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DNP Final Report: CHANGING ADMISSION CRITERIA IN A VOCATIONAL NURSING PROGRAM TO DECREASE ATTRITION

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CHANGING ADMISSION CRITERIA IN A VOCATIONAL NURSING PROGRAM TO DECREASE ATTRITION

by

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A DNP Scholarly Project submitted in partial fulfillment
of the requirements for the degree of
Doctor of Nursing Practice
School of Nursing

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Dedication

This project is dedicated to my loving and supportive husband Scott Davis. I could not imagine going through this journey without you at my side.

TABLE OF CONTENTS

List of Tables

List of Figures

Abstract

CHANGING ADMISSION CRITERIA IN A VOCATIONAL NURSING PROGRAM TO DECREASE ATTRITION

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The University of Texas at Tyler
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By the year 2030 Texas will have a shortage of 33,500 Licensed Vocational Nurses (LVN). The LVN is responsible for providing safe, compassionate and focused nursing care to assigned patients with predictable health care needs. Most LVNS work in settings caring for our ever increasing and aged population. To combat the coming shortage VN programs need to graduate safe, competent, and compassionate nurses, but programs across the state are experiencing high student attrition rates. Admission criteria is a common method to determine student success in nursing programs. This evidence-based practice improvement project synthesized evidence and integrated best practices along with client preference to change the admission criteria to reduce student attrition within a large VN program in Central Texas.

Keywords: attrition, vocational, nursing, student, school, program

Chapter One: Development of the Leadership Question and Problem Identification

Background and Significance

It is projected that by 2030 Texas will have a shortage of 33,000 Licensed Vocational Nurses (LVN), the largest in the United States (U.S. Department of Labor, 2017). Texas is facing a shortage of practicing nurses that will continue to deteriorate if enrollment and graduation rates do not keep up with the population growth (Auerbach, Buerhaus, & Staiger, 2017). The U.S. Department of Labor (USDOL) reports that 38% of LVNs work in long-term care settings with vulnerable older populations (USDOL, 2017). In the next decade, as the rest of the Baby-Boomer Generation reaches retirement age, the job outlook for LVNs is projected to grow by 16% (USDOL, 2015). To meet the needs of Texans there must be sufficient VN students who graduate from their respective nursing programs, pass their licensure exam, and enter the workforce.

Admission criteria establish the minimum requirements to attend an educational institution and/or the select programs within that institution. Standardized testing and existing grade point average (GPA) are common components of admission criteria to educational institutions and/or select programs within educational institutions (Holly, 2014). Nursing programs, including associate degree in nursing (ADN), bachelor's degree in nursing (BSN), and licensed vocational/practical nursing (LVN/LPN), have admission criteria. Admission criteria to nursing school provide metrics to predict student success, and are used to reduce program attrition, increase graduation rates, and improve success in passing the National Council Licensure Examination (NCLEX) to achieve licensure (ATI, 2011; Chen & Voyles, 2013; Cline, 2013; Dunham & Alameida, 2017; Grace, 2017; Knauss & Wilson, 2013; Pritchard, 2010; Twidwell & Records, 2107; Wolkowitz & Kelley, 2010).

Development of Clinical Question and Problem

Internal Evidence

Student attrition in a VN program in Central Texas has resulted in a three-year graduation rate of 53%. The VN program admits approximately 50 students twice a year. The highest attrition occurs in the first semester, also known as level one. Attrition is predominantly a consequence of students failing one or more courses or withdrawing while failing. The level one attrition rate for over five recent consecutive cohorts was 35%. The result of such high student attrition and consequently lower graduation rates are fewer qualified nurses entering the workforce.

CRITERIA	POINTS
ATI TEAS (Nursing) Admission Examination* *(Applicant must complete PRIOR to submission of application.)*	Developmental-0 points Basic - 1 point Proficient - 2 points Advanced - 3 points Exemplary - 4 points
Completion of BIOL 2404 Introduction to Anatomy and Physiology or Anatomy and Physiology I and II** *(If taken prior to start of program.)*	A - 6 points B - 4 points C - 2 points
Completion of HPRS 2300 Pharmacology for Health Professions** *(If taken prior to start of program.)*	A - 6 points B - 4 points C - 2 points
Submission of Application to Vocational Nursing Program	5 points
Information Session *(in-person or online)*	1 point
Reapplication Sheet and current Information Session *(in-person or online)*	6 points

*Denotes TEAS test score expires two (2) years from date of examination
**Denotes science courses expire five (5) years since last attempt. Course has a prerequisite as required by the college. Will accept BIOL 2304 and BIOL 2101 from other accredited colleges if within timeframe. If taking Anatomy and Physiology I and II, the courses must be from the same College or University.

Figure 1. Admission criteria ranking formula for VN program (ACC, 2018)

The eligibility criteria for this VN program was that the applicant is a registered student at the college, has meet technical physical performance standards to perform didactic and clinical work, and has taken the Test of Essential Academic Skills (TEAS) exam. The TEAS, created and administered by Assessment Technologies Institute (ATI), is a multiple-choice format test

that measures basic academic readiness in reading, math, science, English, and language usage (ATI Nursing Education, 2016). Application and admission to the program did not require a minimum GPA, nor were there prerequisites, nor a minimum score required on the TEAS test. However, admission selection is based on ranking applicants using scoring system applied to grades in certain anatomy and physiology or pharmacology courses, TEAS category, and submission of various information forms (see Figure 1).

The program can accept a maximum of 50 students in each biannual cohort. Those applicants with higher overall rankings are offered admission. Students accepting admission must further pass a criminal background check, drug screening and physical, have up-to-date immunizations, and have provider cardiopulmonary resuscitation training. Enrolled students attend a three-semester 43 credit hour program, which is typical for the state of Texas (Texas Board of Nursing, 2016).

An analysis of internal data from the nursing program was conducted. The data analysis was inclusive of five consecutive entering cohorts from Fall 2015 through Fall 2017 totaling 232 admitted students and tracked all but the last entering cohort through graduation. A correlational analysis was conducted to examine the relationship between TEAS score and level one outcomes for an individual student, as well as the individual student's graduation success. Additionally, the cohorts were examined for the relationship between persistence through level one of high TEAS scoring students in relation to the concentration of lower TEAS scoring students in each cohort. The analysis shows those with lower TEAS scores fail level one of the nursing program at a much higher frequency (see Figure 2). In summary, students with TEAS scores of 0.50 or less exhibited a level one failure rate of 56%, compared with the higher scoring TEAS students' failure rate of 13%.

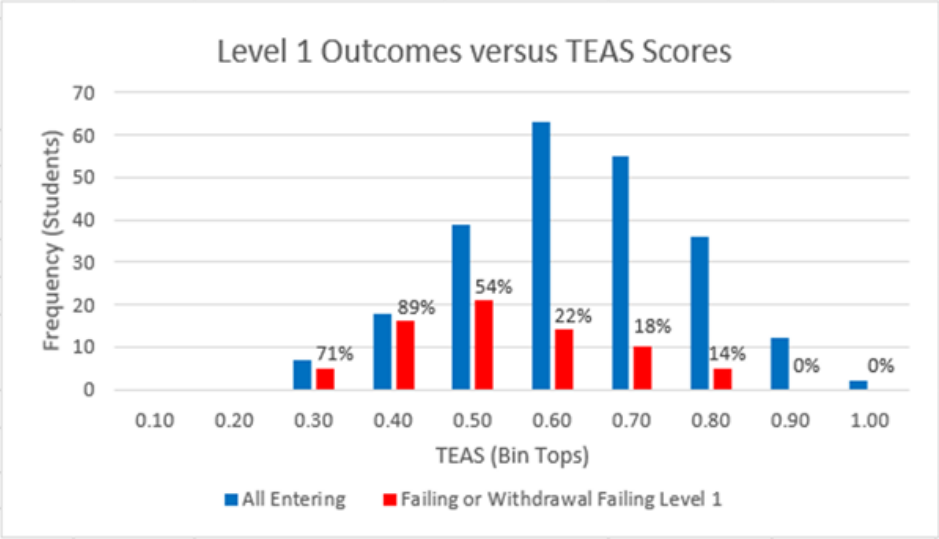

Figure 2. Level one outcomes versus TEAS scores for five cohorts

Similarly, students with TEAS scores below 0.50 exhibited a graduation rate of 14%; in other words, 86% of those with a TEAS of less than 0.50 did not complete the program (see Figures 3 and 4).

