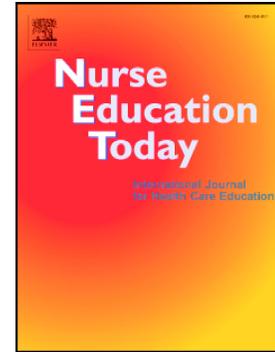# Accepted Manuscript

Evaluating the learning environment of nursing students: A multisite cross-sectional study

Joanne Ramsbotham, Ha Dinh, Hue Truong, Nguyent Huong, Thanh Dang, Chinh Nguyen, Duong Tran, Ann Bonner

Please cite this article as: J. Ramsbotham, H. Dinh, H. Truong, et al., Evaluating the learning environment of nursing students: A multisite cross-sectional study, Nurse Education Today, https://doi.org/10.1016/j.nedt.2019.05.016

Title:

EVALUATING THE LEARNING ENVIRONMENT OF NURSING STUDENTS: A MULTISITE CROSS-SECTIONAL STUDY

Authors:

Corresponding author	Dr Joanne Ramsbotham, School of Nursing, Queensland University of Technology, Victoria Park Rd, Kelvin Grove. 4121 Australia Email: j.ramsbotham@qut.edu.au Phone : 61 4 7 31383902
	Dr. Ha Dinh, Hanoi Medical University; Queensland University of Technology Mrs Hue Truong, Nursing Department, Khanh Hoa Medical College Dr Nguyent Huong, Faculty of Nursing, Hanoi Medical University Dr Thanh Dang, Faculty of Nursing, Pham Ngoc Thach Medical University Dr Chinh Nguyen, Nam Dinh University of Nursing Ms Duong Tran, Hai Duong Medical Technical University Professor Ann Bonner, School of Nursing, Queensland University of Technology,

Highlights

- Evaluating both on and off campus learning environments reveals students' transfer of learning and also development of professional competence.
- The end users' experience of curricula informs course quality improvement.

ABSTRACT

Background: Identifying students' experiences of the university and clinical learning environments informs quality improvement of courses.

Objectives: To investigate undergraduate nursing students' perceptions of their education environment and the facilitators and barriers to learning, during university and clinical experiences.

Design: Multi-site cross-sectional survey.

Setting: Four universities in Vietnam.

Participants: Undergraduate nursing students (n=891).

Methods: Between May and August 2016, Vietnamese versions of the Dundee Ready Education Environment Measure (Nursing) and the modified Clinical Learning Environment Inventory measured students' perceptions of university and clinical environments respectively. Two additional open-ended questions elicited perceptions of facilitators and/or barriers to clinical learning.

Results: The university environment was rated as needing improvement and significant differences between universities and year of study detected. University environment mean scores were significantly higher in second year students compared with those in the third or fourth years of study. Active teaching and interpersonal relationships at university were rated positively. Overall, clinical environment scores were mid-range and second year students' mean scores were significantly higher than third or fourth years. Clinical placements greater than four weeks duration had significantly higher mean score than two week placements.

Conclusions: Evaluation of university and clinical experiences assists with identifying potential areas of interruption to nursing students' transfer of learning. In both learning environments, Vietnamese students' experiences were similar to those experienced in Western countries in that interpersonal relationships with teachers and ward staff were key factors

perceived to influence learning. A notable difference in this study was the hospital environment in Vietnam had features unique to this country that interrupted students' transfer of learning. Globally it is a priority for nurse educators to facilitate both on and off campus environments that promote students' learning. Assessing these environments is a useful strategy for quality improvement of courses.

INTRODUCTION

Globally the quality of the learning environment for undergraduate nursing students is known to impact student learning behaviours and the attainment of competence (Erlam et al., 2018; Haraldseid et al., 2015; Henderson et al., 2012). Being able to put into practice knowledge and skills acquired during on-campus learning is the cornerstone of developing future competent nurses. Students learn most effectively in clinical environments where they participate in care provision working alongside other healthcare staff that support and encourage learning (Dale et al., 2013; Doyle et al., 2017). Similarly, the characteristics of on-campus (university) learning environments such as supportive teacher/student relationships and opportunity for learning interactions with peers are also known to affect the quality of students' experiences, outcomes and course satisfaction (Patterson et al., 2017; Ousey et al., 2014). As learning has a substantial social dimension, it is not surprising that both education environments feature as a strong influence on students' perceptions of learning experiences and quality (Erlam et al., 2018; Henderson et al., 2012). Nursing students' perspectives on how contextual factors enhance or create barriers within their learning experiences in both on- (university) and off- (clinical) campus learning environments provide valuable viewpoints that inform change in curricula and in teaching and learning strategies. This study aimed to determine undergraduate Bachelor of Nursing students' perceptions of the education environments at both university and clinical settings, and the facilitators and barriers to learning, as competency-based curriculum was being introduced across Vietnam.

