Predicting the Success of Nursing Students: Literature Review

Elijah E. Lamb

Lakeview College of Nursing

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Shelby Bosch, MSN-Ed, RN

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Literature reviews are helpful in the progress of all research. When researchers perform a literature review, they develop an understanding of the existing knowledge related to whichever topic they are researching. Additionally, literature reviews can help researchers formulate methods of conducting, organizing, and publishing their research. Quantitative studies define and measure specific variables utilizing the framework of the scientific method (Houser, 2023). Nursing and the education required to enter this field are often regarded as challenging and rigorous, and both instructors and employers are interested in determining what can be done to increase retention rates in education and the workforce. Many theories—formal and vulgar—discuss the factors responsible for the nursing shortage related to poor retention in nursing education, and the researchers behind the articles to be discussed in this paper aim to contribute to this conversation.

Nursing Students' Academic Success Factors: A Quantitative Cross-sectional Study

This article was written by Brown, McDonald, Besse, Manson, McDonald, Rohatinsky, and Singh and published in 2021. The research in this article examined the progress of nursing students throughout their time in nursing education. Each student's baseline was determined at the beginning of their first year in the nursing curriculum, and continued evaluation of their progress occurred at the end of every year until graduation. This data was collected to illustrate the strengths and areas for improvement among the nursing student population, predominantly—though not exclusively—relating to the direct impact of the nursing education curricula. The hope was to determine how to better assist nursing students in completing their education by

supporting them differently depending on their respective stages of progress in curricula (Brown et al., 2021).

Key Points

The researchers who wrote this article utilized the Academic Success Inventory for College Students (ASICS) as a tool for data collection in a cross-sectional fashion to determine the success and progression of success in nursing students throughout their years of education. Research utilizing ASICS to establish a student's baseline, as done by the researchers who wrote this article, is interested in examining a student's high school performance regarding their grade point average (GPA) and their perception of the social environment. For this article, researchers assessed a student's ongoing progress with ASICS by examining study skills, student confidence in their progress (rated on a numeric scale) and the importance of education, how students organized their schoolwork, and how students maintained their social life without compromising their academic performance. The study determined the areas where students most often excelled and compiled these results without using a p-value to quantify the significance/relevance and random chance of the data reappearing in a similar set. The results are that students excel in concentration, confidence, and motivation, while students have room to improve on studying and test anxiety. Even further, student shortcomings were most closely associated with poor organization, instruction, and assessment by the educators themselves (Brown et al., 2021). Thus, the article determined that reform is necessary for nursing education curricula to take better advantage of student successes and support students in their shortcomings.

Assumptions

The study outlined in this article discusses a relationship between nursing education curricula and retention and success rates with particular consideration for student strengths and shortcomings. Studying this relationship helps nursing educators modify curricula to maintain or improve student retention and success. The study determined that students would greatly benefit from the educators' remediation of organizing, teaching, and assessment strategies. The study also determined that students would benefit from improving test anxiety and studying techniques (Brown et al., 2021). Current research supports the idea that test anxiety significantly inhibits students' ability to excel in coursework while also pointing out that a deficiency in research exists regarding studying techniques for students, especially in the realm of nursing curricula.

Deficit/Conclusion

This article's line of reasoning discusses the relationship between the success of nursing students and the nursing curricula, with particular attention paid to the ability of educators and nursing students to comply with the curricula requirements. This inspection was achieved using the Academic Success Inventory for College Students (ASICS), which establishes student baselines and compares these to the ongoing progress of students—assessed at the end of every year (Brown et al., 2021). By observing study skills, student confidence, the student's perception of the importance of education, student organization, and students' balance between social and school lives, the researchers who wrote this article were able to evaluate this relationship. This assessment helps aid nursing education curricula for current and future students, which would assist nursing in preparing its students with the most up-to-date, supportive instruction. If nursing were to fail to adopt new teaching methods based on research as presented in this article and similar articles, this would undermine the nursing field's strength and lead to ill-prepared nurses

both currently and in the future. This student nurse agrees with this point put forth by the article. Where this study falls short is in defining and evaluating interventions for improving the shortcomings it defines throughout its writing. The article's failure to include this as part of the writing provides an example of research deficit in this specific article and in nursing research in general, which new searches into these topics may remediate.