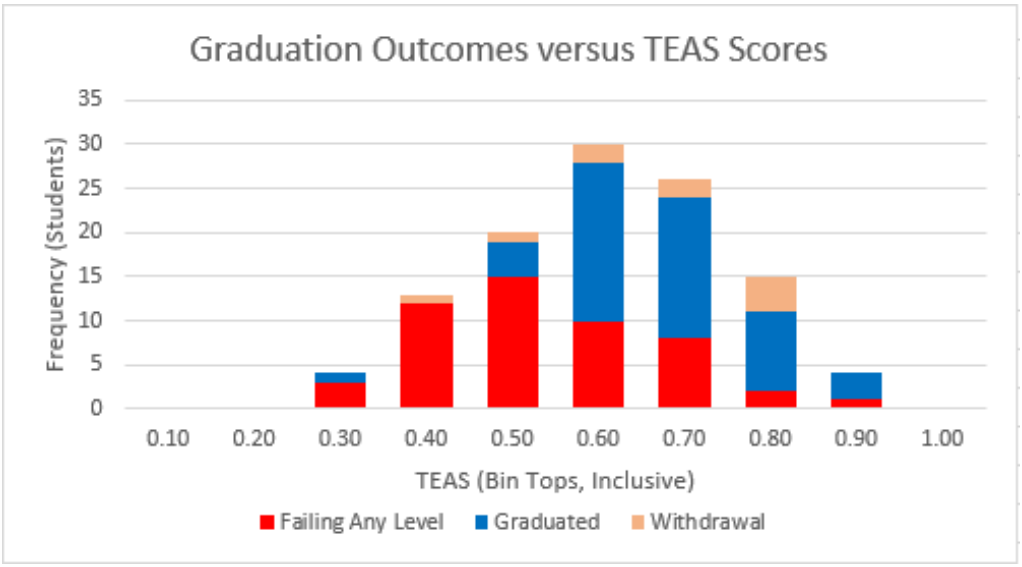

Figure 3. Graduation outcomes versus TEAS scores

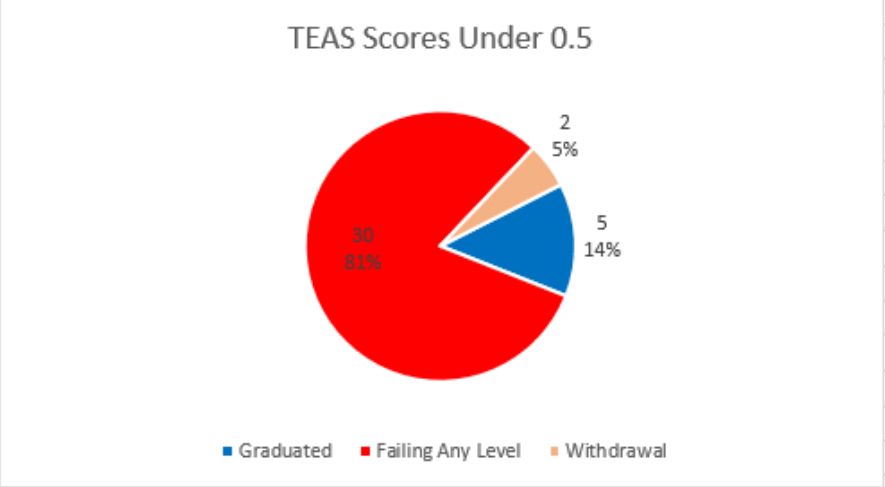

Figure 4. Outcomes for those students with a TEAS score under 0.50

Finally, an analysis of the effect of high concentrations of low TEAS scoring students on students with high TEAS scores within a cohort was conducted. The data analysis shows that cohorts with higher concentrations of low scoring TEAS students (<0.50) negatively impact the persistence of higher TEAS scoring students (see Figure 5). The blue line utilizes all five of the

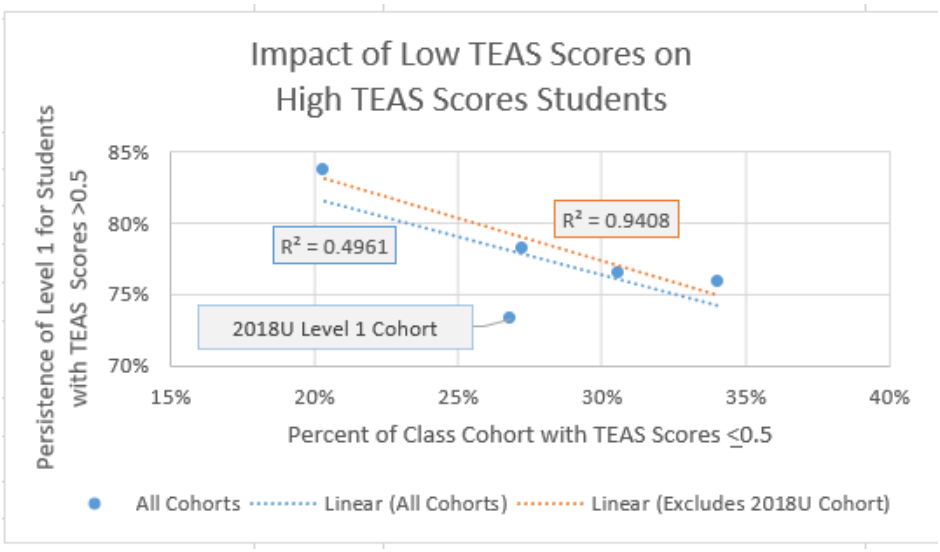

Figure 5. Impact of cohort with overall low TEAS on the persistence of the whole cohort.

cohorts' data for persistence through Level One. The r-square of 0.496 indicates a possibly

strong correlation between the concentration of low TEAS scoring students negatively impacting the balance of the higher scoring students.

Note, however, that the 2018U cohort appears to be an outlier; that is, the high TEAS scoring students (>0.50) in the 2018U cohort performed more poorly (more failed out) than might have been expected (explained) by the trend of percent of the class cohort being low TEAS scoring students. Removing 2018U cohort, the orange line shows a very strong correlation with an r-square of 0.94. Thus, the data strongly suggest that inclusion of high concentrations of low TEAS scoring students not only hurts overall graduation rates due to their lack of success but also negatively impacts persistence of the higher TEAS scoring students, which further impacts overall graduation rates.

Program costs inclusive of tuition, fees, supplies, textbooks, and other miscellaneous items such as uniforms depends on the residency of the student, but varied from $6,542 for in-district, $18,410 for out-of-district, and $21,549 for out-of-state and international students (Austin Community College, n.d.). Up to 60% of those costs are incurred by the student in the first semester. Some students who do not complete a level apply for readmission, and although

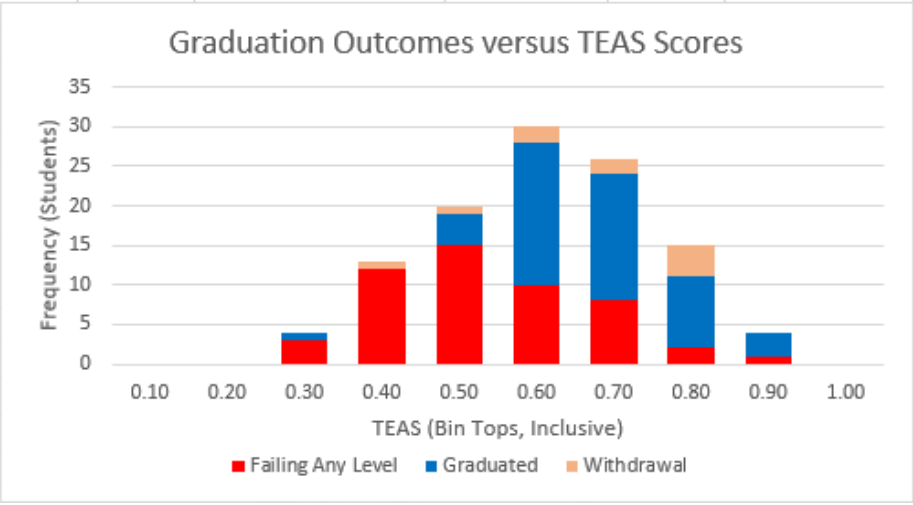

Figure 6. Outcomes for those readmitted students and their TEAS scores

their costs to re-take a level are usually limited to tuition, those re-admits with a TEAS below 0.50 are unlikely to persist to graduation (see Figure 6).

External Evidence

According to the Texas Department of State Health Services (TDSHS) most of the 91 VN programs in Texas are in metropolitan areas and are a division of a college or university (TDSHS, 2017a). Within the state of Texas, there has recently been an increase in seats for new students and in qualified applicants (TDSHS, 2017a). While there is no standard for admission qualification in VN program, a review of the websites of VN programs in Central Texas shows that while all use a standardized admission test as part of an admission matrix, only one has a cut score to apply. Throughout the years VN programs in Texas have experienced about a 50% attrition rate (Texas Board of Nursing, 2017; TDSHS, 2017b).

Admission criteria are meant to provide discernment for predicting student success. Considering the data presented linking student success and TEAS scores, and the implications of high concentrations of low TEAS scoring students on other students and overall program graduation rates, the following PICOT question arises: In a vocational nursing program (Population) how does changing the admission criteria (Intervention) compared to the current methodology for admission (Control) affect student attrition (Outcome) within a level one semester (Time)?

Chapter 2: Evidence Synthesis and Model of Evidence-Based Practice

Systematic Search for Evidence: Process

Answering the PICOT question requires a systematic search for evidence. Accurate records of systematic searches provide the researcher and other interested parties confidence in the results, helps to attain the best relevant evidence to answer a clinical question and avoids unnecessary duplication of work. (Melnyk, Gallagher-Ford, & Fineout-Overholt, 2017; Hartzell, Fineout-Overholt, Hofstetter, & Ponder, 2015). The process for searching was guided by the use of a PICOT. Main topics were developed from the natural language in the P, I, O portions of the PICOT question: admission criteria; nursing program or nursing school; and attrition. Searching was conducted in the databases Cochrane, PubMED, CINAHL, and Science Direct. Terms were searched by keywords, titles, and subject headings in combinations of three terms in the Cochrane search and by all fields in the PubMED, CINAHL, and Science Direct. There were no exclusion criteria. Each systematic search was captured as screenshots (see Appendix A).

Systematic Search for Evidence: Results

The initial yields are evaluated by examining article titles and abstracts for relevance to the PICOT question keywords “admission criteria”; “nursing program or nursing school”; and “attrition”. Titles and abstracts were reviewed for majority themes in the PICOT, then the relevant articles are subject to review by a general appraisal overview form (GAO) and data-specific rapid critical appraisal form (RCA) for analysis of study validity (see Appendix B).

The initial results from the Cochrane database from keyword combinations and MeSH terms were 168 studies for evaluation (See Appendix A1). The initial result of 65 studies for evaluation from PubMed by searching the same combination of keywords in all fields and by combining MeSH terms (see Appendix A2). From the CINAHL database, 37 articles were found

in the initial yield (see Appendix A3). From the Science Direct database, the initial yield was 196 possible articles (see Appendix A4). Finally, two dissertations and one study from the previous searching when first considering the subject are also included in the initial yield. A total of 469 potential papers were identified in the aforementioned searching. The final yield for this project was nine papers (see Figure 7).