BACKGROUND AND LITERATURE

Evaluation of Learning Environments

Learning environments in nursing typically comprise both on-campus university-based learning experiences and off-campus clinical practice in healthcare (Flott and Linden, 2016; Haland Jeppesen et al., 2017) and within these learning environments a combination of interactions impact students' learning outcomes (Haland Jeppesen et al., 2017; Henderson et al., 2012). A variety of mechanisms drive students' learning and related satisfaction in each learning environment (Brown et al., 2011; Haraldseid et al., 2015; Henderson et al., 2012). The university environment provides students with much of their theoretical knowledge as well as the development of discipline skills that prepare students to understand and engage with real healthcare experience during off-campus practice (Billet and Henderson, 2011). Quality learning environments in both university and clinical practice are those where conditions are conducive to students' engagement with learning activities. Such conditions support and enable students' transfer of learning and attainment of competence (Billet and Henderson, 2011). The implications for curricula, therefore, are that learning environments ought to be evaluated.

In nursing education, understanding how the university environment influences students' experience of learning, that is their construction of knowledge and acquisition of skills, is important in refining curricula. In three recent studies (Erlam et al., 2018; Haraldseid et al., 2015; Patterson et al., 2017) taking into consideration student preferences for learning (e.g. use of technology, physical amenities) were important elements in evaluating the university environment. However, it is the interactions with supportive educators and peers which have been reported frequently (Brown et al., 2011; Erlam et al., 2018; Haraldseid et al., 2015; Ousey et al., 2014; Patterson et al., 2017). Interpersonal relationships emphasise the importance of the social dimension of learning.

In off-campus clinical learning environments, the factors known to influence nursing students' learning have been widely studied. Several authors (Doyle et al., 2018; Ford et al., 2016; Pitkanen et al., 2018) agree that learning outcomes are affected by the quality of student/staff relationships, how students engage with patients, and how practice opportunities are facilitated by a supervisor (i.e. teaching faculty member or health facility nurse). Further, students' feelings of belongingness and inclusion within the healthcare team interacts with students' motivation to seek learning experiences, feedback on practice, and their overall sense of support and satisfaction with the learning environment (Ford et al., 2017; Jansson and Ene, 2016; Pitkanen et al., 2018; Perli and Brugnolli, 2009). In studies of nursing clinical environments in developing countries, similar interactions have also been demonstrated (Aktas and Karabulut, 2016; Nepal et al., 2016). Nursing students' perceptions of the clinical environment affect learning and acquisition of competence.

Nursing students' perceptions of the clinical environment are intertwined with the learning behaviours they use. If students feel learning is supported by supervisors they feel safe to engage in active roles, seek opportunities to participate in practice and use strategies such as questioning to develop understanding (Ford et al., 2017; Jansson and Ene, 2016). Within such interactions, students draw on knowledge acquired at university to inform performance in the clinical environment. Thus both university and clinical environment experiences inform the development of competence as a nurse.

Nurse Education in Vietnam

Vietnam has experienced rapid economic and population growth, and social change over the last three decades. The country is shifting from traditional to Western lifestyles and the

population health profile has changed towards chronic disease (World Health Organization, 2017). Healthcare provision, however, remains largely hospital based and family care with a general (medical) practitioner is only just emerging. Consequences include severe over-crowding in hospitals, often with two patients per bed, extended lengths of stay, and a heavy workload with one nurse typically responsible for 25-30 patients (Nguyen et al., 2019).

The Vietnamese government is attempting to address these challenges through development of the health workforce and, in particular, nursing is being transitioned toward an autonomous profession with nursing-specific professional benchmarks (Vietnamese Ministry of Health, 2013). Nurse training places have increased and the minimum undergraduate Bachelor course length extended from two to three years with some universities offering a four-year course. Nursing courses are also moving towards a model where nurses are providing most of the teaching rather than medical practitioners. There are some Masters and Doctoral qualified nursing faculty. National nurse registration was introduced in 2015 and national undergraduate nursing competency-based curriculum practice standards are being implemented, although there is no national accreditation system or external monitoring of courses. Similar to other countries, clinical experience is embedded within courses and placements are undertaken in teaching hospitals where students are supervised by university teachers or ward nurses. A total of nine months of clinical experience is required for nurse registration (Vietnamese Ministry of Health, 2013). Developments in nursing education provision needs to keep pace with these changes and attention given to replacing traditional didactic teaching methods with active student-centred teaching and learning approaches that have been demonstrated to facilitate deep understanding and development of competence in the nurse role (Billet and Henderson, 2011). The perspectives of nursing students who are at the centre of these changes reflect

8

whether student centred teaching and learning has been incorporated into courses and, are therefore important to gauge.