Predicting Nursing Baccalaureate Program Graduates Using Machine Learning Models: A Quantitative Research Study

This article was written by Hannaford, Cheng, and Kunes-Connell and published in 2021. The research in this article examined the rates of attrition and poor likelihood of completion in baccalaureate nursing programs and how these rates may be managed by predicting student success via artificial intelligence and machine-learning models. Participating students were examined during the beginning of their first year of the nursing curriculum, and machine-learning models were used to predict, based on inputted information about the student, whether the student would finish the nursing curriculum within six years. The data was collected during this initial screening and at the beginning of every year for all four years. Data were collected only at the end of the sixth year for students enrolled in the nursing curriculum for five or six years. The data was collected in this fashion to surmise trends and relate these trends as scenarios for the machine-learning models to analyze and yield predictions of the student's success. The researchers hoped that, by collecting this data, they would aid future researchers and educators to perform a more individualized evaluation of student success/failure and make more effective alterations to the nursing curriculum to account for these findings as resulting from the nursing curriculum itself rather than the students' backgrounds (Hannaford et al., 2021).

Key Points

The researchers who wrote this article collected data from willing student participants who satisfied the following criteria: full-time, first-attempt, and degree-seeking. Data was collected in a correlational design on 773 students enrolled in a traditional four-year nursing baccalaureate program from 2004 to 2012 in an unidentified medium-sized, private, urban, Midwestern university. 245 of these 773 students did not graduate from this program within six years. These students yielded data the article's researchers placed into four major categories and seventeen subcategories (Hannaford et al., 2021).

The four major categories are as follows: high school, college, graduation status, and demographic background. High school subcategories include grade-point average (GPA), the state where the high school was located, and the time between high school completion and college enrollment. College subcategories include term GPA and cumulative GPA. Graduation status subcategories include graduated and not graduated. Demographic background subcategories include gender, ethnicity, marital status, religion, citizenship status, location of residence, whether the student had a pre-enrollment campus visit, whether the student qualifies as a first-generation college student, whether the student has ever been dismissed from college, and lastly the presence of felony conviction (Hannaford et al., 2021).

The study determined how these factors relate and correlate with an artificial intelligence-derived scenario generated from the machine-learning models. This outcome was accomplished without calculating a p-value to quantify the significance, relevance, and random chance of the data reappearing in a similar set. The results are that graduation rates varied between 63.5% and 74.5% from 2004 to 2012 and that machine-learning models built from the findings of this study

are more effective at predicting student success/failure at a rate of 74% to 100%, increasing in success as students progress closer to their fifth year of the curriculum. This model is more accurate than 98% of other models (Hannaford et al., 2021). Thus, the article determined that artificial intelligence and machine-learning models can be used to predict student success or failure in a nursing baccalaureate program. Even further, the article demonstrated that the machine-learning model utilized by the researchers is effective in predicting student success or failure.

Assumptions

The study outlined in this article discusses a relationship between select information about students and whether they will either succeed in or fail to complete a traditional four-year nursing baccalaureate program. Studying this relationship helps researchers in artificial intelligence and education determine whether machine-learning models can aid educators in performing more individualized student evaluations and tailoring the nursing curriculum based on these evaluations. The study confirmed that machine-learning models are effective, and the researchers feel that this data better equips them and similar researchers to support the use of artificial intelligence and machine-learning models in the nursing curriculum to decrease rates of attrition and increase rates of completion (Hannaford et al., 2021).