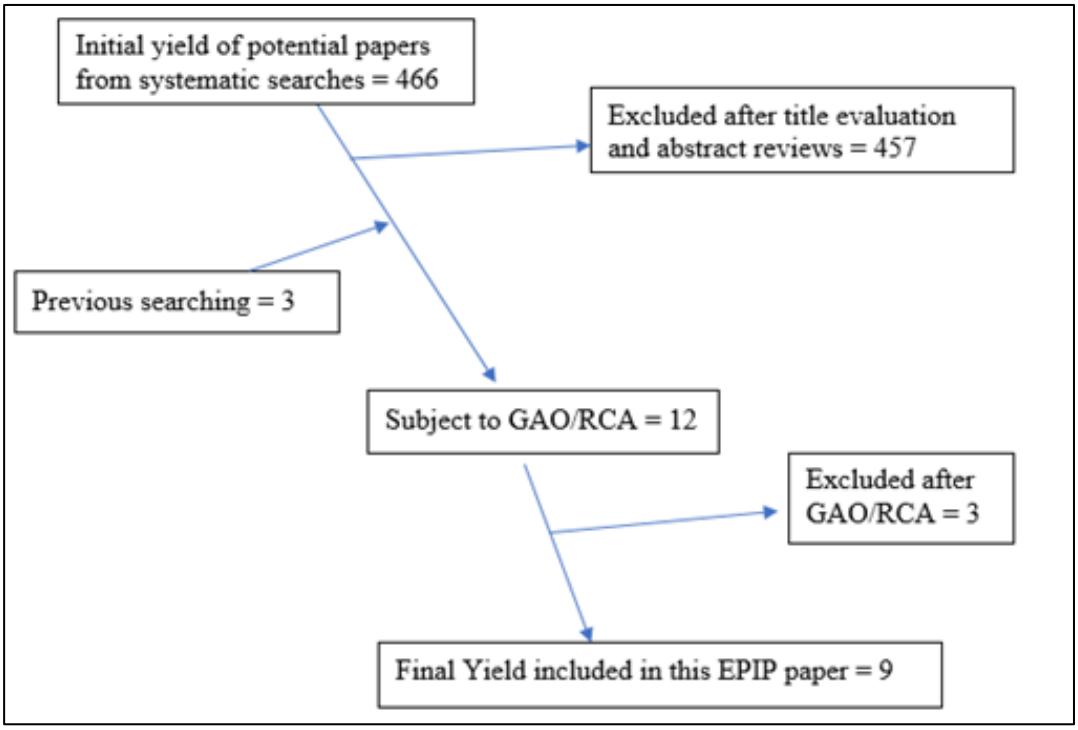

Figure 7. Search result, inclusion and exclusion methodology, and final yield

Critical Appraisal of Evidence

Rapid critical appraisals

Those studies which met the minimum standards in the RCA and GAO (see Appendix B) and were applicable for synthesis are included in the critical appraisal of the evidence. Those studies which did not meet these standards were excluded. All 168 studies from the Cochrane database in the initial yield were excluded after the review of the titles. In PubMed 65 articles were subject to title review which excluded 56 articles leaving nine for abstract review,

following the abstract review six articles were excluded, leaving three articles for further evaluation; two were available for download and one was requested from the library. In CINAHL 37 articles were in the initial yield, two were duplicates from the PubMed results and 32 were excluded after the title and abstract review, leaving two articles and one dissertation for further review. In Science Direct the initial yield was 196 articles, after title review two were found to be duplicated from the previous searching, five were subject to abstract review after which three were retained for further examination. Finally, two dissertations and research paper generated by ATI all located from the previous searching are also included for review. The remaining 12 papers underwent GAO/RCA evaluation, resulting in the exclusion of three papers. Thus, the final yield from all search methodologies was six articles and three dissertations totaling nine papers.

Evaluation

The nine articles in the final yield were critically appraised via an evaluation table (see Appendix C) and various synthesis tables (see Appendix D). Two papers are level one evidence (LOE) I and seven papers are LOE IV. One article, an integrative review, provides a descriptive analysis of 15 quantitative studies wherein the preponderance of the evidence shows a strong correlation between standardized nursing school admission test scores and student success (ATI, 2011). The second level I article is a meta-analysis analyzing aggregated data from three articles reviewing the student records for both RN and PN students in metrics of attrition and student success (Twidwell & Records, 2017).

As noted in synthesis table 1D (see Appendix D) four articles and three dissertations are cohort studies providing level IV evidence. These seven cohort studies used nursing school student records to test the correlation between student success and the various metrics of

admission criteria, such as composite and sub-scores in standardized nursing school admission testing, grade point average (GPA) or pre-requisite coursework. These studies showed significant correlations between composite standardized admission test scores and metrics of student success. Further, one of these cohort studies also examined which standardized admission testing is most reliable in predicting student success. Each article was critically appraised in a synthesis table 2D for commonalities in the effect of components of admission criteria with early attrition and other metrics of student success, and in synthesis table 3D for commonalities in the student populations in each article or dissertation (see Appendix D).

Synthesis

As noted in the evaluation table (see Appendix C) and synthesis table 1D (see Appendix D) the LOE for all studies in this paper are delineated by the criteria in Melnyk et al. (2017, pp. 78-79). Studies retained for this paper are LOE I-IV. These higher levels of evidence, the data analyses, and the data produced in each study invoke confidence in the body of evidence for this project.

One common form of admission criteria for nursing programs is standardized testing such as TEAS and the Health Education Systems, Inc. (HESI) test. The scores for both exams can be considered as an overall composite score or as an individual score on each subsection. The subsections are similar in both tests. The TEAS exam assesses the areas of reading, math, science, and English language and usage. The HESI tests English language, math, science, and a learner profile. Other less frequently examined admission tests include the American College Test (ACT), SAT and the Computer Adaptive Placement Assessment and Support System (COMPASS), all of which measure mathematical and verbal skills. The studies referenced in the evaluation table provided in Appendix B indicate that the composite scores for the TEAS and

HESI standardized testing methods are a valid and reliable method to predict decreasing attrition, also known as early student success, or program completion (ATI, 2011; Chen & Voyles, 2013; Dunham & Alameida, 2017; Grace, 2017; Knauss & Wilson, 2013; Twidwell & Records, 2017; Wolkowitz & Kelley, 2010), and success on the NCLEX (Dunham & Alameida, 2017).

Examining each admission criteria separately reveals that the TEAS composite test score is significantly ($p<.0001$) related to decreased attrition or other metrics of early success, as well as to graduation ($p<.0001$) in a nursing program (ATI, 2011; Wolkowitz & Kelley, 2010; Dunham & Alameida, 2017; Grace, 2017). Further, as Dunham & Alameida (2017) note, each point of increase on the TEAS composite mean score is indicative of a 1.046 increase in RN completion rate. Grace (2017) notes that for each point increase on the TEAS the odds ratio of graduation increased 1.034 times and passing the NCLEX increased by 1/042 times. Twidwell & Records (2017) integrative review concluded that the value of the composite TEAS score needs more study but is a reliable predictor of student success. Results are inconclusive on TEAS sub-scores; Cline (2013) found all TEAS sub-score areas except math weakly correlated ($p<.05$) to success metrics. Wolkowitz & Kelley (2010) found significance ($p<.0001$) in all sub-score areas, except math, for aggregate data from ADNs and BSNs. The TEAS scores and student success metrics have been examined in PN, ADN, and BSN programs. Thus, the composite TEAS score is a reliable and accurate admission criterion to predict student success and decrease attrition in the VN program.

As noted in the integrative review (ATI, 2011), 60% of practical (Vocational) nursing students with a TEAS score of at least 58.7% exhibit success on the Fundamentals PN exam which is a measure of early success in nursing school. The same study notes that when students score at least 78% on the TEAS their success rate increases to 82%, and at a TEAS score of

≥90.6% there is 100% success. Although the TEAS is the same test for RN or VN school, RN programs may have a cut-score, that is a score that is a cut-off point for accepting an application. In examining changing the cut-score for the California College system, Dunham & Alameida (2017) conclude, the cut score of 62% on the TEAS produces an odds ratio of 2.35, indicating the score is an accurate predictor of student success. The authors note that although raising the cut-score to 64% would produce a slightly better odds ratio (2.47) the benefits of raising the score does not outweigh the impact to change in the state system. Other studies do not offer a cut-score or a minimum score that is correlated with early program success but do assert that as the TEAS composite scores increase so does early success, graduation, and NCLEX pass rates (Grace, 2017; Twidwell & Records 2107; Wolkowitz & Kelley, 2010).

The additional data on the HESI, COMPASS, and ACT/SAT provide support for the use of standardized testing as a reliable predictor of nursing school success but do not provide compelling evidence to suggest the VN program change to another admission exam. The HESI composite scores and sub-scores are also statistically significant ($p<.001$) metrics to predict student success and decrease attrition in ADN and aggregate ADN/BSN datasets (Chen & Voyles, 2013; Knauss & Wilson, 2013). Twidwell & Records (2017) conclude that the HESI is a reliable indicator of student success. No studies of the HESI or ACT/SAT for VN programs were found, and although there is abundant evidence for the efficacy of the HESI in RN programs it is indeterminable if this standardized exam would be of more value to the VN program than the one already in use, the TEAS. The COMPASS test is phased out and no longer available for use. Twidwell & Records (2017) found value in the ACT and SAT as a predictor of student success, but the authors also note that there are inadequate studies on these two college placement tests for nursing school admissions. The VN students already take a placement test,

the TSI, so the value of supplanting an existing well-studied exam, the TEAS, with the ACT/SAT is questionable. In studies of PN programs, it was found that pre-nursing GPA and pre-requisite courses are not statistically significant as metrics of success (Cline, 2013; Grace, 2017; Pritchard, 2010). These findings support the VN program admission criterion of not requiring pre-requisites nor a GPA as a condition of admission.

Recommendation

As noted in the evaluation and synthesis tables (see Appendices B and C), the final recommendation was to alter the program admission ranking criteria to give the most weight to the TEAS score. As the evidence shows the TEAS score is an accurate predictor of early student success and is thus best practice to decrease student attrition. Based on the findings (see table 2D) the program should immediately change the admission ranking criteria. This information was presented to the program dean, director, curriculum committee, and faculty.

EBP Model

The EBP model chosen for this Evidence-Based Practice Innovation Project (EPIP) was the Larrabee (2008) revised Model for Evidence-Based Practice Change (MEBPC) which is a six-step integrated process to guide an EBP change. This model provides a clear guided path to crucial steps in the process with guidance on progression, regression, or diversion to ensure needs and quality checks are met internally and externally. The current MEBPC model was revised by Larrabee (2008) while she was mentoring and teaching nurses in EBP and research utilization; it is designed as a model and a teaching tool. Thus, the model is a good choice as it is familiar to educators who are the primary stakeholders in this EPIP.

Change Theory

The change theory chosen for this EPIP was Lewin's Change theory. The Change Theory postulates that there are driving forces and restraining forces that influence the equilibrium of an organization in any change. Change happens in three stages: Unfreezing, which requires the organization to manage the driving and restraining forces; Change, which is the new way of doing things; and Refreezing, which is establishing the new method as a habit (Petiprin, 2016).

Chapter 3: Project Design and Methodology

The project was designed as an EPIP, synthesizing the internal and external data along with the client preferences and values and faculty expertise to alter the admission criteria to give determinant ranking to applicants with higher TEAS scores (see Figure 8), and to use the ATI TEAS ranking system, and a 58.7% or above as an indicator of student preparedness.