METHODS

A cross-sectional multi-site study was conducted at four universities in Vietnam (three in the north and one in the south) between March and August 2016. The university nursing departments that participated in this study were partners in a two-year project leading undergraduate nursing curriculum reform through development of teachers to deliver competency-based curricula. The setting also included five nearby hospitals these universities use for clinical placement.

Sample

Participants were adult (≥18 years) undergraduate students studying nursing subjects at four universities experiencing curriculum reform. Students had varying duration of exposure to the competency-based curriculum with second-year students having had 12 months exposure; third and fourth-year students – 24 months exposure. First-year students were excluded as the majority of this year is devoted to core university-wide subjects such as Ho-Chi-Minh philosophy, English, and bioscience subjects. No other exclusion criteria were required. Convenience sampling was used to recruit and collect data from 918 eligible students.

Procedure

Students were notified of the study and given participant information one week prior to a scheduled lecture. Then at the conclusion of the lecture, students were invited to, complete a hard copy of the instruments and place each in a secure box.

Study Instruments

Participants provided demographic information (age, gender, course year, placement length [weeks] and most recent location) and completed two instruments measuring the on- and off-campus learning environments.

Students' perceptions of on-campus university teaching were assessed using the Vietnamese language version of the Dundee Ready Educational Environment Measure (V-DREEM). The DREEM (Miles et al., 2012) is a 50-item self-report instrument assessing five domains: 1) students' perceptions of teaching (12 items), 2) students' perceptions of teachers (11 items), 3) students' academic self-perceptions (8 items), 4) students' perceptions of atmosphere (12 items), and 5) students' social self-perception (7 items). Domains scores are reported as means. The English version of the DREEM is a widely used instrument that measures health students' perspectives of learning environment experiences and has been used with students from medicine, nursing, dentistry and chiropractic courses (Miles et al., 2012; Ousey et al., 2014). In this study, three items in the V-DREEM were deleted, one as it referred to services not available in Vietnamese universities (item 46, *My accommodation is pleasant* [Students' Social Self Perception domain]) and two related to clinical experiences (item 6, *The teacher is patient with patients* [Students' Perception of Teaching domain], item 11, The atmosphere is relaxed during ward teaching [Students' Perception of Atmosphere domain]) to avoid repetition with the CLEI. The V-DREEM uses a 4-point Likert scale (1 =strongly disagree, 2 =disagree, 3 =agree, 4 =strongly agree), different to many other language versions that employ a 5-point scale. This choice was made for two reasons. First, the other instrument selected for use in this study, the V-CLEI, uses a 4-point Likert scale. Second, the unsure option was removed because Vietnamese nursing students are unfamiliar with being surveyed regarding their experiences, and the dominant cultural expectation is that students should not criticise those perceived to be

more senior, such as teachers or the university. To enable later comparison of results with prior research, DREEM cut points were recalculated consistent with the 4-point Likert scale in the same ratio as that advised when using a 5-point Likert Scale. V-DREEM item scores are indicative of environments that are positive (mean score ≥ 2.8/4), need improvement (mean scores 1.6–2.8/4) or problematic (mean score ≤ 1.6). Prior to this current study, the V-DREEM had been translated into Vietnamese (Huong, 2013) using a rigorous forward and backward translation process for cross-cultural health research. In this study the V-DREEM demonstrated good reliability (Cronbach's alpha = .80).

The modified Clinical Learning Environment Inventory (CLEI) is a 52-item instrument which measures students' perceptions of their experiences while on clinical placement (Newton et al., 2010). It comprises six sub-scales: affordance and engagement (16 items), student centeredness (20 items), enabling individual engagement (4 items), valuing nurses' work (3 items), fostering workplace learning (6 items) and innovative and adaptive change (3 items). Each item is rated on a 4-point Likert scale (1 =strongly disagree, 2 =disagree, 3 =agree and 4 =strongly agree). It had been previously translated into Vietnamese (V-CLEI; Truong, 2015). In this study the V-CLEI demonstrated good reliability (Cronbach's alpha = .75). Additionally, two open-ended questions were added at the end of the V-CLEI seeking three examples of facilitators and barriers to learning experienced in the clinical environment. The addition of these questions enabled researchers to check congruence between students' instrument ratings and open-ended question responses, because, as identified previously, the dominant cultural expectation is that students would not criticise senior hospital nurses.

Ethical considerations

Ethical approval was received from the Australian university (de-identified for review) and Vietnamese universities provided written agreement for the study. The study was conducted in Vietnamese and consent to participate was assumed when students returned the instruments to a sealed box in the lecture room. No identifying data was collected.

