed), with values ranging from -0.8 to -0.09 . With non-normality of the data as reflected by the measures of skewness and kurtosis (p -values $< .05$), the use of non-parametric statistical tests was justified.

The findings show that the final-year students held a moderately positive view of their clinical environment with an overall mean score of 3.16 of the CLEI. The mean scores of the six CLEI constructs ranged from 2.77 to 3.52 (Table 3), suggesting the nursing students' positive (though not strongly positive) perceptions. For the construct of "Satisfaction," its mean score of 3.36 implied that they were moderately satisfied with their clinical learning experience. The constructs of "Personalization" and "Task orientation" yielded the highest mean scores (3.52 and 3.42 respectively), whereas the constructs of "Innovation" and "Individualization" yielded the lowest (2.77 and 2.87), indicating the need to improve them.

Frequency scores (Table 4) of the CLEI ("Actual" version) were computed to analyse the responses to the individual questionnaire items. Most scores were positive, with an overall mean score of 3.16. Among the 42 items, the top three with the highest frequency scores construing a higher level of agreement are as follows (in descending order): (a) "Students in this ward pay attention to what others are saying"; (b) "The clinical teacher helps the student who is having trouble with the work"; and (c) "The clinical teacher considers student's feelings."

The Mann-Whitney U test (the non-parametric equivalent of the t test) was used to evaluate the significance of the mean differences based on gender and on sponsorships. In contrast, the Kruskal-Wallis test (the non-parametric equivalent of the one-way ANOVA) was used to compare all six age groups. Constructs with corresponding p -values not exceeding .05 were deemed significant.

Table 5 shows that each construct was aggregated according to the gender, age group and sponsorship to determine any differences in the participants' perceptions. Firstly, it was noted that, regardless of gender, the constructs of "Innovation" and "Individualization" needed improvement the most, while the others received positive responses. Nonetheless, no statistically significant differences were observed according to gender (p -value $> .05$), given the fewer male participants as evidenced by the male-to-female ratio of 1:5.

Secondly, when considering the age group as a factor for each construct, only the construct of "Individualization" was found to have a significant difference in the means ($H = 11.98$, $p = .035$). Age groups that revealed significant disparities in their responses were "18-20 and 30-39," "18-20 and 50-59," "21-29 and 30-39," "21-29 and 50-59" and "30-39 and 60-69" (p -values $< .05$). Dunn's test was used to conduct the non-parametric post hoc ANOVA to determine the pairwise multiple comparisons in age groups: the corresponding Bonferroni-corrected/adjusted p -values $\leq .05$ were deemed significant for any given pair. With the post hoc test to determine differences in the perception of "Individualization" among the pairs, the disparity could not be affirmed, given the distribution of the data across age groups (adjusted p -values $> .05$). This might be due to most of the younger groups aged < 30 (18-20 and 21-29) and the presence of fewer than five participants in the older cohorts (Table 5).

Thirdly, with sponsorship as a factor, no statistically significant differences were observed in the perceptions between nursing students with sponsorships by healthcare institutions and those without (Table 5). However, it could be noted based on this study's results that there may be a need to focus on the constructs that scored the least, such as "Innovation" and "Individualization" since most respondents had positive feedback on the other constructs.

TABLE 3 Key statistical measures of the six constructs of the clinical learning environment inventory comprising descriptive statistics (mean and (SD)), skewness, kurtosis, one Kolmogorov-Smirnov test (Z , (p -value)) for normality assessment

Construct	Definition	Mean	Skewness	Kurtosis	Normality assessment
Individualization	Extent to which students are allowed to make decisions and are treated differently according to ability or interest	2.87 (0.54)	-0.33	-0.22	1.78 (0.00)
Innovation	Extent to which clinical teacher/clinician plans new, interesting and productive ward experiences, teaching techniques, learning activities and patient allocations	2.77 (0.47)	-0.10	-0.28	2.13 (0.00)
Involvement	Extent to which students participate actively and attentively in hospital ward activities	3.01 (0.45)	-0.09	0.46	1.59 (0.01)
Personalization	Emphasis on opportunities for individual student to interact with clinical teacher/clinician and on concern for student's personal welfare	3.52 (0.62)	-0.80	1.33	2.01 (0.00)
Task orientation	Extent to which ward activities are clear and well organized	3.42 (0.53)	-0.51	0.80	2.11 (0.00)
Satisfaction	Extent of enjoyment of clinical placement	3.36 (0.70)	-0.72	0.67	1.75 (0.00)
Overall		3.16 (0.39)	-0.80	1.41	1.74 (0.01)

