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Impact of Blended Learning on NCLEX Scores and Subscores

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Abstract
The nursing workforce shortage is the biggest crisis that demands increased qualified licensed graduate nursing students. The shortage of licensed professional nurses has tremendously affected the quality of health care delivery. Subsequently, nursing schools are challenged to educate nursing students faster. Undergraduate nursing colleges have been challenged to educate more nurses faster to meet the increasing demands of qualified nurses in the workforce. Successful completion of the NCLEX exam is an entry requirement to practice as a registered nurse in the United States**.** The purpose of this quantitative, correlational research study is to compare the NCLEX score rates and sub-scores of psychosocial integrity and safety using data from multiple cohorts of the pre-licensure nursing program to evaluate the impact of the sudden transition from face-to-face (F2F) learning to a blended learning format. The study participants included students from the 2019 Spring and 2019 Fall cohorts who completed nursing in a F2F setup and 2020 Fall and 2021 Spring cohorts who completed nursing in a blended format. The pre-existing data of NCLEX scores and subcategory scores were obtained from two hundred and eighteen students enrolled in the F2F track, and two hundred and twenty-one students enrolled in the blended track of the nursing program. The pre-existing data obtained were coded separately in three sets using '0' for fail grade and '1' for pass grade to assess the correlation. The chi-square test of independence and Phi were employed to test the null hypothesis. The statistical analysis reported a significant difference in the NCLEX scores of the students, $p < .001$. Findings of the NCLEX safety and psychosocial subsection scores showed no ranked significant difference, $p < .133$ and $p < .355$. This study's results will help modify appropriate teaching-learning platforms to foster successful student learning outcomes and NCLEX success rates. Suggestions for future research include qualitative research to erase certain limitations, correlational studies including demographic factors, and a comparative study using a diverse, larger sample size. Additionally, as the global pandemic impacts this study, a follow-up study is recommended in the future to analyze NCLEX scores with sub-scores after the COVID pandemic.
Keywords: Nurse education, NCLEX, COVID-19, Blended Learning, Exam scores.
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1. Introduction

Healthcare needs are expected to escalate as the baby boomers age, intensifying the nurse shortage in the United States (U.S.) (American Association of Colleges of Nurses [AACN], 2021). The nursing education program administrators recommend expanding capacity to meet the increasing demands for registered nurses in the United States (Salifu et al., 2018). AACN (2020) utilizes its resources to identify strategies, shape legislation, and develop collaboration to alleviate the nursing shortage. Undergraduate nursing colleges have been challenged to educate more nurses faster (AACN, 2021). A criticism exists that due to the limited class schedule of students, the shortage

of nursing teachers, and the lack of clinical experience, undergraduate education fails to prepare nursing students for future careers (Salifu et al., 2018).

Research studies encourage nurse educators to adopt diverse strategies to increase pass rates in the nursing program (Carter et al., 2020; Li et al., 2019). Innovative teaching strategies in blended, online, and traditional nursing classes are expected to encourage nursing students to participate in self-regulated learning actively (Carter et al; 2020; Davis et al., 2022). Blended learning is an approach that combines asynchronous or synchronous online learning with traditional, face-to-face learning (Li et al., 2019). The learners in online and blended learning have unparalleled access to the course content. Therefore, blended and online learning methods have been widely accepted by students who have struggled to pursue advancement in a career in nursing amidst busy schedules (Carter et al., 2020). The National Council Licensure Examination (NCLEX) is the standardized test developed by the National Council of State Board of Nursing (NCSBN) for licensing in the United States (National Council of State Boards of Nursing [NCSBN], 2021). Successful completion of the exam is an entry requirement to practice as a registered nurse in the U.S. and is developed by each state's regulatory board. Hence, maintaining a high NCLEX-RN pass rate is vital to resolve the nursing staff shortage (NCSBN, 2021). The NCLEX-RN examination has various subsections that include: safe and effective care, health promotion and maintenance, psychosocial integrity, and physiological integrity (NCSBN, 2021a). The NCLEX questions are distributed under each sub-section differently, where safe and effective care is one of the highest weighted categories.