Data analysis

The Statistical Package for Social Sciences (SPPS version 20) was used for data entry and analysis. Instruments with more than 80% completion were scored and inputted. Responses to negative items in the V-DREEM and V-CLEI were reverse scored prior to analysis. Missing data was assessed using Little's Missing Completely at Random test which indicated data was randomly missing and not significant (highest missing rate 0.8% across all variables; Li, 2013). Data was normally distributed. Means and standard deviations were calculated for scores of each item, subscale and scale of V-DREEM and V-CLEI, higher scores indicate better evaluation. Length of clinical practice placement were recoded into three categories (1=zero to two weeks, 2=three to four weeks and 3=more than four weeks). We used General Linear Models (GLM) and post hoc analysis because of variances between study sites (Bhattacharya and Burman, 2016) to examine V-DREEM scores after adjusting for university, school year and gender; and V-CLEI scores after adjusting for the same variables as well as length of clinical placement and type of clinical wards. Site 4 was used as the reference in GLM because of consistent lower scores in both instruments. Statistical significance was set at $p \leq 0.05$.

Responses to the two open-ended questions regarding facilitators and barriers to learning in the clinical area (n=542) were entered into Microsoft EXCEL and grouped into similar topics, then checked by two authors (de-identified for review) independently. Then using a process of transforming qualitative data, frequencies were calculated (Crewell and Plano Clark, 2018).

The five most frequent facilitators and barriers to clinical learning described by students are presented.

RESULTS

Demographic characteristics

A total of 891 (97% response rate) students participated from four settings with a mean age of 20.9 (*SD*=0.87) years (Table 1). The majority of the sample were female (84.5%) and over half were second year (59.4%). Students had undertaken clinical placement in medical (35.7%), surgical (28.9%) and speciality practice wards (35.4%). The length of clinical placements varied from less than two to more than four weeks.

Students' perceptions of the university environment

The mean total V-DREEM score was 127.8 (*SD*=15.9). V-DREEM scores were similar between third and fourth-year students (*M*=126.7, *SD*=16.5; *M*=125.9, *SD*=12.8 respectively), while second-year students rated the university environment higher (*M*=128.7, *SD*=16.4). Mid-range scores were found across all domains (Table 2). The V-DREEM mean item scores varied between 2.12 to 3.03 with no item scoring in the problematic range (Supplementary file). In the students' perception of teaching domain all items were rated as positive (exceed cut point >2.8/ 4) – see for example item 1 (*I am encouraged to participate during teaching sessions*) and item 16 (*The teaching helps to develop my confidence*). Overall, item 5 (*learning strategies which worked for me before continue to work for me now*) was the lowest rated item in the V-DREEM indicating changing learning expectations of students.

General linear modelling demonstrated that students' perceptions of university teaching environments differed significantly between universities (*p*<0.001) and year of course

13

(p<0.001). There was no statistical difference between female and male students after controlling for school year and university (Table 3).

<u>Students' perspective of clinical environment</u>

The mean total V-CLEI score was 138.7 (SD=14.7) and all sub-scales scores were mid-range (Table 2). Male students tended to rate the clinical environment higher than female students. Mean item scores ranged between 2.01-2.91 indicating students were somewhat satisfied with support for learning in the clinical environment (Supplementary file).

General linear modelling indicated that student perceptions of the clinical learning environment were significantly different between universities (p<0.001) and year of study (p<0.001) although there was no difference between genders (p=0.662). Clinical placements of more than four weeks duration were reported as offering a better quality learning environment than those of two weeks or less (p<0.001) (Table 3). In univariate analysis there was no difference between surgical or medical wards (p=0.18) while quality of the learning environment in speciality wards was lower, this difference was not significant when adjusted for university and year of study. Post-hoc tests indicated that fourth year students perceived the quality of clinical environments as significantly lower (p<0.001) than third and second year students but there was no statistical difference between second or third year (Table 3).

In response to the open-ended questions, the majority of students' (n=542) provided at least one example of a facilitator or barrier to their learning experience. Facilitators coalesced together into 23 topics whereas 37 barriers were identified. The five most frequent facilitators and barriers to clinical learning are presented in Table 4.

DISCUSSION

This study is the first to evaluate both on- and off-campus learning environments in Vietnam finding that both environments indicated several areas of potential interruption to nursing students' transfer of learning. We also found a significant difference between universities with regards to both the university and clinical environments. Of interest to a global audience, and while there have been extensive studies of the clinical learning environment (for example Dale et al., 2013; Doyle et al., 2017), few studies evaluating students' concurrent perception of both learning environments have been reported (Haland Jeppesen el al., 2017).