TABLE 4 Frequency score of the clinical learning environment inventory (CLEI) Actual version

CLEI items	Strongly disagree	Disagree	Agree	Strongly agree
The clinical teacher considers student's feelings	2.7	15.6	74.4	7.3
The clinical teacher talks rather than listens to the students	1.7	37.9	51.5	9.0
Students look forward to coming to clinical placement	10.3	35.2	48.8	5.6
Students know exactly what has to be done in the ward	6.3	35.9	52.8	5.0
New ideas are seldom tried out in the ward	2.0	22.9	64.5	10.6
All staff in the ward are expected to do the same work in the same way	5.0	38.2	46.8	10.0
The clinical teacher talks individually with students	1.7	13.3	71.8	13.3
Students put effort into what they do in the ward	0.0	3.3	69.8	26.9
Students are dissatisfied with what is done in the ward	3.0	52.2	39.2	5.6
Getting a certain amount of work done is important in the ward	0.0	3.7	69.8	26.6
New and different ways of teaching to the students are seldom used in the ward	1.3	20.3	68.1	10.3
Students are generally allowed to work at their own pace	15.9	42.5	38.2	3.3
The clinical teacher goes out of his/her way to help students	1.7	21.3	67.1	10.0
Students "clock watch" in the ward (can't wait till the end of the shift)	2.0	11.3	44.2	42.5
After the shift, the students have a sense of satisfaction	3.0	15.9	65.8	15.3
The clinical teacher often gets side-tracked instead of sticking to the point	2.3	43.2	47.2	7.3
The clinical teacher thinks up innovative activities for students	9.0	34.6	53.8	2.7
Students have a say in how the shift is spent	8.0	31.9	52.2	8.0
The clinical teacher helps the student who is having trouble with the work	1.7	14.0	74.8	9.6
Students in this ward pay attention to what others are saying	0.7	10.0	79.7	9.6
Clinical placements are a waste of time	24.9	53.5	17.6	4.0
This is a disorganized clinical placement	11.3	57.8	23.3	7.6
Teaching approaches in this ward are characterized by innovation and variety	4.0	29.2	62.8	4.0
Students are allowed to negotiate their workload in the ward	15.0	39.9	41.5	3.6
The clinical teacher seldom goes around to the ward to talk to students	4.3	44.2	43.2	8.3
Students have little opportunity to involve with the process of handing over to staff in the ward for the next shift	2.7	26.2	58.1	13.0
Clinical placements are boring	11.6	50.8	29.9	7.6
Ward assignments are clear so that students know what to do	8.0	27.9	55.5	8.6
The same ward staff member works with the students for most of the placement	13.6	34.9	48.5	3.0
Teaching approaches allow students to proceed at their own pace	6.0	27.2	61.5	5.3
The clinical teacher is not interested in students' problems	11.0	53.8	28.6	6.6
There are opportunities for students to express opinions in this ward	7.3	21.3	64.1	7.3
Students enjoy coming to the ward	8.3	37.5	50.8	3.3
Ward staff are often punctual	4.3	19.9	61.5	14.3
The clinical teacher often thinks of interesting activities for the students	11.0	41.2	45.2	2.7
There is little opportunity for a student to pursue his/her particular interest in this ward	2.0	28.6	60.5	9.0
The clinical teacher is unfriendly and inconsiderate towards students	9.4	62.1	26.2	2.3
The clinical teacher dominates debriefing sessions	2.7	27.5	59.5	10.3
Clinical placements are interesting	4.3	20.6	66.8	8.3
Workload allocation in the ward are carefully planned	5.3	23.6	66.4	4.7
Students seem to do the same type of tasks in every shift	2.3	18.6	60.1	19.0
It is the clinical teacher who decides the students' activities in the ward	4.0	35.2	51.5	9.3