CRITERIA	POINTS
ATI TEAS (Nursing) Admission Examination (must complete **before** submission of application)	Developmental (below 41.2): 0 points Basic (41.3-58.6): 25 points Proficient (58.7-77): 50 points Advanced (78-90.6): 70 points Exemplary (90.7-14): 75 points
Completion of BIOL 2404: Introduction to Anatomy and Physiology with grade of A, B, or C	5 points
Completion of Anatomy and Physiology I & II (if taken prior to start of program) with grade of A, B, or C	8 points
Completion of HPRS 2300: Pharmacology for Health Professions (if taken prior to start of program) with grade of A, B, or C	5 points
Completion of a computer class (if taken prior to start of program)	2 points
Military Medical Training such as Air Force Medic, Army Combat Medic, Navy Corpsman, or Coast Guard Medic	2 points
Certified Nursing Assistant (CNA) or Medical Assistant (MA) training	2 points
Information Session (in-person or online)	1 point

Figure 8. New admission ranking criteria for VN program (ACC, 2019)

To facilitate this process a through organizational assessment was undertaken. The project intervention was designed with these factors in mind and utilized many tools for project guidance and organization such as the Larrabee model, 2008 (see Appendix E), Lewin's Change theory (see Appendix F), a combination PDSA/Gantt chart (see Appendix G), a Logic Model (see Appendix H), a Project Table and Summary (see Appendix I), and a budget (see Appendix J).

Organizational Assessment

Description of setting

This EPIP to change the admission criteria in a vocational nursing (VN) program was conducted in a VN program that is in the division of the health sciences department in a large community college in Central Texas in the United States. The health sciences department includes the VN program, an ADN program, and a new ADN to BSN program. The VN and ADN to BSN programs are housed on one campus, whereas the ADN program is on three campuses. The VN program admits twice a year, once in the spring and once in the fall. Each cohort in the VN program is up to 50 students.

Student population

The population for this EPIP was VN nursing students at a large community college in Central Texas. As shown in Table 1 the VN program characteristics are similar in gender to other VN programs and practicing VNs in Texas. The racial/ethnic demographics for the program are like all VN programs in Texas but have disparate numbers concerning practicing VNs, especially regarding percent of Hispanics and Caucasians. Data on age for the program is very similar to the state VN programs with most students in the 20-30 years old age range. The VN program faculty demographics are very similar to aggregate Texas VN program faculty.

Table 1

Demographic Data of VN program, Texas VN programs and practicing VNs in Texas

Population	Female %	Male %	African American %	Asian %	Caucasian %	Hispanic %	18-29-year-old%	30-49-year-old%	50+ year old%
VN Program: Students	87.72	12.28	21.05	2.26	33.33	40.35	54.39	33.33	7.02
VN Program Faculty	91.67	8.33	33.33	0.0	50.00	16.67	0.0	50.00	50.00
VN Students (All Texas Programs)	87	13	22	-	33.3	41	63.8 (18-30)	32.8 (31-50)	3.4 (51+)
VN Faculty (All Texas Programs)	89.6	10.4	17.1	-	59	19.5	33.2 (<45)		65.8 (45+)
Practicing LVN's (Texas)	88.37	11.63	21.56	1.49	55.48	14.67	2.52 (<25)	27.95 (35-44)	25.17 (55+)
							21.82 (25-34)	22.53 (45-54)	

Note. Internal program data obtained from program archives. Texas VN program data from Department of Health and Human Services, 2018. Texas VN program faculty data obtained from Department of Health and Human Services, 2017. Aggregate practicing LVNs in Texas obtained from the Texas Board of Nursing, 2018.

Discussion of the culture

Positive instructor-student relations in nursing school are an important characteristic of nursing school culture. As Kantek, Baykal, & Altuntas (2015) note, a culture that is student-oriented is the strongest cultural characteristic according to instructors. This relationship contributes to student success and transfers the cultural values, norms, and practices of the school to the student. Beyond the diverse demographical make-up of the students and faculty of this VN program, is a faculty culture that values evidence-based practice in nursing and education.

This VN program is the only one in the state of Texas that requires instructors be minimally master's (MSN) educated. Further 17% of the faculty hold a certification in nursing education (CNE), one faculty member is a DNP and one is a PhD, and within the next year, it is expected that 50% of faculty will hold a terminal degree in nursing. Standardized testing addresses the faculty culture in the ethical practice of deontology and utilitarianism while respecting the autonomy of each applicant. Just as nursing students, and ultimately graduate nurses, must apply EBP in their care, and monitor the results of their interventions, so too do the educators in ensuring students are most apt to become safe and effective nurses (Young, 2018).

The educational demographic for this program contrasts with the rest of the VN programs in Texas wherein the Texas Board of Nursing (TBON) faculty qualifications for teaching in a VN program do not include minimal degree qualification, just licensure (TBON, 2015). Vocational nurses may teach in VN programs under the supervision of an RN in the limited didactic course and supervise students in the clinical setting (TBON, 2013). In fact, over 70% of VN educators in Texas lack an advanced nursing degree (TDSHS, 2017c). The race/ethnicity and gender make-up of the students and faculty for this program are very similar to the aggregate state demographics. These educational and demographic factors promote the success of the EPIP in this setting as the faculty is more likely to understand and promote the evidence concerning standardized testing.

Given these educational cultural considerations, project implementation in another setting that does not value higher educated faculty might be more difficult. For implementation in other programs with less educated instructors, it might be necessary to overcome barriers concerning lack of preparedness in statistics and EBP research. In the VN educational setting with less

degreed colleagues, appealing to the ideal of ethical practice could help to promote the value of standardized testing in admission criteria.

Stakeholders

Stakeholders for this EPIP are the program faculty, the program curriculum committee, program director, and the health sciences dean, all of whom are also registered nurses, and many of whom were also once a practicing LVN/LPN. Other stakeholders are the community, the overall college and ultimately the students, graduates, and the patients for whom they provide care. Organizational approval was obtained from the Department Chair of the LVN program. A power grid was developed to assess the power and interest of the stakeholders (see Figure 9). Within the power grid (see Figure 9) in the high power and high-interest areas are the Dean of Health Sciences, the Department Chair, the administrative assistant who keeps the data, and the faculty who is comprised of 10 professors.

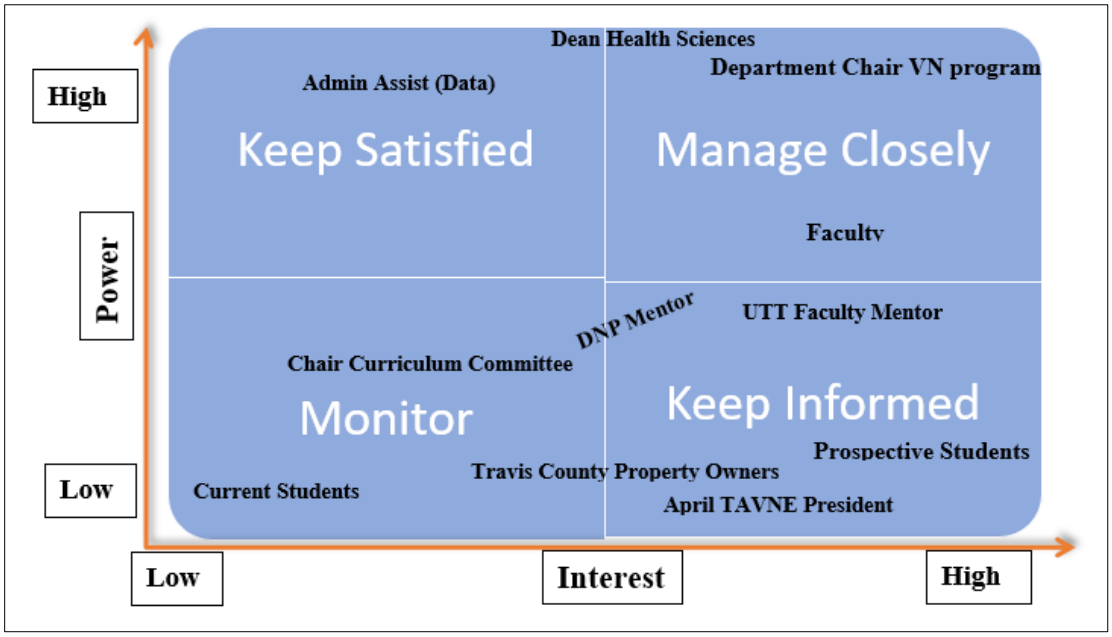

Figure 9. Power interest grid of all potential stakeholders

Three faculty and the program director serve on the curriculum committee with the chair. The curriculum committee, faculty, and the program director will serve in an active role. The dean, college, students, property owners, the Texas Association of Vocational Nurse Educators (TAVNE) president, and patients will serve in a passive role. Although the role of the dean and college administration is passive, they have veto power.

Barriers and facilitators

Barriers that were identified to the success of this EPIP includes potential applicant quantity and qualifications, and the capacity obligation to meet faculty FTE. The program has 12 full-time faculty. This number is calculated with the expectation to have 50 students in each entering class. Students are not denied application due to low TEAS scores; there is no "cut-score". If there are not enough applicants in the higher-ranking criteria, lower ranked students will be admitted. At the time of the implementation of the pilot of the EPIP there was an inadequate number of applicants to apply a robust selection process and 29% of the summer 2020 cohort (fall 2019 incoming class) had a TEAS below 58.7%.

Facilitators included the strength of the internal data showing the effect of a low TEAS score on the individual and cohort student success. Other facilitators include the external evidence showing the correlation between standardized testing and student success (ATI, 2011; Chen & Voyles, 2013; Dunham & Alameida, 2017; Grace, 2017; Knauss & Wilson, 2013; Twidwell & Records, 2017; Wolkowitz & Kelley, 2010), and success on the NCLEX (Dunham & Alameida, 2017). Finally, a facilitator in this EPIP is the faculty and administration.

Fortunately, there was support for a change in the admission process. Concerns about applicant pool quality and quantity are being addressed by ensuring applicants are aware of the ranking formula to discourage lesser qualified applicants. Faculty recently began a recruiting

program in anatomy and physiology II and microbiology classes to inform these health science-minded students about the program and career opportunities; this has already produced qualified applicants who were otherwise not considering the LVN route to entry nursing. The faculty and administration are supportive of a change; it is discouraging to teacher morale to lose half a cohort only to find out that they were statistically extremely unlikely to succeed.

Patient inclusion

Texas is facing the largest projected shortage of LVNs in the United States (HRSA, 2017). Inadequate staffing of nurses leads to poorer outcomes and increased mortality (Kane, Shamliyan, Mueller, Duval, & Wilt, 2007; Needleman et al., 2011). To meet the needs of Texans there must be enough VN's in the workforce (see Figure 10).