Overall the university environment in Vietnam was perceived by students as needing improvement which was lower than other studies using the DREEM (Brown et al., 2011; Ousey, et al., 2014). Despite the known shortcomings at universities in Vietnam such as high teacher/student ratios and scarce teaching resources (e.g. library facilities, nursing laboratory equipment), the students' perceptions were higher than might be expected. A possible explanation is that Vietnamese students have different expectations of the university learning environment. Vietnam has a stringent and competitive university entrance process and having a university education is highly prestigious. To be successful in this context students are likely to have adapted their learning techniques and these results could also indicate that, regardless of the university environment, students enjoy the learning experience. This study also found that as students progressed through their course, their perception of the university and clinical environment trended down. Other studies using the DREEM have also reported similar findings (Brown et al., 2011; Ousey et al., 2014). It is likely that students in many countries, rate university environments higher early in their course as experiences are novel, and that in later years their perceptions become more critical as they become more familiar and confident within the university environment. With the availability of English language education, use of

15

internet-based nurse teaching resources and social media exposure, Vietnamese nursing students may develop a growing awareness of the shortfalls in their university environments as they progress through their course. Both in Western countries and in Vietnam, this trend may also be due to the prospect of taking on the responsibilities of being a practicing professional.

Vietnamese students were somewhat satisfied with support for learning in the clinical environment and results were slightly higher than in one other Vietnamese study although this study was much smaller and conducted at a regional collage (Truong, 2015). When compared with similar studies from developed countries using versions of the CLEI, total and sub-scale scores in this study were mid-range in that they were higher than some studies (Newton et al., 2012) and not others (Perli and Brugnolli, 2009; Shivers et al., 2017; Smedley and Morey, 2009). The mid-range results may illustrate a similar feature to that found in the university environment results. Vietnamese students could have lower expectations of practice environments than counterparts in developed countries, and high student/clinical teacher ratios and low individual support for clinical learning in Vietnam did not result in lower satisfaction.

We found that students' perceptions of the clinical learning environment differed between length of placement and year of study. Those with shorter clinical placements and in the final year of the course reported lower support for clinical learning. Length of clinical placement has previously been identified as important to nursing students (Jansson and Ene, 2016) which is likely due to students' preference for forming relationships with and to feel a sense of belongingness and familiarity with clinicians (Doyle et al., 2017; Henderson et al., 2012). Longer lengths of clinical placements increase a student's opportunity for transfer of university learning into clinical practice. We also found differences between year of study and the clinical learning environment with those in later years less satisfied with experiences. Other studies

16

which have used the CLEI have reported varied results with regards to year of study. For example, Italian final year students reported being more satisfied than inexperienced cohorts (Perli and Bugnolli, 2009) whereas Australian final year students' perceived the opposite and that learning environments were less supportive (Shivers et al., 2017). Other studies have not found a difference between year of study (Newton et al., 2012; Papathanasiou et al., 2014). In this study conditions unique to a developing country such as Vietnam, for example, overcrowding (2 patients/bed), workload (25 patients/nurse), and lack of functioning equipment probably influenced students' negative perceptions. These topics also appeared as barriers to learning. We also found that final year students' had lower perception of university environment support. Both of these low learning environment scores could also indicate that as students approach graduation, the need to function independently in the chaotic health care environment may feel more immediate and prompt a higher desire for supportive learning environments.

This study also identified common facilitators and barriers to learning in the clinical environment which provide interesting insights into hospitals in Vietnam. The positive and negative impacts of staff/student relationships on learning opportunities, and the positive effect of being able to practice skills with real patients are important to nursing students regardless of country (Dale et al., 2013; Doyle et al., 2017; Jansson and Ene, 2016). There was some consistency between V-CLEI perception of teaching and learning scores and the qualitatively identified facilitators of learning, for example the relationships between students, ward staff and clinical teachers. However, and conversely, negative interactions with ward staff was a frequently identified barrier to clinical learning. The clinical learning environment and operating within a profession that is undergoing substantial transformation is challenging for Vietnamese students, nurse teachers and ward staff.

Limitations

This study has limitations in that responses were captured at one time-point although the large sample was drawn from four universities across the country. The study did have an extraordinarily high response rate (97%) which raises questions about whether students completed the instruments out of duty, despite ethical research practices such as different teachers who were not responsible for that student cohort explaining the purpose of the study. Completion of the instruments was voluntary and no identifying data were collected. Despite these concerns, the instruments used to measure the university and clinical learning environments demonstrated good reliability which will enable other universities to benchmark against these results.

CONCLUSIONS

Even though this study occurred in Vietnam, there are nevertheless implications for undergraduate nursing education more broadly. Evaluating both university and clinical environments concurrently offers important insights into how the planned curriculum is enacted at the student/course experience interface, and whether the clinical environment is supporting transfer of learning. Regardless of country, it is the interpersonal relationships students have with teachers at university and with ward staff during clinical placement that is important to learning. The convoluted processes of education reform in Vietnam and the move to competency-based education is likely to take many years, and this will also impact on the shift of nursing towards an autonomous profession. Future studies ought to evaluate both learning environments to determine key factors which enhance or impede student learning.