TABLE 5 Mean scores of clinical learning environment inventory constructs according to demographic characteristics

	Constructs					
	Personalization	Involvement	Satisfaction	Task	Innovation	Individualization
Gender						
Male	3.56	3.14	3.37	3.47	2.79	2.90
Female	3.52	2.99	3.35	3.41	2.76	2.87
Age group						
18–20	3.57	3.03	3.32	3.41	2.77	2.87
21–29	3.51	3.01	3.41	3.46	2.75	2.93
30–39	3.48	2.87	3.40	3.34	2.77	2.54
40–49	4.14	2.86	3.71	3.43	3.71	2.86
50–59	2.29	2.93	2.00	2.50	2.64	1.93
60–69	2.81	3.19	3.48	3.33	2.86	3.19
Sponsorship						
Sponsored	3.54	3.03	3.38	3.47	2.82	2.97
Not sponsored	3.50	3.00	3.33	3.36	2.70	2.76

TABLE 6 Correlation of spearman rho correlation coefficient (*r*) between the scale "satisfaction" with the other scales of the clinical learning environment inventory (CLEI) for actual clinical learning environment

CLEI scale	Spearman correlation coefficient (<i>r</i>)	<i>p</i> -value
Personalization	.49	.000
Student involvement	.42	.000
Task orientation	.47	.000
Innovation	.27	.000
Individualization	.25	.000

The Spearman's rank correlation coefficient was used to assess the correlation between the construct of "Satisfaction" (outcome measure) and each of the other five CLEI constructs (independent variables). Data analysis revealed a positive correlation, correlation coefficients ranging from 0.25 ($p = .000$) for "Individualization" to -0.49 ($p = .000$) for "Personalization" (Table 6).

All constructs and confounding variables (gender, age group and sponsorship) significantly related to the construct of "Satisfaction" were included in the multivariate analysis. To predict the relationship between "Satisfaction" (outcome variable) and the other five constructs (independent variables), a multiple linear regression model was deployed. *R*-square and ANOVA tests were used to determine the model accuracy, and the normality of the residual errors was tested. Data analysis revealed the statistical significance of the positive correlations between "Satisfaction" and each of other three CLEI constructs: "Task orientation" ($\beta = 0.41$, $p = .00$); "Personalization" ($\beta = 0.32$, $p = .00$); and "Student involvement" ($\beta = 0.20$, $p = .02$). The independent variables account for 40.4% of the variance for the outcome variable of "Satisfaction" for the actual clinical learning environment (Table 7).

5 | DISCUSSION

This study complements the existing limited literature to better understand nursing students' perceptions of their clinical learning environment in the context of Singapore. The findings herein have demonstrated through the overall mean score of the CLEI that the final-year nursing students perceived their clinical learning environment to be positive (although not strongly so).

Among the six CLEI constructs, "Personalization" attained as the highest mean score in this study, a finding that was consistent with the literature (Berntsen & Bjørk, 2010; Papathanasiou et al., 2014; Smedley & Morey, 2010). This reflects the satisfaction among the participating nursing students with how their clinical teachers interacted with and cared for them; this thus has promoted a trusting relationship between them during the placement. The construct of "Personalization" is affiliated to the relationship dimension, one of three basic dimensions central to the human environment that emphasizes personal relationship to support learning (Moos, 1979). Given the complexity and unpredictability of the clinical setting, Campbell, Larrivee, Field, Day, and Reutter (1994) contended that nursing students as novice learners would face heightened stress and anxiety during their clinical placements, hence their perceived vulnerability. Thus, they would seek and value support, acknowledgement and respect during the placements (Chan, 2001). Accordingly, establishing a positive student-teacher relationship is vital to promoting their sense of belonging and learning experiences and to driving internalization of the profession (Killam, Mossey, Montgomery, & Timmermans, 2013; Levett-Jones, Lathlean, Higgins, & McMillan, 2009). Notwithstanding this argument, a positive collegial relationship is essential to a clinical learning environment that promotes effective apprenticeship-based learning and professional socialization for nursing students.