Figure 10. Flowchart of the consequence of changing admission criteria

Discussion of the admission process

In the multi-step admission process (see Figure 11) to the VN program a prospective student must first meet eligibility criteria. Eligibility criteria is inclusive of being a currently enrolled student at the college, meeting the college's Texas Success Initiative (TSI) assessment testing state approved minimums to be deemed "TSI complete" (ACC, 2018, para. 7), and meeting the technical standards for essential functions for a nursing student (ACC, 2017a).

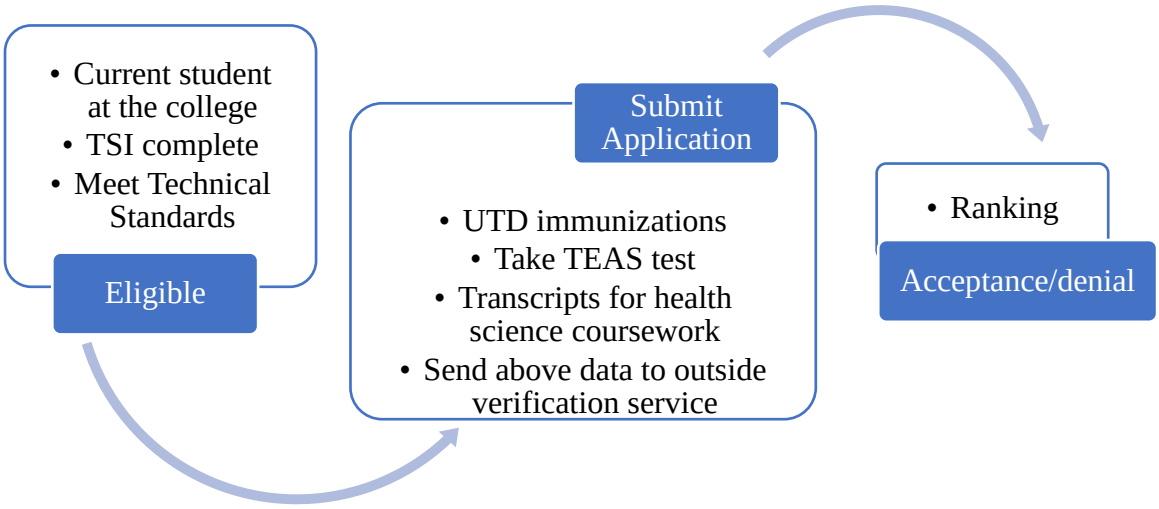

Figure 11. Flowchart of the application process

Eligible applicants then must complete specific criteria prior to submitting their application. This criterion is inclusive of having immunizations up-to-date (UTD), taking the TEAS test, determining board of nursing (BON) eligibility, obtaining transcripts from any other college/university, and then uploading the aforementioned data to an outside data collection service. Once these steps are complete an application is submitted. Submitted applications were then ranked according to points award as previously described in Figure 1. Once ranking is complete the top 50 applicants are offered a spot in the program, if any decline acceptance then moves down the ranking list until 50 spots are filled for the incoming class. The EPIP has not changed the steps described in the process for admission but has changed the ranking formula so that the TEAS score are the determinant in ranking.

Timeline and Tools

After considering the clinical question born from a spirit of inquiry, the process inherent in the Evidence-Based Paradigm (see Figure 12) guides the clinician to consider the internal and external variables that may influence the development and implementation of an EPIP to improve patient outcomes (Melnyk, Fineout-Overholt, Stillwell, & Williamson, 2009). As further discussed below, the components of this project are considered using the guidelines delineated by Melnyk & Fineout-Overholt (2015, pp. 274-277).

For this EPIP, these considerations include the VN program as the clients, the clinical state is nursing education setting in one VN program in Central Texas, and the circumstances include the high nursing student first-semester attrition and their TEAS admission scores. The availability of resources includes a well-developed organization with advanced degreed faculty and a faculty lead curriculum committee, as well as receptive leadership. Also included as

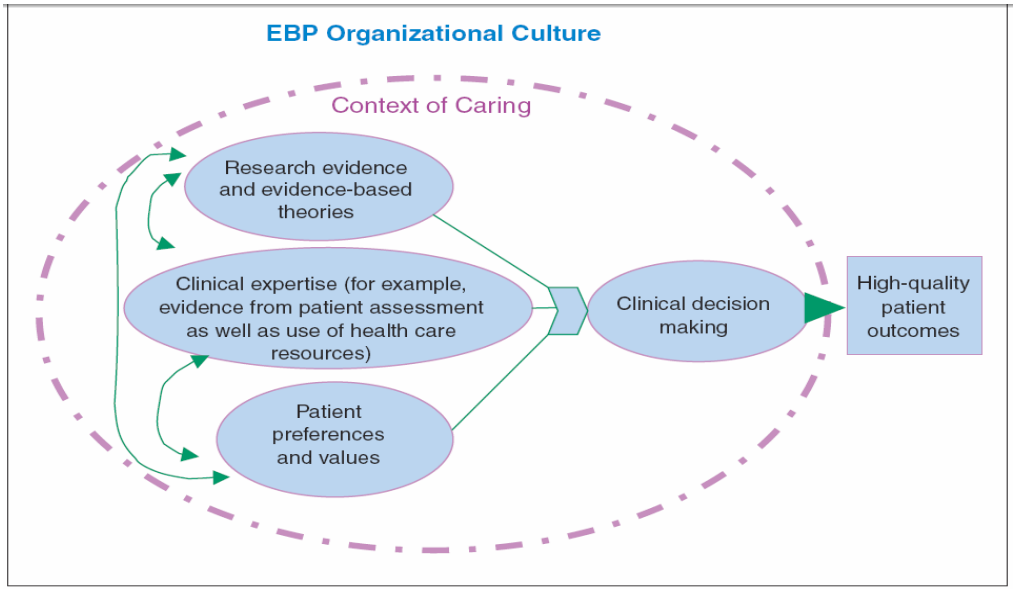

Figure 12. The EBP Paradigm graphic to illustrate the components in EBP implementation process. Copyright 2003 by Melnyk & Fineout-Overholt.

resources are this author's experience as a VN educator, certification as a nurse educator, and expertise in the field of VN education, and a receptive culture in the organization. Political

resources included the relationships the author has with the aforementioned human resources. High-quality research evidence is obtained by a systematic search of the literature, a rigorous evaluation process and synthesis of the best evidence to support a change in practice. Finally, clinical expertise is employed in the author's retrospective statistical analysis of student persistence and program outcomes data.

Timeline: Plan, Do, Study, Act and Gantt Chart

For this EPIP two quality improvement (QI) processes were used in one tool (see Appendix G). The first, Plan, Do, Study, Act cycle (PDSA) was used as the process indicator to provide organization, data collection and analysis, and actionable steps in the implementation of the project. The PDSA is organized into a Gantt chart to provide a visual timeline of the tasks and process (see Appendix K). Alone, the PDSA steps is a four-step process. First, in the "plan" the problem is defined, and plans are developed to address the problem. Second in "do", the plan is carried out. Third, in "study" the results are studied by the collection and analysis for efficacy and fit to the planned change. In the fourth step, "act", plans are modified, revised or continued (British Journal of Medicine, 2015). Alone, the Gantt timeline is a bar graph showing project tasks aligned with a calendar timeline (American Society for Quality, 2018). By combining these two QI processes into one graphic the step-by-step cyclic processes of the PDSA are captured in the Gantt timeline for easy visualization of the innovation process in calendar formatting.

Logic Model and Project Table

The Logic Model (see Appendix H) was used with the Project Table and Summary (see Appendix I) to develop the intervention, planning, and implementation process. The Logic Model aids the stakeholders in understanding the EPIP process and create consensus within the

organization. Further the Logic Model delineates the resources as well as the output activities and outcomes of those activities. The Project Table and Summary gave stakeholders a quick visual representation of patterns across evaluated studies that were used to guide the development and implementation of the EPIP. As noted in the Project Table and Summary (see Appendix H), evidence showed that standardized admission test scores are correlated with student success and attrition in nursing programs. Using the Logic Model (see Appendix H) and the Project Table (see Appendix I) integrates the EBP paradigm into the EPIP and promotes sustainable change.

EBP Model application to this EPIP

The graphic representation of the 2008 Larrabee model (see Appendix E) demonstrates the actualization of the model to the project. As noted in the graphic, step one was actualized in assessing the need for change in the practice. For this EPIP the personal experience of the faculty in noticing the students with lower TEAS scores tend to be unsuccessful resulted in data analysis of the five previous cohorts. This presented the initial evidence to change practice.

Step two of the Larrabee model (2008) concerns evidence gathering and review. Thus, in actualizing the Larrabee (2008) model, in step two research was conducted to determine the extent of the problem and develop a PICOT. Then a systematic search of the literature was completed. At this point, the project was regressed to step one to inform stakeholders of the external evidence and discuss the EBP practice change.

In step three of the Larrabee model (2008) the product of the searching is critically appraised. This was actualized by using rapid critical appraisal and general appraisal overview forms, and then by the creation of an evaluation table (see Appendix C). The synthesis of the best evidence was accomplished by using synthesis tables (see Appendix D). This analysis

shows the best practice to increase the weight of the TEAS scores in the admission ranking criteria. Using the Logic Model (see Appendix H) and Project Table and Summary (see Appendix G) feasibility, benefits, and risks were initially assessed.

Step four of the Larrabee model (2008) was guided by Lewin's Change Theory (see Appendix F) to actualize the change in the admission criteria ranking to give the greatest weight to the TEAS score. Buy-in from the administration is also achieved in step four. The intervention was piloted in spring 2019 for the applicants for summer 2020 cohort and analyzed in December 2019.

Step five of the Larrabee model (2008) utilized the PDSA/Gantt chart (see Appendix G) to provide guidance for the implementation and evaluation of the EBP practice change (see Appendix E). This step was actualized in this project by implementing the pilot for the summer 2020 cohort entering class and the analysis of their attrition rates and correlation to their TEAS scores was accomplished in December 2019.

Finally step six in the Larrabee model offers steps for integration and maintenance of an EBP practice change. For this EPIP the results of the analysis of the summer 2020 cohort were presented to the faculty and department chair. There will be ongoing monitoring starting with the class entering in spring 2020.