REFERENCES

Aktas, Y., Karabulut, N. (2016). A survey on Turkish nursing students' perception of clinical learning environment and its association with academic motivation and clinical decision-making. *Nurse Education Today*, *36*, 124-128. DOI:http://dx.doi.org/10.1016/j.nedt.2015.08.015

Bhattacharya, P., Burman, P. (2016) Theory and methods of statistics, O'Reilly Safari Books Online, 309-382 DOI https://doi.org/10.1016/B978-0-12-802440-9.00011-4

Billet, S., Henderson, A. (2011). *Promoting professional learning: Integrating experiences in university and practice settings*, In Billet, S. & Henderson, A. (Eds.) Developing Learning Professionals: Integrating Experiences in University and Practice Settings. (pp1-15). ProQuest Ebook Central, DOI:10.1007/978-90-481-3937-8_1

Brown, T., Williams, B., Lynch, M. (2011). The Australian DREEM: evaluating student perceptions of academic learning environments within eight health science courses. *International Journal of Medical Education*, *2*, 94-101. DOI:10.5116/ijme.4e66.1b37

Crewell, J., Plano Clark, V. (2018). *Designing and conducting mixed methods research* (3rd ed.). Los Angeles: Sage.

Dale, B., Leland, A., Dale, J. (2013). What factors facilitate good learning experiences in clinical studies in nursing: bachelor students' perceptions. *International Scholarly Research Notices -Nursing*, 1-7. DOI:http://dx.doi.org/2013/628679

Doyle, K., Sainsbury, K., Cleary, S., Parkinson, L., Vindigni, D., McGrath, I., Cruichshank, M. (2017). Happy to help/ happy to be here: Identifying components of successful clinical placements for undergraduate nursing students. *Nurse Education Today, 49*. 27-32, DOI:http://dx.doi.org/10.1016/j.nedt.2016.11.001

Erlam, G., Smythe, L., Wright-St Clair, V. (2018). Action research and millennials: Improving pedagogical approaches to encourage critical thinking. *Nurse Education Today, 61*, 140-145. DOI:http://dx.doi.org/10.1016/j.nedt.2017.11.023

Flott, E., Linden, L. (2016). The clinical learning environment in nursing education. *Journal of Advanced Nursing*, 72(3), 501-513.

Ford, K., Courtney-Pratt, H., Marlow, A., Cooper, J., Williams, D., Mason, R. (2016). Quality clinical placements: The perspectives of undergraduate nursing students and their supervising nurses. *Nurse Education Today, 37*, 97-102. DOI:http://dx.doi.org/10.1016/j.nedt.2015.11.013

Haland Jeppesen, K., Christiannsen, S., Fredericksen, K. (2017). Education of student nurses: a systematic review. *Nurse Education Today*, 55, 112-121. DOI:http://dx.doi.org/10.1016/j.nedt.2017.05.005

Haraldseid, C., Friberg, F., Aase, K. (2015). Nursing students' perceptions of factors influencing their learning environment in a clinical skills laboratory: A qualitative study *Nurse Education Today, 35*, e1-e6. DOI:http://dx.doi.org/10.1016/j.nedt.2015.03.015

Henderson, A., Cooke, M., Creedy, D., Walker, R. (2012). Nursing students' of learning in practice environments: A review, *Nurse Education Today*, 32, 299-302. DOI:10.1016/j.nedt.2011.03.010

Hoang, L. (2013). *Translation, adaption and content validation of the DREEM instrument: a Vietnamese nursing education pilot project*. Masters Dissertation, Queensland University of Technology: Australia.

Jansson, I., Ene, K. (2016). Nursing students' evaluation of quality indicators during learning clinical practice. *Nurse Education in Practice, 20*, 17-22. DOI:http://dx.doi.org/10.1016/j.nepr.2016.06.002

Li, C. (2013). Little's test of missing completely at random. *The Stata Journal*, *13*(4), 795-809.

Miles, S., Swift, L., Leinster, S. (2012). The Dundee ready education environment measure (DREEM): A review of its adoption and use. *Medical Teacher, 34*: e620-34. DOI:http://dx.doi.org/10.3109/0142159X.2012.668625

Nepal, B., Taketomi, K., Ito, Y., Kohanawa, M., Kawabata, H., Tanaka, M., Otaki, J. (2016). Nepalese undergraduate nursing students' perceptions of the clinical learning environment, supervision and nurse teachers: A questionnaire survey. *Nurse Education Today,39*, 181-188, DOI:http://dx.doi.org/10.1016/j.nedt.2016.01.006

Newton, J., Ockerby, C., Cross, W. (2010). Clinical Learning Environment Inventory: factor analysis. *Journal of Advanced Nursing*, *66*(6), 1371-1381, DOI:http://dx.doi.org/10.1111/j.1365-2648.2010.05303.x

Newton, J., Jolly, B., Ockerby, C., Cross, W. (2012). Student centeredness in clinical learning: the influence of the clinical teacher. *Journal of Advanced Nursing, 68*(10), 2331-2340. DOI:10.1111/j.1365-2648.2012.05946.x

Nguyen, N., Douglas, C., Bonner, A. (2019). Effectiveness of self-management program in people with chronic kidney disease: A pragmatic randomized controlled trial. *Journal of Advanced Nursing*, 75(3), 652-664. DOI: 10.1111/jan.13924.