The COVID-19 pandemic has tremendously increased academic challenges in the nursing education field. Nursing programs were forced to transition from a traditional, face-to-face platform to a blended platform in a limited time. The pandemic halted clinical placements of the students to preserve protective resources and limit the spread of the disease (Lemay et al., 2021). The emergence of virtual and in-person simulations considerably sealed the gap in providing enriched clinical experiences to nursing students during the pandemic. However, the COVID-19 pandemic has restricted students' engagement in direct patient care, compelling them to practice clinical skills on the mannequins (Dewart et al., 2020). Following the academic challenges and limitations of the COVID-19 pandemic, the NCSBN has adopted various testing modifications to the NCLEX examinations after careful evaluation keeping the difficulty levels and the standards consistent (NCSBN, 2021).

1.1 Background of the Study

Undergraduate nursing education programs have undergone substantial changes over the last few years, causing a more significant impact on the quality of health care delivery**.** Some of the significant changes that occurred over the years include the advancement of nursing education from diplomas to multiple-level degrees, technological advancement, increased leadership roles, and diverse career opportunities in nursing (Davis et al., 2022; Li et al., 2019). These changes made nursing education more accessible to a wide range of learners with diverse characteristics**.** As healthcare needs grow, the shortage of licensed nurses is expected to escalate. Nursing education must be reconstructed in numerous ways to prepare nursing graduates to work effectively and collaboratively with other health professionals in various settings in the ever-changing and complex healthcare system (Paul & Jefferson, 2019). Nursing education should prepare nursing students to provide direct care services, including patient care coordination, administering treatments, education, and health promotion for patients, families, and communities (Li et al., 2019). The provision of nursing education through different platforms is paramount to addressing the barriers.

NCLEX for Nursing Licensure

The NCLEX is a standardized nationwide examination required to license nurses in the U.S. The graduate student nurse has to successfully complete the NCLEX-RN examination to work as a licensed registered nurse. The nursing colleges evaluate the effectiveness of their program based on the NCLEX results of the first-time test-taker graduate students (NCSBN, 2021). The purpose of NCLEX- R.N. is to measure the knowledge and competencies acquired through the nursing program, readiness for practice as a licensed nurse in the country, and to ensure public protection. The NCLEX-RN examination is offered almost daily, and candidates' results are published within a few days of exam completion (NCSBN, 2021). The pre-licensure program at the site under study makes revisions to the curriculum based on the NCLEX-RN score with sub-score reports. The sub-score category of the NCLEX-RN exam includes health promotion and maintenance, safe and effective care, physiological integrity, and psychosocial integrity (NCSBN, 2021c). Research survey reports state that the learning transition to online and blended education due to the pandemic had a significant impact on the NCLEX scores and sub-scores (NCSBN, 2021).

The world is struggling with the COVID pandemic in 2021, and it has a greater impact on psychosocial integrity among nursing students and clients. The threat to any individual's social and psychological equilibrium following a crisis, illness, and stress is crucial to address. A nurse should be able to anticipate, recognize, and analyze the psychosocial needs of the patients to provide optimal care (Dewart et al., 2020). The NCLEX examination measures the student's psychosocial integrity as an important subcomponent to evaluate the student's

readiness to care for clients with acute or chronic illnesses (NCSBN, 2021). This category also measures students' abilities to promote support for the clients' emotional, mental, and social well-being. Safe and effective care is another integral subsection of the NCLEX examination (NCSBN, 2021). The nurse is responsible for identifying and practicing the methods to prevent pathogen transmission and potential safety hazardous conditions. The COVID-19 pandemic has increased academic challenges, forcing students to choose online classes and virtual clinical platforms for learning and practicing skills (Dewart et al., 2020). The Florida Board of Nursing (FBON) demands that all prelicensure learning students complete the required theory and clinical learning experiences before attempting the NCLEX-RN exam (Florida Center of Nursing, [FCN], 2019). The COVID-19 pandemic has restricted students' engagement in the direct-patient care setting, compelling them to practice clinical skills on mannequins. Following the academic challenges and limitations of the COVID-19 pandemic, the NCSBN has adopted several carefully evaluated and tested modifications to the NCLEX examinations, keeping the difficulty levels and the standards consistent (NCSBN, 2021).