Change Theory application to this Innovation Project

Lewin's Change theory was actualized (see Appendix F) by influencing the conceptual framework and deepening the meaningfulness of the EPIP. This theory was chosen as the previous admission criteria scoring system undervalued the TEAS standardized testing as a predictor of success. All stakeholders were engaged in the charge to avoid disruption to the organizational equilibrium. Initial buy-in, or unfreezing, was established by the data analysis of

previous cohorts and the external data. Change happened when the admission criteria changed and the first cohort under the new criteria complete the first semester. Refreezing happens in the monitoring of the change with successive cohorts (see Appendix F).

Final budget

The costs of the project was $7920 (see Appendix J). These costs were exclusively labor and are broken down into the project phases (see Figure 13). For this EPIP the costs included the authors time and the time of the committee members and department administrative assistance. No equipment was required, nor were there consumables as the data will be transmitted electronically.

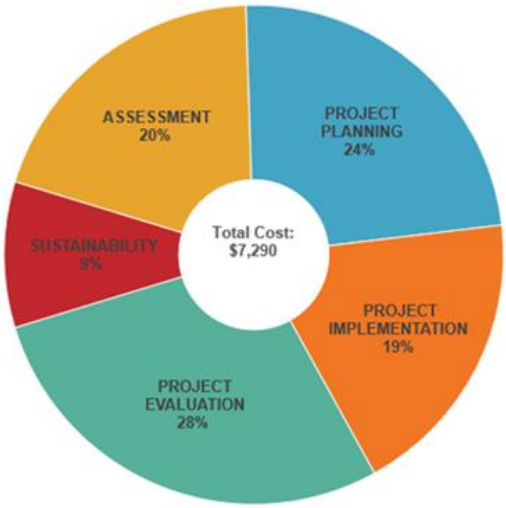

Figure 13. Budget

Monetary impact

Community colleges attract more non-traditional students. One of the demographic factors that contributes to the higher drop-out rate in community colleges is the age of the non-traditional student. Early drop-outs are twice as likely if the student starts college after age 27 (Crosta, 2013). While the college is making progress increasing technical awards, licensure rates have declined (ACC, 2017b). Evidence suggested that the new admission criteria will increase

persistence, graduation rates and qualified graduates who pass the NCLEX-PN. Increasing the success and stature of the program is an intangible return on investment. For the program and college having a cohort that is more likely to progress to completion could result in the collection of additional tuition and fees of $2617 to $8620 per student who is retained to graduation.

Data Collection Plan

Data were collected at the conclusion of the fall semester indicating the final disposition of the fall level one students. This is inclusive of level one students who passed, failed, withdrew, or withdrew while failing. The TEAS scores of the fall level one students were also collected. The Administrative Assistant collects and maintains this data as part of the college's accreditation. The student data was deidentified in a password protected Excel workbook, and the password is only known by this author and the Administrative Assistant.

Data Analysis Plan

As noted in the PDSA/Gantt chart, the section entitled "study" is an analysis of data and timeline implementation (see Appendix G). Data were analyzed in Excel. A correlational analysis of individual outcomes (passing, failing or withdrawal while failing) relative to student TEAS scores. The cohort was also analyzed for the effect of the lower TEAS scoring students on the attrition rate of the higher scoring students. The attrition data from the new class for the summer 2020 cohort will be compared with the previous cohort data presented in the background and significance.

Chapter 4: Project Implementation, Outcomes, Impact, and Results

Process Indicators/Milestones

There were no barriers to the process indicators or accomplishing the milestones in the EPIP. By engaging the stakeholders (see Figure 9) in the process, the EPIP ran smoothly and no course corrections nor changes to the process were required. Using the PDSA/Gantt Chart (see Appendix G) process indicators and milestones were planned and tracked.

In Phase I: Plan, the spring and summer semesters of 2018 internal and external data was obtained, analyzed, synthesized, and presented to the stakeholders (see Figure 9). As indicated in the PDSA/Gantt Chart (see Appendix G) Phase II: Do, the new admission ranking matrix was developed with in the EBP Paradigm (see Figure 12). Based on the egalitarian principles expressed by the client a cut-score was rejected in favor of a ranking formula giving determinant ranking to the TEAS score (see Figure 8). The EPIP was approved in the fall of 2018 (see Appendix K), and the faculty voted unanimously to accept the new admission criteria. Applications for the summer 2020 cohort were accepted under the new ranking formula .

In the PDSA/Gantt Chart, Phase III, the data from the summer 2020 cohort was analyzed and discussed among the program faculty. The deadline for applications for the fall 2020 cohort concluded prior to the conclusion of fall 2019. Thus, in Phase IV: Act, no changes to the admission ranking could be considered for the 2020 fall cohort which begins in spring 2020, and due to the smaller applicant pools the faculty requested no further changes to the admission criteria. The findings have been disseminated to the Health Sciences Dean and the findings will be presented to TAVNE in the fall of 2020.

Project Results

The summer 2020 cohort applicant pool did not have enough prepared students (TEAS >58.7) to fill up the class; 29% of the class has a TEAS <58.7. Predictive analysis indicated that there would be an attrition rate of 25% to 34% based on the large number of unprepared students who were admitted filling up the class. At the end of the semester attrition due to failure or withdrawing failing was 41%. This is a much higher number than predicted. Unsurprisingly, 93% of the unprepared students (Teas<58.7%) failed or withdrew failing level one (see Figure 14). 21% of students with a TEAS >58.7 failed or withdrew failing level one (see Figure 14).

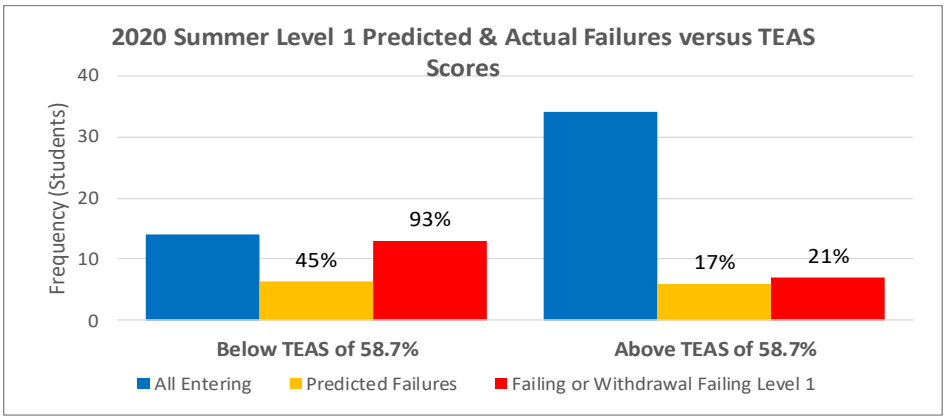

Figure 14. Predicted versus actual attrition.

Far more lower scoring students failed or withdrew failing level one than predicted, and slightly more higher scoring students failed or withdrew failing (see Figure 14). Compared to the previously studied cohorts this cohort had the lowest number of Developmental and Basic level TEAS scores and the highest number of Proficient scores (see Figure 15).

Count of Record	2016F	2016U	2017F	2017U	2018U	2020U	Grand Total
Developmental	17%	14%	8%	11%	7%	2%	10%
Basic	38%	50%	43%	41%	32%	30%	39%
Proficient	38%	31%	43%	43%	46%	61%	44%
Advanced	7%	5%	4%	5%	12%	7%	6%
Exemplary	0%	0%	2%	0%	2%	0%	1%
Grand Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Figure 15. Cohort by TEAS level

Finally, the effect of lower scoring students on higher scoring student was reexamined. In examining all six cohorts it is noted that the summer 2020 cohort had the fewest students in the Developmental and Basic TEAS categories (see Figure 15). Having fewer of the Developmental and Basic scoring students dramatically lowered their impact on the persistence of the higher scoring students (see Figure 16).

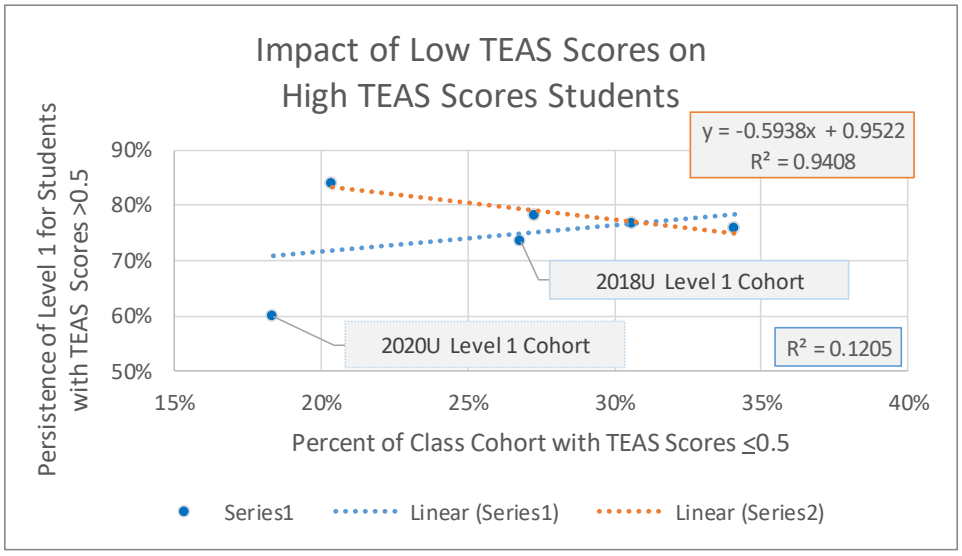

Figure 16. Impact of low TEAS on the persistence of the whole cohort.

Data Collection

The Administrative Assistant collected the raw student data including TEAS, demographics, and final disposition of each student at the beginning and the conclusion of each semester. The student data was deidentified in a password protected Excel workbook and the password is only known by this author and the Administrative Assistant. Deidentified analyzed data is maintained in an Excel database on the author's password protected personal computer and on a secure password protected the encrypted cloud-based server. Cohort data is presented in charts or graphs and is documented in presentation delivery formats such as this paper.

Data Analysis

Data were analyzed in Excel. A correlational analysis of individual outcomes (passing, failing, or withdrawal while failing) relative to student TEAS scores. The cohort was also analyzed for the effect of the lower TEAS scoring students on the attrition rate of the higher scoring students.

Outcomes Measured

The outcomes that were measures are success or failure in level one by TEAS category, and the correlation between lower scoring students and their effect on the persistence of higher scoring students.