Ousey, K., Stephenson, J., Brown, T. & Garside, J. (2014). Investigating perceptions of the academic educational environment across six undergraduate health care courses in the United Kingdom, *Nurse Education in Practice, 14*, 24-29. DOI:http://dx.doi.org/10.1016/j.nepr.2013.06.012

Patterson, C., Stephens, M., Chiang, V., Price, A., Work, F., Snelgrove-Clarke, E. (2017). The significance of personal learning environments (PLEs) in nursing education: Extending current conceptualisations, *Nurse Education Today, 48*, 99-105. DOI:http://dx.doi.org/10.1016/j.nedt.2016.09.010

Papathanasiou, I., Tsaras, K., Sarafis, P. (2014). Views and perceptions of nursing students on their clinical learning environment: Teaching and learning. *Nursing Education Today, 34*, 57-60. DOI:http://dx.doi.org/10.1016/j.nedt.2013.02.007

Perli, S., Brugnolli, A. (2009). Italian nursing students' perception of their clinical learning environment. *Nurse Education Today,29,* 886-890.

Pitkanen, S., Kaariainen, M., Oikarainen, A., Tuomikoski, A., Elo, S., Ruotsalainen, H., Saarikoski, M., Karsamanoja, T., Mikkonen, K. (2018). Healthcare students' evaluation of the clinical learning environment and supervision– a cross-sectional study, *Nurse Education Today, 62*, 143-149. DOI:https://doi.org/10.1016/j.nedt.2018.01.005

Shivers, E., Hasson, F., Slater, P. (2017). Pre-registration nursing student's quality of practice learning: Clinical learning environment inventory (actual) questionnaire. *Nurse Education Today, 55*, 58-64.DOI:http://dx.doi.org/10.1016/j.nedt.2017.05.004

Smedley, A., Morey, P. (2009). Improving learning in the clinical nursing environment: perceptions of senior Australian bachelor of nursing students. *Journal of Research in Nursing, 15* (1), 75-88. DOI:10.1177/1744987108101756

Truong, T. (2015) *Vietnamese nursing students' perceptions of their clinical learning environment: a cross sectional survey*, Research Masters Dissertation, Queensland University of Technology: Australia.

Vietnamese Ministry of Health (2013). *Joint Annual Health Review 2013*. Vietnamese Government, Retrieved from http://jahr.org.vn/downloads/JAHR2013/JAHR2013_Final_EN.pdf

World Health Organisation (2017). Country Profile –Vietnam. Retrieved from www.who.int/countries/vnm/en/

Table 1. Demographic characteristics of students (n = 891)

Demographic characteristics		
Age	*M* =20.9, *SD*= 0.87	
	n	*%*
Gender		
Male	138	15.5
Female	753	84.5
Course year		
Year 2	530	59.5
Year 3	243	27.3
Year 4	118	13.2
Clinical ward type		
Medical	318	35.7
Surgical	258	28.9
Speciality	315	35.4
Length of clinical placement		
2 weeks	162	18.2
3 -4 weeks	372	41.7
Over 4 weeks	357	40.1

Table 2. Mean total (SD) and subscale scores of the Vietnamese language versions of the Dundee Ready Education Environment Measure and Clinical Learning Environment Inventory by gender and year of course (n=891)