Teaching Approaches

Face-to-face learning has been the mainstay of nursing student learning. Blended learning is an approach that utilizes the combination of synchronous or asynchronous online learning and traditional, face-to-face learning (Davis et al., 2022; Li et al., 2019). Innovative web-based instructions offer unparalleled possibilities in the nursing education field. Experts in nursing education have studied the advantages and disadvantages of diverse teaching-learning modalities from multiple perspectives. Paul and Jefferson (2019) compared traditional and online learning to depict online education's flexibility and unparalleled opportunities and its drawbacks on student success rates. The quality of learning in the traditional, face-to-face approach strongly depends on the teachers. In contrast, online learning is more of a student-centered approach, where the learning quality is equally dependent on the student's approach, attitude, and skills (vanOostveen et al., 2018). Blended learning empowers students by providing the benefits of a face-to-face approach, allowing them to access the materials online.

The COVID-19 pandemic has forced pre-licensure nursing students to transition from a face-to-face learning environment to a blended learning environment for their theory classes and clinical practices. Students who attended the classes in a traditional, face-to-face platform in the beginning semesters completed the classes in an online environment towards the end of the nursing program. The sudden transition during the unprecedented time limited students' opportunities for hands-on clinical skills practice in hospital settings due to the pandemic, which presented logistical and practical challenges for patient safety (Salifu et al., 2018). Numerous research studies have been conducted on the quality of students' engagement, knowledge retention, and perception of the learning environment in traditional, face-to-face, online, and blended environments (Cao et al., 2021; Salifu et al., 2018). However, little evidence-based research on prelicensure nursing is available regarding the impact of transitioning from face-to-face learning to blended learning on theory and clinical components on NCLEX scores and the sub-scores. A need exists to explore a detailed understanding of the effects of the sudden transition to a blended learning format on NCLEX scores and sub-scores of safety and psychosocial integrity among pre-licensure nursing students.

1.1.1 *Purpose of the Study*

The purpose of this quantitative, correlational research study was to compare the NCLEX score rates and sub-scores of psychosocial integrity and safety using data from multiple cohorts of the pre-licensure nursing program to evaluate the impact of the sudden transition from face-to-face learning to a blended learning format. The specific goal was to examine whether there is a significant impact on NCLEX scores and sub-scores of psychosocial integrity and safety for multiple cohorts after sudden transitioning from face-to-face learning to a blended learning format.

The following research questions guided this quantitative, correlational research study:

RQ1. Is there a significant association in NCLEX scores between the students enrolled in a blended course and students enrolled in a face-to-face course among nursing students in an undergraduate nursing program?

RQ2. Is there a significant association on NCLEX exam sub-scores on nursing concept safety between the students enrolled in a blended course and students enrolled in a face-to-face course among undergraduate nursing students?

RQ3. Is there a significant association on NCLEX exam sub-scores on nursing concept psychosocial integrity between the students enrolled in a blended course and students enrolled in a face-to-face course among undergraduate nursing students?

Hypotheses

H_1: There is a significant association on NCLEX scores between students enrolled in a blended course and students enrolled in a face-to-face course among nursing students of an undergraduate nursing program.

H_{01}: There is no significant association on NCLEX scores between students enrolled in a blended course

and students enrolled in a face-to-face course among nursing students in an undergraduate nursing program.

H_2: There is a significant association on NCLEX sub-scores on nursing concept safety between the students enrolled in a blended course and students enrolled in a face-to-face course in an undergraduate nursing program.

H_{02}: There is no significant association on NCLEX sub-scores on nursing concept safety between the students enrolled in a blended course and students enrolled in a face-to-face course in an undergraduate nursing program.

H_3: There is a significant association on NCLEX sub-scores on nursing concept psychosocial integrity between the students enrolled in a blended course and students enrolled in a face-to-face course in an undergraduate nursing program.