Outcome Analysis

Because there was an inadequate pool of applicants with higher TEAS scores, 29% of the cohort had a score of <58.7% (Proficient). All students with a TEAS below 58.7% were counseled by the director as to their likelihood of success or failure prior to beginning classes. Although there was a high attrition rate it was predominately in these lower scoring students and there was less effect on the higher scoring students. It is also worth noting that although they had fewer students scoring in the Developmental and Basic categories, most of the score in the Proficient category were clustered in the lower end of the range for Proficient.

Financial Impact

The attrition rate is comparable to previous cohorts thus the project produced no financial impact to the college. It could be postulated that there was a positive financial impact on the higher scoring students in that they experienced less attrition There continues to be a negative financial impact to the lower scoring students; despite being counseled that they were unprepared for nursing school all of them accepted their admission and the costs therein.

Chapter 5: Project Sustainability, Discussion, Conclusions, and Recommendations

Implications of Project Results

The project results reaffirm the internal and external data showing that students with low entrance exam scores on the TEAS exam are unprepared for nursing school. There have been more robust discussions in the curriculum committee and the faculty meetings to consider instituting a cut score. But with applications at an all-time low, there have also been discussions that a cut score could affect faculty load and employment.

There is renewed interest in recruiting students from higher level science courses and the recruiting presentation has been shared with a new faculty member. The health science retention coordinator has taken an interest in the outcomes and is working with faculty to examine courses that may help students to prepare for the rigors of nursing school. The program director is working with a faculty member to create a series of lessons to fill gaps for unprepared students.

Questions of equity and inclusion have been raised by administration. Analysis shows that overall acceptance to the program is unrelated to race or ethnicity and success or failure is correlated to the TEAS score in each demographic category. Interestingly Caucasian students tend to drop while passing more frequently than African American or Hispanic students. Hispanic students with lower TEAS scores tend to graduate more frequently than the other demographic categories. This data was shared with the program director and dean.

Project Sustainability Plans

The project is sustainable with the admission matrix as it is written. If there is a larger applicant pool with more prepared students, then that cohort should have less level one attrition. 24% of the incoming fall 2020 cohort has TEAS scores below 58.7%, thus it is likely that

attrition will continue at previous rates unless other measures are effective in increasing retention.

Implications of Results to Organization and VN Education Community

The implications to the organization are the heightened awareness of the difficulty faced by the students with a TEAS of below 58.7% in that they are unprepared for the rigors of nursing school and by admitting them the program is expecting them to become prepared and learn the material all within the same semester. As the statistical analysis shows this is highly unlikely to happen.

The implications of admission test scores not gone unnoticed with the larger VN education community. Prior to the beginning of the project none of the 10 VN programs in Central Texas and the nearby Houston area had cut scores. The evidence on the predictive value of the TEAS score has been socialized. Now all the 10 programs have a cut score of minimally of 58.7% and some as high at 70% on the TEAS. There are concerns that many of these schools are within driving distance to this college and the lower scoring students who cannot apply at their "home" school will apply to this college, thus further driving down the applicant pool test scores.

Key Lessons Learned

Standardized admission scores are the most reliable and least biased way to predict student success. Student who score below a 58.7% on the TEAS are highly unlikely to be successful in a VN program. Cohorts with larger clusters of lower scoring student negatively affect the persistence of higher scoring students. All lower scoring students who are counseled on their statistical probability of success still chose to attend the VN program.

Project Recommendations

It was recommended that the program institute a cut-score of minimally 58.7% to apply to the VN program. This recommendation is in line with the internal and external data and is also in line with the regional standards for VN programs. Further, the recruitment efforts in higher level science courses should be increased to increase the pool of applicants.

Chapter 6: DNP Practice Scholar Role Actualization

Role Impact

The EPIP was born out of the spirit of inquiry to identify a problem that was preventing the departmental and organization to achieve its mission to graduate safe, competent, compassionate nurses. And to create a solution that is based in evidence, while respecting the wishes of the client. The Transformational Leadership Model (TLM) provided guidance to create idealized influence and inspirational motivation, while employing individualized consideration and intellectual stimulation (Hodos, 2013).

Using the TLM, I was able to actualize my DNP role by creating idealized influence by producing high quality data analysis and evidence-based research. I used my presentation skills to provide a compelling vision of the problem which helped to develop inspirational motivation to seek change. Individualized considerations included the data conflict with the egalitarian principles of the department and possible economic losses if the enrollment is inadequate. To overcome this the department was motivated to innovate and think of solutions, which resulted in greater interest in recruiting better prepared students, and in identifying preparatory course work for students who would be otherwise unlikely to be successful.

While enrolled in the DNP program I was appointed the Assistant Dean for Distance Education and External Partnerships for Health Sciences. This role is a facilitator for change and improvement within the Health Sciences division. I have used my DNP skills to develop training for traditional course conversion to a distance format. The 14 departments within Health Sciences are the first division in the college to be trained on quality distance course alignment. I have also developed new clinical partnerships and contribute to groups creating new scholarship opportunities and new courses and degrees.

Summary of Experience in Context of Strengths and Emotional Intelligence

My strengths (Rath, 2007) and emotional intelligence (Bradberry & Greaves, 2009) are evident in the development and implementation of the EPIP. My strength of learner helped the implementation of my EPIP because I was engaged in the entire process of data evaluation, research for best evidence, and how to present it so it was digestible by the audience. Using connectedness and social awareness I created a lot of easy to follow graphs & charts to present the EPIP which made the data more accessible to the client.

Connectedness and context helped me to manage relationships with faculty who are more driven by "story-data" or anecdotal evidence. Using self-management and relationship management, I understood I needed to validate their feelings and help them to connect with the project data. Self-awareness helped me to see that the data is oppositional to some people's egalitarian principles. Context and social awareness helped to overcome story driven data because faculty members were able to connect the damage an unprepared student can do to themselves and the cohort. Because of the use of my strengths and emotional intelligence there was little to no opposition to the implementation.

Restorative helped me with the EPIP in that I engaged the client and didn't solve the problem alone. I used social awareness to understand that while people may know that the program should have a cut-score, but this was not the client's wishes. Relationship management and social awareness provided a platform for collaboration on a solution that will work if there is a large enough applicant pool from which to select prepared students. By using achiever, I engaged more faculty in a recruiting program to improve the quality of the applicant pool. By using my strengths and emotional intelligence I facilitated a change in the VN program, and I have grown to be recognized as a leader in the College.

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Appendix A

Screenshots of Systematic Searching

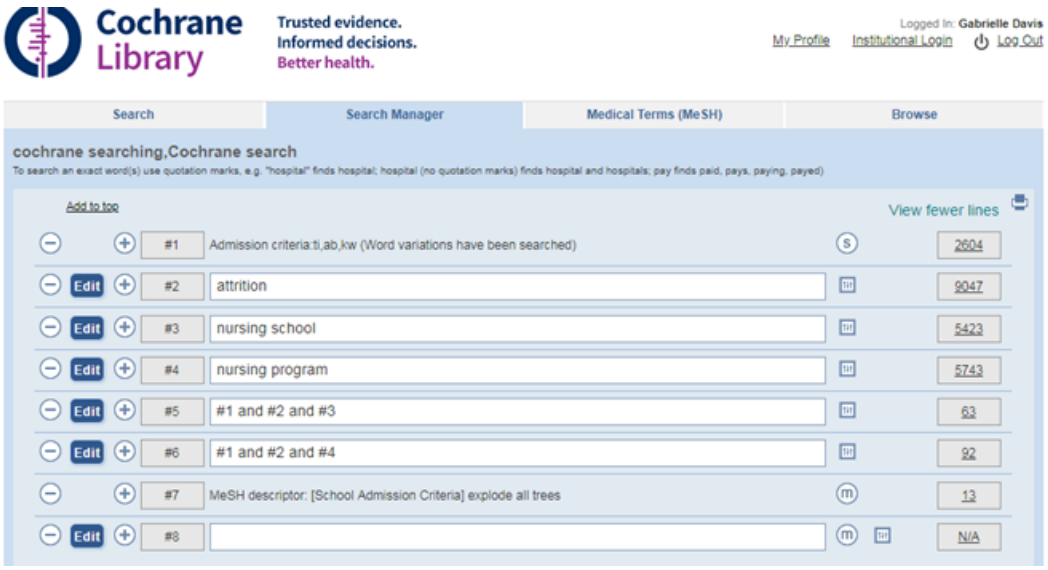

Figure A1. Cochrane systematic search process of keywords, subject headings, and title searching and MeSH results with initial yield of 168 and a final yield of zero for evaluation.

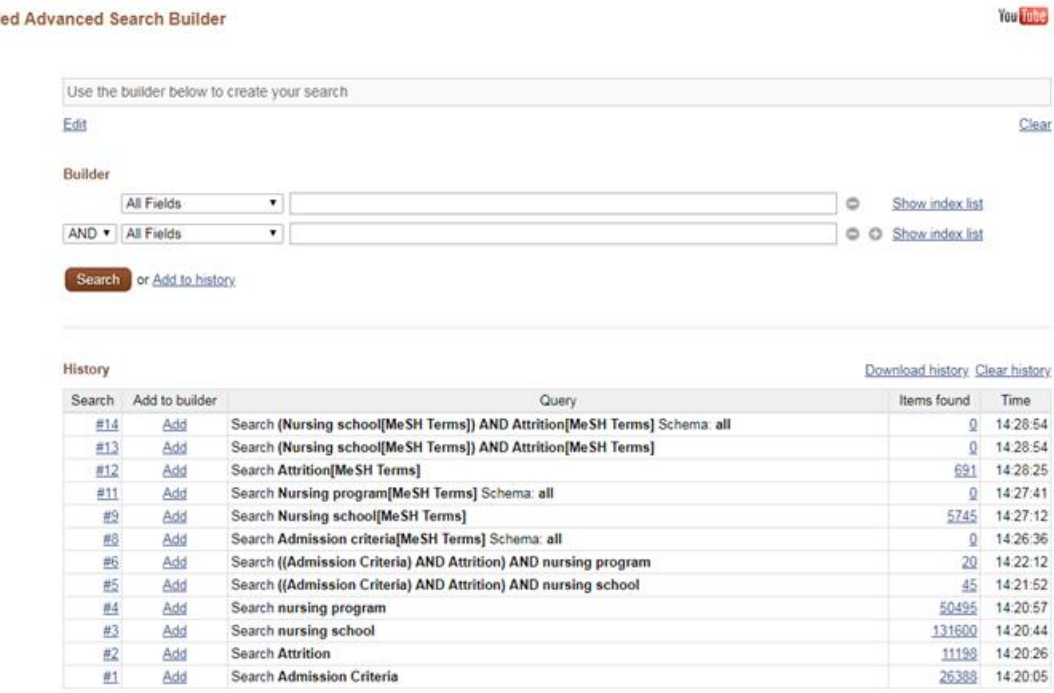

Figure A2. PubMED systematic search process of keywords, subject headings, and title searching and MeSH results with initial yield of 65, and a final yield of three for evaluation.