Deficit/Conclusion

This article's reasoning discusses the relationship between select information about students and whether they will succeed in a nursing program. This discussion was accomplished by collecting multiple types of information on students, which can be summarized into four

major categories: high school, college, graduation status, and demographic background. By examining these factors and inputting this information as scenarios into artificial intelligence-derived machine-learning models, the researchers of this article were able to evaluate the proposed relationship. They found that a relationship can be surmised, as well as that this relationship can be used to predict student success. Thus, the researchers concluded that educators could use this data to conduct more individualized evaluations of students, which would aid them in tailoring the nursing curriculum to prepare students better. This remediation would decrease attrition and increase student program completion (Hannaford et al., 2021).

This student nurse agrees that a more individualized evaluation of students and tailoring the nursing curriculum to these evaluations would increase student success. If educators were to fail to adopt the proposed changes, attrition rates would stay the same or increase, while program completion rates would stay the same or decrease. Additionally, nursing students who receive a less individualized evaluation of their efforts may be less likely to complete the nursing curriculum due to less relevant guidance from educators. One shortcoming of this article is that it needs to define specific methods of altering student evaluations to make them more individualized. This deficit, in turn, prevents educators from making adjustments to the nursing curriculum based on the findings of student evaluations.

Does Faculty Experience Count? A Quantitative Analysis of Evidence-Based Testing Practices in Nursing Baccalaureate Nursing Education

This article was written by Moore and published in 2021. The research in this article examined the ability of nursing educators to write error-free, evidence-based test questions that require higher-level thinking. Participating instructors were selected and categorized into five

groups based on the instructor's level of experience: novice, advanced beginner, competent, proficient, and expert (Moore, 2021). These categories are based on Benner's Novice to Expert theory (Hood, 2022). Individuals in the novice category have less than one year of experience; those in the advanced beginner category have one to two years of experience; those in the competent category have three years of experience; those in the proficient category have four to five years of experience; those in the expert category have more than five years of experience. The data was collected by surveying how many years each participating faculty member had. Then, a questionnaire was provided to reveal how compliant each instructor's test-writing ability was with evidence-based practices. The researchers compiled this evidence hoping to point out that poor instructor test-writing practice yields diminished success in nursing students. With this information, they sought to provide evidence that test-writing practices should have more guidelines and standardizations (Moore, 2021).

Key Points

The researchers who wrote this article collected data from willing educator participants who fell into one of the following categories based on their level of experience: novice, advanced beginner, competent, proficient, and expert. Data was collected in a causal-comparative quantitative design on 177 educators. Most of these individuals had MSN degrees, while some had DNP, fewer had Ph.D. in a study other than nursing, even fewer had MS in a field other than nursing, and one had a BSN (Moore, 2021).

To determine the effectiveness of the instructors' teaching methods, the researchers of this article pushed a questionnaire that asked the instructors to rank test-writing strategies from 1 to 7 on the likelihood of the instructor using it, and the points were tallied. The closer the tallied

score added up to 196, the more likely the instructor utilized evidence-based practice in formulating test questions (Moore, 2021).

The study then correlated these results to the instructors' experience level per Brenner's Novice to Expert theory. The study did use p-value verification to determine whether the findings were significant, relevant, and likely to occur randomly in a similar data set. The results indicated a positive correlation between the expert category and the likelier use of evidence-based practices in test writing. The null hypothesis was also successfully rejected, indicating that the results are legitimate. Thus, the authors concluded that faculty experience does predict nursing student success (Moore, 2021).

Assumptions

The study outlined in this article discusses whether there is a relationship between faculty experience and evidence-based test questions. The study puts forward the notion that exams containing more evidence-based test questions will result in tremendous student success, and it concluded that a more experienced instructor would contribute to tremendous student success (Moore, 2021).