H_{03}: There is no significant association on NCLEX sub-scores on nursing concept psychosocial integrity between the students enrolled in a blended course and students enrolled in a face-to-face course in an undergraduate nursing program.

2. Methodology and Sample

This research study was conducted utilizing pre-existing NCLEX data of eligible participants that included 218 learners from the face-to-face platform and 221 learners from the blended platform of an ADN program at a large community college in South Florida. The study's independent variable was the enrollment track, which included face-to-face and blended learning platforms. The dependent variables for the study were NCLEX scores and subcategory scores of safety and psychosocial integrity. Pre-existing data obtained on NCLEX scores and subcategory scores on students from the face-to-face platform and blended platforms were coded separately in three sets using '0' for fail grade and '1' for pass grade to assess the correlation. The chi-square test of independence and Phi were employed to test the null hypothesis (Laerd Statistics, 2018).

The study used a convenience sample of pre-licensure nursing students from a public community nursing college in South Florida who completed the NCLEX Exam between 2019-2021. The sample frame for this study consisted of all learners enrolled in the different cohorts of the blended track and the face-to-face track of the college's pre-licensure nursing program. The study was conducted using students from four different cohorts of the pre-licensure nursing program of a public community college in South Florida.

3. Data Analysis and Results

The chi-square test of independence and Phi were employed to test the association between the two variables. Three statistical assumptions of the chi-square test were met by design: both variables were categorical (dichotomous); observations were independent, and all cells had at least five observations (Laerd Statistics, 2018). The NCLEX exam is scored twice, initially at the exam test center and finally by the Pearson VUE (McGillis Hall et al., 2019). The reliability of the NCLEX exam is assessed through a decision consistency statistic (NCSBN, 2021b). The NCLEX exam has previous validation for construct validity, content validity, and scoring validity by the NCSBN and therefore is a valid evaluation tool that measures students' preparedness for licensure (NCSBN, 2021a). Additionally, the student investigator compared the data obtained from the college's archival records with the NCLEX scores and sub-score data under the possession of the institution's evaluation committee. There were no incongruencies between the data obtained by the investigator and the institutional evaluation committee data set.

Research Question 1 Results

The first research question asked if there was a statistically significant association between NCLEX scores of the students in the face-to-face course and the blended course of an undergraduate nursing program. The chi-square test of independence and Phi were employed to test the null hypothesis of no association between the two variables. Three statistical assumptions of the chi-square test were met by design: both variables were categorical (dichotomous); observations were independent, and all cells had at least five observations (Laerd Statistics, 2018). There was a statistically significant relationship between the two variables. Students who took their NCLEX after completing F2F modality learning were more likely to pass (82.6%) than students who took their NCLEX following blended modality learning (72.4%), $X2$ (1, N F2F = 218, N blended = 221) = 88.5, $p < .001$. The null hypothesis was rejected for Research Question 1. The effect size was very large (Phi = .67). According to Cohen (1988), the effect size is low if the value of r varies around 0.1, medium if r varies around 0.3, and large if r varies more than 0.5. Scatter plots were not used in the study as the study used nominal data.

Research Question 2 Results

The second research question asked if there was a statistically significant association between NCLEX exam sub-scores on nursing concept safety between the students enrolled in a blended course and students enrolled in a face-

to-face course among undergraduate nursing students. The chi-square test of independence and Phi were employed to test the null hypothesis of no association between the two variables. Three statistical assumptions of the chi-square test were met by design: both variables were categorical (dichotomous), observations were independent, and all cells had at least five observations. There was no significant relationship between the two variables. Students who attempted the safety subsection of NCLEX following F2F modality learning were equally likely to pass (57.8%) than students who took their safety subsection NCLEX following blended modality learning (57.9%), $X2$ (1, N F2F =218, N blended = 221) = 2.3, $p < .133$. The null hypothesis was retained for Research Question 2.