95.0% confidence interval for β						
Independent variables	Coefficient, β	Lower bound	Upper bound	p-value	R^2	F (p-value)
Personalization	0.32	0.19	0.45	.00	40.40%	40.07 (p = .000)
Student involvement	0.20	0.03	0.37	.02		
Task orientation	0.41	0.26	0.55	.00		
Innovation	0.11	-0.04	0.26	.14		
Individualization	0.01	-0.13	0.14	.92		

TABLE 7 Multiple linear regression with dependent variable, "satisfaction" and independent variables of the other scales of clinical learning environment inventory for the actual clinical learning environment

The construct of "Task orientation" gained the second highest mean score. This finding is distinct in that it differs from most literature, where lower scoring was accordingly reported for this construct with the use of the CLEI (Berntsen & Bjørk, 2010; Chan, 2001; Shivers et al., 2017; Smedley & Morey, 2010). In her seminal work "From Novice to Expert," Benner (1982) posited that novice nurses were beginning nursing learners lacking the situational experiences in the clinical setting; therefore, they would require clear instructions to guide their actions. This view was supported by Ip and Chan (2005). As nursing students fit into this description of novice learners, they should be offered an orientation programme to alleviate their fears and promote effective apprenticeship-based learning. Such a programme should ideally stipulate their expected learning outcomes and clinical teachers' expectations of them during clinical placements. This study confirmed the extensive commitment of clinical teachers in Singapore in meeting their nursing students' clinical learning needs.

The lowest mean scores were reported for the constructs of "Innovation" and "Individualization," and such findings echo the literature (Berntsen & Bjørk, 2010; Chan & Ip, 2007; Henderson, Twentyman, Heel, & Lloyd, 2006). The low score for "Individualization" indicates that, while the nursing students in Singapore desired some degree of autonomy, it was not offered to them. This concurred with Perli and Brugnolli (2009), who argued that the learning approach for nursing students was often more directed and top-down than self-driven and bottom-up. This finding thus implies that nursing students in Singapore were often deprived of opportunities to make their own adjustments to suit their learning pace and needs. Additionally, the low score for "Innovation" indicates that the clinical teachers in Singapore often overlooked the need for creativity in clinical education to engage the students. This resonated with Flott and Linden (2016), who attributed this to most clinical teachers' background: as they themselves had previously been practicing nurses before transiting to the educators' role, their limited exposure to and expertise in clinical pedagogies might be a hindrance. Collectively speaking, it is therefore advisable to not only improve on both areas of "Individualization" and "Innovation" in the clinical learning environments in Singapore, but also urge clinical teachers to embrace new teaching philosophies to support contemporary clinical learning needs.

To determine the nursing students' overall satisfaction of the clinical learning environment, Chan (2002) recommended measuring the relationship between the construct of "Satisfaction" and the other five CLEI constructs. This study accordingly reported a positive correlation, with multiple linear regression demonstrating that "Personalization," "Involvement" and "Task Orientation" represent strong predictors for the students' actual satisfaction of the environment. This finding corroborates those in the literature (Brown et al., 2011; Chan 200; Papathanasiou et al., 2014). As for nursing students who are novice learners undergoing experiential learning in a workplace, their involvement is essential to their professional training. Lave and Wenger (1991) and Solvoll and Heggen (2010) stressed that active participation and interaction with the environment are the cornerstone to mastering skills performance in apprenticeship-based learning. Yet, as aforesaid, students who felt vulnerable to the clinical environment would also value a sense of acceptance and belonging to support their learning (Henderson et al., 2010; Smedley & Morey, 2010). Under the recommendations from these studies, it is theorized that "Involvement" would complement "Personalization" and "Task orientation" to offer the holistic approach of student-centred clinical learning. The nursing students in this study have reported appreciation of being able to build an engaging and trusting relationship with their clinical teachers: this underlines the adoption of this holistic learning approach in Singapore-based clinical education.