Deficit/Conclusion

The study's reasoning suggests that faculty experience shapes baccalaureate nursing program students' ability to succeed via the amount of evidence-based practice incorporated into test writing. By quantifying faculty experience by number of years and assigning titles in line with Brenner's Novice to Expert theory as well as providing a questionnaire that quantifies the amount of evidence-based writing ability, researchers of this article were able to conclude that

faculty experience matters in student success. This conclusion was reached by finding a direct correlation between years of experience and the amount of evidence-based test writing ability. Thus, the researchers of this article concluded that faculty members with more experience should lead mentoring for faculty members with less experience. The researchers concluded that this mentoring should focus on test item writing, item analysis, and item revision. Faculty members with less experience should be required to engage in continued professional development (Moore, 2021).

This student nurse agrees that more experienced faculty should ensure that less experienced faculty feel equipped to provide evidence-based test questions. One risk of educators failing to adopt this mentoring method is students' success suffering, while the goal should be for student success to stay the same or improve (Moore, 2021). One shortcoming of this article is that it fails to provide specific, real-world examples of mentoring programs which led to the maintenance or improvement of student success.

Conclusion

This quantitative literature review discusses predicting student nurse success, which is accomplished by shedding light on multiple aspects of the nursing curriculum that contribute to the achievement of students. Each article discussed in this paper explores different features of nursing education and how these may contribute to or dampen student success in the baccalaureate nursing curriculum.

The first article of this paper, written by Brown et al. (2021), discusses the significance of areas students succeed and where students can improve. It utilized the ASICS tool to discuss how a student's academic lifestyle can be surmised from their performance in high school, college,

and social settings. This article also highlighted that educational reform should focus on student strengths while providing for student weaknesses (Brown et al., 2021).

The second article of this paper, written by Hannaford et al. (2021), discusses artificial intelligence and machine learning as methods of predicting student success in nursing baccalaureate programs. Researchers demonstrated that these models can successfully predict student success by collecting data from student participants, inputting this data as scenarios into a program, and reviewing real-world success/failure. The researchers proposed that this finding can aid in formulating more individualized evaluations of students and tailoring nursing curricula to improve completion rates (Hannaford et al., 2021).

The third article of this paper, written by Moore (2021), discusses the impact of faculty experience on evidence-based test writing in nursing education. The study found a positive correlation between faculty experience and the likelihood of using evidence-based practices in test writing, which suggests that faculty play a crucial role in promoting student success (Moore, 2021).

The information discovered in this literature review can be used to improve patient outcomes, nursing practice, evidence-based practice/quality improvement, and healthcare.

By identifying student strengths and weaknesses, nursing education programs can tailor their curricula to address specific areas of improvement. This individualized approach can produce more competent and confident nurses, improving patient care. Predictive models based on artificial intelligence and machine learning can help nursing programs identify students who may struggle and provide early interventions to support their success. This change can decrease student attrition rates and produce a more skilled nursing workforce, ultimately benefiting patient outcomes.

Recognizing the importance of evidence-based testing practices, nursing educators can implement effective test methods that evaluate higher-level thinking skills and critical reasoning. This skilled evaluation aligns with real-world nursing challenges, preparing students for better clinical decision-making. Experienced faculty members can mentor less experienced faculty using evidence-based practices, leading to improved teaching methods, standardized testing, and a more effective learning environment for nursing students. These changes will improve nursing practice.

The literature review highlights the significance of evidence-based practices in nursing education. As educators incorporate evidence-based teaching methods and test writing, students are better prepared to apply evidence-based practice in clinical settings, thus providing an example of quality improvement and implementing evidence-based practice.

Investing in educational reforms, research, and technology integration in nursing programs can lead to better-prepared nursing professionals contributing to healthcare practices and patient safety advancements. By aligning nursing curricula with real-world challenges, evidence-based practice, and patient-centered care, healthcare institutions will benefit from having highly competent and adaptable nursing professionals.

The information obtained from the literature review can drive positive change in nursing education and practice. By focusing on evidence-based teaching, student support, and predictive models, healthcare systems can foster a more skilled and resilient nursing workforce, leading to improved patient outcomes, better evidence-based practice implementation, and overall advancements in healthcare delivery.

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