Research Question 3 Results

The third research question asked if there was a statistically significant relationship between NCLEX exam sub-scores on nursing concept psychosocial integrity among the students enrolled in a blended course and students enrolled in a face-to-face course among undergraduate nursing students. The chi-square test of independence and Phi were employed to test the null hypothesis, and there was no association between the two variables. Three statistical assumptions of the chi-square test were met by design: both variables were categorical (dichotomous), observations were independent, and all cells had at least five observations. There was not a significant relationship between the two variables. Students who took their psychosocial subsection of NCLEX following F2F modality learning were equally likely to pass (53.2%) than students who attempted their psychosocial subsection NCLEX following blended modality learning (55.7%), $X2$ (1, N F2F = 218, N blended = 221) = .86, $p < .355$. The null hypothesis was retained for Research Question 3.

4. Conclusions

Nurse educators are challenged to develop critical thinking abilities among nursing students that will translate and evolve into clinical decision-making skills in dynamic, high-stakes practice settings (Salifu et al., 2018). Nursing programs support student nurses in developing competence and skills to provide safe, effective care in the hospital setting. Even though blended, face-to-face and online learning have been widely utilized for more than a decade for teaching-learning in the nursing education field, the periodic comparison of its impact on students' outcomes helps identify the gaps.

Historically, the success of nursing programs is measured by NCLEX examination success rates. The NCLEX success rate is crucial for continuing accreditation of the pre-licensure nursing program and will solve the nursing staff crisis by increasing the number of licensed practicing R.N.s in the workforce (Olbrych, 2018). The findings of the study are crucial, as this offers better opportunities for the expansion of teaching and learning practices in face-to-face and blended learning environments of the pre-licensure nursing programs. The problem is the impact of the sudden transition from face-to-face learning to a blended learning format on NCLEX score rates and sub-scores among pre-licensure nursing students. Evidence obtained from this research study will guide nurse educators in optimizing the learning platforms and strategies to improve learning outcomes and NCLEX scores.

The study is of paramount importance with this COVID-19 pandemic, as this research study reveals the impact of an unexpected transition to blended learning through a comparative analysis of NCLEX score reports and sub-score reports. The results from this research study were aligned with existing research findings (Olbrych, 2018; Paul & Jefferson, 2019). The perceived student outcome in terms of NCLEX scores significantly impacted the transition of learning from a face-to-face to a blended platform. The null hypotheses of this research question were rejected. The outcome could mean the nursing program should investigate the drawbacks of the sudden learning transition to a blended format. Additionally, the flexibility of teaching-learning to adapt to the global pandemic during transition can be modified to support NCLEX results and increase the additional graduate numbers of nursing students.

The shortage of licensed professional nurses has tremendously affected the quality of healthcare delivery (AACN, 2021). Subsequently, nursing schools are challenged to educate nursing students faster (Fawaz et al., 2018). The major barriers to increased student enrollment at nursing schools are limited institutional capacities, class schedules, and increased faculty shortages (AACN, 2020). Therefore, the utilization of diverse teaching platforms can help solve this crisis to some extent. However, nursing colleges are always reluctant to modify the teaching-learning environment or incorporate diverse strategies without proper evidence-based data due to the fear of jeopardizing the NCLEX exam success rates. Results from this research study can help modify appropriate teaching-learning platforms to foster successful student learning outcomes and NCLEX success rates. Results can guide the educator in developing alternative pathways to overcome unexpected challenges in teaching and learning during unprecedented times. Additionally, this will guide the educators to be better prepared in the future for the sudden transition by understanding the gaps and trends of the NCLEX scores and sub-scores.