5.1 | Limitations

This study has several limitations. Firstly, given the self-reporting methodology in the survey, response bias might have predisposed the participants to answering in a socially desirable manner rather than based on their own experience. Secondly, this study was conducted in only one local polytechnic; this may limit the generalizability of the findings. Thirdly, with a descriptive cross-sectional survey design, the use of a questionnaire restricted the collection of in-depth and pertinent information to understand the causes and effects of their experiences. Nevertheless, the favourably high overall response rate (>50%) and the fulfilment of the minimum sample-size requirement ensure the acceptability of the findings.

Correspondingly, recommendations for future studies should consider the following. Firstly, the curricula adopted by the educational institutions, individual experiences and factors in influencing perceptions of the clinical learning environment might vary among the nursing students. With that said, given this study was conducted in one higher educational institution, findings of this study might not be generalized to the wider population of nursing students throughout Singapore. Future research should consider replicating this study on a larger population to cross-examine any differences of experiences between pre-registration nursing students from various institutions in Singapore. This contributes to a more representative view and better understanding of factors to enable cross-learning of strategies among different institutions to improve the learning environment.

Secondly, future studies should consider collecting qualitative data to better elucidate the causes and effects of factors underlying their clinical experiences. The resultant insights will aid in developing better educational initiatives to improve their clinical experiences.

6 | CONCLUSION AND RELEVANCE TO CLINICAL PRACTICE

The results of this study have demonstrated the moderation satisfaction among nursing students in Singapore with their clinical learning environment based on their experiences from clinical placements. However, the two CLEI constructs, that is "Innovation" and "Individualization," warrant improvement, given their unfavourable performance as evidenced in this study. The construct of "Satisfaction" has herein been used as an outcome measure to delineate its relationship with other five CLEI constructs, as recommended by Chan (2002). This measure represented the interplay among factors governing the complexities of the clinical learning environment, which in turn would affect the students' satisfaction in clinical education. Accordingly, this highlights the need for closer collaboration between members of nursing faculties and healthcare institutions in strategically delivering clinical education. Such delivery should adopt a multi-factorial perspective and holistically meet nursing students' learning and affective needs, therefore improving their clinical experiences and satisfaction.

These findings thus underpin two recommendations based on the CLEI constructs: educational reforms and cultural reforms. For educational reforms, academics and clinical nursing educators in Singapore should be offered training opportunities, ranging from in-house training programmes to formalized educational qualifications. The educators should be exposed to a suite of instructional approaches such as different pedagogies, curricula, modes of assessment and learners' preferred learning styles: such exposure is envisioned to drive their creativity ("Innovation") and ability to promote learner-centric learning ("Individualization") in clinical education.

In considering cultural reforms, collective efforts of nursing leaders (both senior and middle nurse managers) should be

advocated to forge a culture conducive to the nursing students' professional learning and socializing. Firstly, the nurse managers are instrumental in motivating their nursing staffs and ward-based clinical teachers to actively source for learning opportunities for the students and in involving the students in practicing their clinical skills ("Involvement") to meet their learning objectives. Secondly, they are also vital in promoting more positive interactions between the teachers and students to support their individualized learning needs ("Personalization"). Lastly, to enrich the students' learning experiences during their clinical supervision, the managers should not only ensure the availability and organization of ward resources, but also place expectations on the teachers to provide them with clear instructions and timely evaluations ("Task orientation"). This, in turn, enhances their overall satisfaction of the clinical placement where their professional learning and socializing can be maximized.

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CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

AUTHOR CONTRIBUTIONS

Study design: MWJW, WJL; Data collection: MWJW, WJL; Data analysis: MWJW, WJL; Manuscript writing: MWJW, WJL. All listed authors meet the authorship criteria and all authors are in agreement with the content of the manuscript.

ETHICS REVIEW

This research was reviewed and granted approval by Institutional Review Board of Ngee Ann Polytechnic (IRB Reference Number: NPIRB-P0016-2018-HS-WMW2).

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