	Possible score	Overall	Male	Female	Year 2	Year 3	Year 4
	(min-max)	(n = 891)	(n = 138)	(n = 753)	(n = 530)	(n = 243)	(n = 118)
Total V-DREEM[a]	47-188	127.8 (15.9)	132.91 (11.6)	126.85 (16.5)	128.71 (16.4)	126.75(16.5)	125.98 (12.7)
Domains							
Students' perception of teaching	12-48	32.9 (5.1)	34.3 (4.3)	32.6 (5.2)	33.4 (5.2)	32.5 (4.9)	30.9 (4.5)
Students' perception of teachers	9-36	25.5 (4.6)	26.7 (3.4)	25.3 (4.7)	22.5 (4.7)	24.9 (5.0)	26.3 (2.9)
Students' academic self-perception	8-32	21.4 (2.8)	22.3 (2.3)	21.3 (2.9)	21.3 (2.8)	21.4 (2.9)	22.4 (2.7)
Students' perception of atmosphere	11-44	29.1 (4.1)	30.1 (3.3)	28.9 (4.2)	29.3 (4.1)	28.9 (4.2)	28.3 (3.6)
Students' social self-perception	7-28	18.6 (2.6)	19.3 (2.2)	18.5 (2.7)	18.7 (2.5)	18.8 (2.7)	17.9 (2.7)
Total V-CLEI[b]	52 - 208	138.7 (14.7)	141.8 (12.0)	138.1 (15.1)	140.4 (14.9)	138.7 (13.5)	131.6 (14.5)
Sub-scales							
Student centeredness	20-80	53.3 (6.3)	54.7 (4.9)	53.0 (6.5)	53.8 (6.4)	53.2 (5.8)	51.1 (6.6)
Affordances and engagement	16-64	42.5 (5.3)	43.6 (4.4)	42.2 (5.5)	42.8 (5.4)	42.6 (4.9)	40.3 (5.4)
Individualization	4-16	10.8 (2.1)	11.0 (1.9)	10.7 (2.2)	11.0 (2.1)	10.8 (2.0)	9.7 (2.3)
Valuing nurses work	3-12	8.4 (1.7)	8.8 (1.4)	8.4 (1.8)	8.2 (1.7)	8.4 (1.7)	9.6 (1.3)
Fostering workplace learning	6-24	15.5 (2.2)	15.7 (2.1)	15.5 (2.2)	15.8 (2.0)	15.6 (2.1)	14.1 (2.3)
Innovative and adaptive culture	3-12	7.8 (1.4)	7.9 (1.4)	7.8 (1.4)	7.9 (1.3)	8.0 (1.4)	6.8 (1.4)

Notes. Results are presented as mean (standard deviation).
[a] Vietnamese Dundee Ready Education Environment Measure (V-DREEM); [b] Vietnamese Clinical Learning Environment Inventory (V-CLEI)

Table 3. General linear model of the Vietnamese language versions of the Dundee Ready Education Environment Measure and Clinical Learning Environment Inventory

	V-DREEM[a]					V-CLEI[b]				
	Adjusted coefficient	SE	P value	95% CI		Adjusted coefficient	SE	*p* value	95% CI	
				Lower bound	Upper bound				Lower bound	Upper bound
Intercept	97.6	1.8	< 0.001***	94.1	101.2	119.4	3.2	< 0.001***	112.9	125.7
Site 1 *(Site 4 as reference)*	29.0	1.4	< 0.001***	26.3	31.7	14.7	1.6	< 0.001***	11.4	17.9
Site 2 *(Site 4 as reference)*	35.1	0.87	< 0.001***	33.3	36.8	22.0	1.7	< 0.001***	18.6	25.4
Site 3 *(Site 4 as reference)*	32.4	1.4	< 0.001***	29.7	35.2	24.4	2.2	< 0.001***	20.0	28.8
Female *(male as reference)*	-0.81	0.87	0.35	-2.5	0.91	-.42	.96	0.66	-2.3	1.5
Year 2 *(year 4 as reference)*	3.8	1.6	0.02**	0.65	6.9	6.1	2.6	0.02**	.97	11.2
Year 3 *(year 4 as reference)*	5.4	1.3	< 0.001***	2.7	8.0	8.4	2.1	< 0.001***	4.3	12.5
Internal ward *(specialty as reference)*						-1.5	1.2	0.21	-3.9	.90
Surgical ward *(specialty as reference)*						-1.2	1.3	0.35	-3.7	1.3
Placement length = 2 weeks										
(>4 weeks as reference)						-9.4	1.9	< 0.001***	-13.3	-5.5
Placement length = 3-4 weeks						-1.2	1.5	0.43	-4.1	1.8

(> 4 weeks as reference)

** Significant at $p \leq 0.05$, *** significant at $p < 0.001$

[a] Vietnamese Dundee Ready Education Environment Measure (V-DREEM); [b] Vietnamese Clinical Learning Environment Inventory (V-CLEI)

Table 4. Five most frequent facilitators and barriers to student learning in the Vietnamese clinical environment (n = 542)

Facilitators of Learning (*f*)	Barriers to Learning (*f*)
• Positive interaction with nurse leader and ward staff (n=353)	• Unfriendly, uninterested or negative interactions with ward staff (n=111)
• Clinical teachers' (faculty) and preceptors' willingness to support student learning (n=155)	• Heavy workload, overcrowding and work pressure (n=91)
• Opportunities to engage with practice (n=133)	• Uncooperative patients and family (n=85)
• Adequate facilities and equipment (n=118)	• Few chances to practice taught skills (n=79)
• Cooperative patients and family (n=85)	• Inadequate facilities (lack of, broken or expired) (n=78)