References

AACN. (2020). *Interdisciplinary education and practice*. American Association of College of Nursing.

https://www.aacnnursing.org/News-Information/Position-Statements-White-Papers/Interdisciplinary-Education-Practice

American Association of College of Nurses. (2021). *Data spotlight: Insights on the nursing faculty shortage*. American Association of Colleges of Nursing (AACN). https://www.aacnnursing.org/News-Information/News/View/ArticleId/25043/data-spotlight-august-2021-Nursing-Faculty-Shortage

Cao, W., Hu, L., Li, X., Li, X., Chen, C., Zhang, Q., & Cao, S. (2021). Massive open online courses-based blended versus face-to-face classroom teaching methods for fundamental nursing course. *Medicine*, *100*(9), e24829. https://doi.org/10.1097/md.0000000000024829

Carter, R., Jr., Rice, M., Yang, S., & Jackson, H. A. (2020). Self-regulated learning in online learning environments: Strategies for remote learning. *Information and Learning Sciences*, *121*(5/6), 321–329. https://doi.org/10.1108/ils-04-2020-0114

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Routledge.

Davis, D., McLaughlin, M. K., & Anderson, K. M. (2022). Universal design for learning: A framework for blended learning in nursing education. *Nurse Educator, 47*(3), 133-138.

Dewart, G., Corcoran, L., Thirsk, L., & Petrovic, K. (2020). Nursing education in a pandemic: Academic challenges in response to COVID-19. *Nurse Education Today*, *92*, 104471. https://doi.org/10.1016/j.nedt.2020.104471

Fawaz, M. A., Hamdan-Mansour, A. M., & Tassi, A. (2018). Challenges facing nursing education in the advanced healthcare environment. *International Journal of Africa Nursing Sciences*, *9*, 105–110. https://doi.org/10.1016/j.ijans.2018.10.005

Florida Center of Nursing. (2019). *2019 annual report*. Florida Center of Nursing. https://floridasnursing.gov/forms/2019-fcn-annual-report.pdf

Laerd Statistics. (2018). One-way ANOVA - An introduction to when you should run this test and the test hypothesis. https://statistics.laerd.com/statistical-guides/one-way-anova-statisticalguide.ph

Lemay, D., Bazelais, P., & Doleck, T. (2021). Transition to online learning during the COVID-19 pandemic. *Computers in Human Behavior Reports*, *4*, 100130. https://doi.org/10.1016/j.chbr.2021.100130

Li, C., He, J., Yuan, C., Chen, B., & Sun, Z. (2019). The effects of blended learning on knowledge, skills, and satisfaction in nursing students: A meta-analysis. *Nurse Education Today*, *82*, 51–57. https://doi.org/10.1016/j.nedt.2019.08.004

McGillis Hall, L., Lalonde, M., Visekruna, S., Chartrand, A., Reali, V., & Feather, J. (2019). A comparative analysis of nclex pass rates: Nursing health human resources considerations. *Journal of Nursing Management*, *27*(6), 1067–1074. https://doi.org/10.1111/jonm.12752

NCSBN. (2021). *NCLEX fact sheet*. https://www.ncsbn.org/publications/2021-nclex-fact-sheet

NCSBN. (2021a). *COVID-19 impact to NCLEX candidates*. https://www.ncsbn.org/14428.htm

NCSBN. (2021b). *NCLEX pass rates*. https://www.ncsbn.org/15858.htm

NCSBN. (2021c). *NCSBN and the American Nurses Association issue new joint national guidelines for nursing delegation*. https://www.ncsbn.org/13546.htm

Olbrych, D. D. (2018). Predicting the NCLEX-RN pass rate at an Associate Degree Nursing Program. *Walden Dissertations and Doctoral Studies*.

Paul, J., & Jefferson, F. (2019). A comparative analysis of student performance in an online vs. face-to-face environmental science course from 2009 to 2016. *Frontiers in Computer Science*, *1*. https://doi.org/10.3389/fcomp.2019.00007

Salifu, D., Gross, J., Salifu, M., & Ninnoni, J. (2018). Experiences and perceptions of the theory-practice gap in nursing in a resource-constrained setting: A qualitative description study. *Nursing Open*, *6*(1), 72–83. https://doi.org/10.1002/nop2.188

vanOostveen, R., Desjardins, F., & Bullock, S. (2018). Professional development learning environments embedded in a collaborative online learning environment: Moving towards a new conception of online professional learning. *Education and Information Technologies*, *24*(2), 1863–1900. https://doi.org/10.1007/s10639-018-9686-6