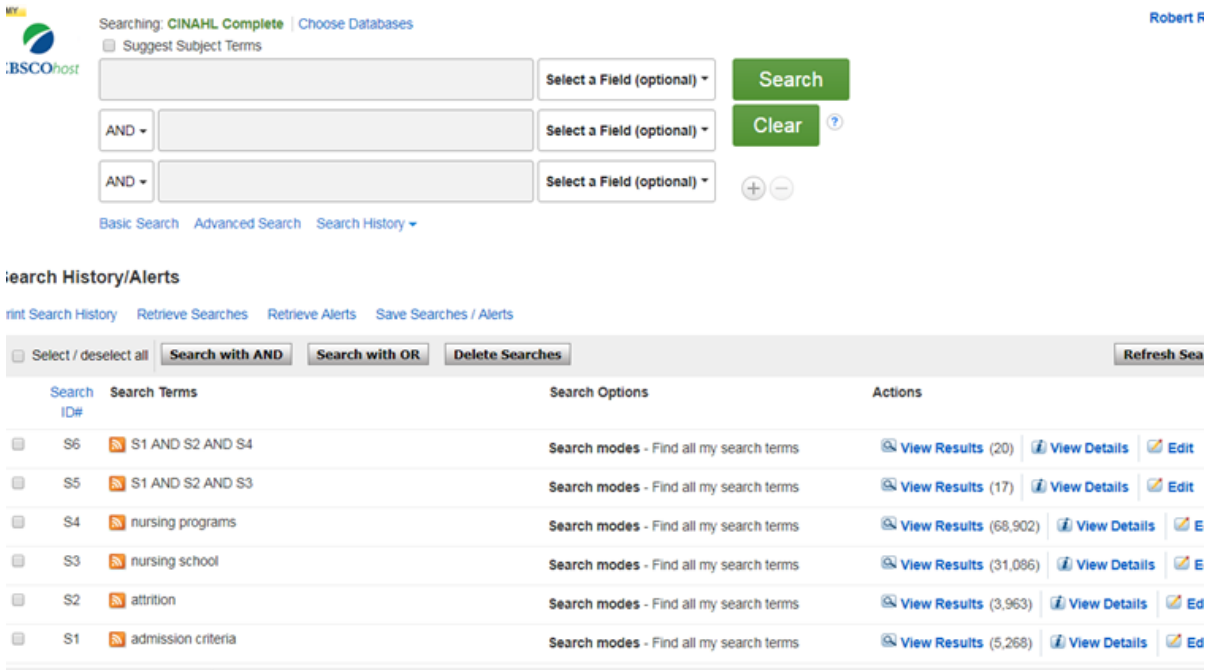

Figure A3. CINAHL systematic search process of keywords in all fields, results with initial yield of 37 for evaluation and a final yield of three for evaluation.

Figure A4. Science Direct systematic search process of keywords in all fields, results with initial yield of 196 for evaluation and a final yield of three articles for evaluation.

Appendix B

GAO and RCA Results

General Appraisal Overview for All Studies

Date: June 12, 2018	**Reviewer(s) name(s)**: Gabrielle O. Davis
Article citation (APA): ATI Nursing Education. (2011) Is the TEAS V predictive of early nursing school success? [PDF]. Retrieved from: https://www.atitesting.com/Libraries/pdf/Is_the_TEAS_V_predictive_of_early_nursing_school_success_12-20-11.sflb.ashx	
PICOT Question: In a vocational nursing program how does changing the admission criteria, compared to the current methodology for admission, affect student attrition within one level one semester?	
Overview/General Description of Study: **Purpose of study**: The purpose of the study was to determine the predictive reliability of the TEAS test as an indicator of early nursing school success.	
Study Design: Retrospective cohort study. **LOE**: IV **General Description of Study**: The TEAS is a Test of Essential Academic Skills and the Fundamentals test is a standardized test administered in the fundamentals of nursing course (typically a first semester course) measure of early success in nursing school the TEAS scores were correlated with the Fundamentals scores	
Research question(s) or hypotheses: 1. Do TEAS V test scores correlate with early nursing school performance as measured by the Fundamentals test? 2. How accurately can TEAS V predict early nursing school success? 3. Do successful early nursing school students perform differently on the TEAS V test than unsuccessful students?	
Study aims: Determine the validity of the TEAS V test as a predictive indicator of early nursing school success.	
Sampling Technique, Sample Size & Characteristics: Data records for first time test takers -PN students who took the ATI TEAS V and the ATI Fundamentals test. N= 4899 from 393 schools.	
Major variables studies: **Independent variable**: 1. TEAS scores 2. TEAS scores 3. TEAS scores **Dependent (outcome) variable(s)**: 1. Fundamentals scores 2. Early nursing school success 3. Successful Fundamentals test scores	
Variable Analysis Used (include whether appropriate to answer research questions/hypothesis or discover themes): 1. Pearson correlation coefficients 2. Frequency counts and percentage 3. Mean, SD & t-test – statistical significance (p-value) Yes these are appropriate	

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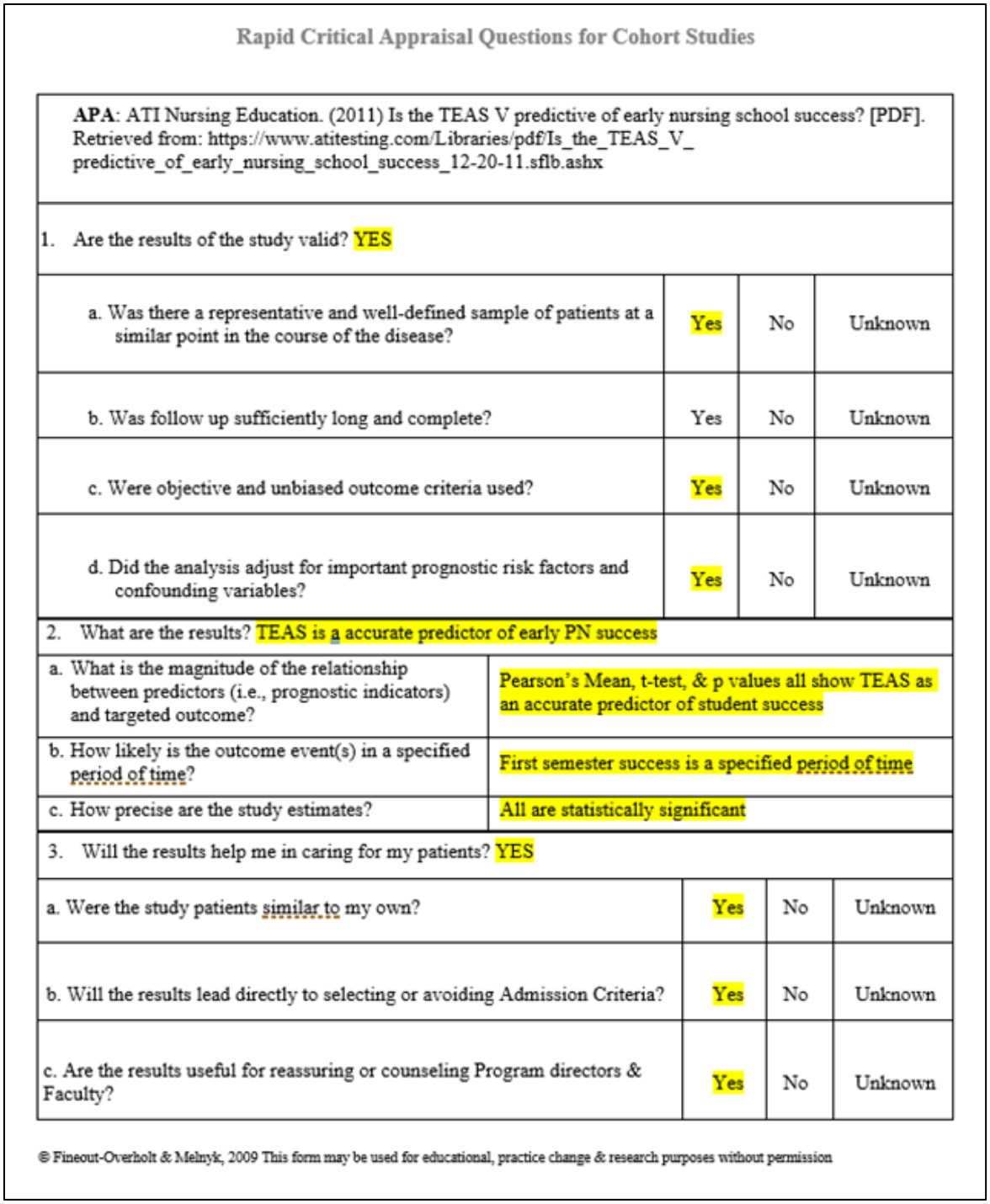
Figure B1.1. ATI Study GAO



Rapid Critical Appraisal Questions for Cohort Studies

APA: ATI Nursing Education. (2011) Is the TEAS V predictive of early nursing school success? [PDF]. Retrieved from: https://www.atitesting.com/Libraries/pdf/Is_the_TEAS_V_predictive_of_early_nursing_school_success_12-20-11.sflb.ashx			
1. Are the results of the study valid? YES			
a. Was there a representative and well-defined sample of patients at a similar point in the course of the disease?	Yes	No	Unknown
b. Was follow up sufficiently long and complete?	Yes	No	Unknown
c. Were objective and unbiased outcome criteria used?	Yes	No	Unknown
d. Did the analysis adjust for important prognostic risk factors and confounding variables?	Yes	No	Unknown
2. What are the results? TEAS is a accurate predictor of early PN success			
a. What is the magnitude of the relationship between predictors (i.e., prognostic indicators) and targeted outcome?	Pearson's Mean, t-test, & p values all show TEAS as an accurate predictor of student success		
b. How likely is the outcome event(s) in a specified period of time?	First semester success is a specified period of time		
c. How precise are the study estimates?	All are statistically significant		
3. Will the results help me in caring for my patients? YES			
a. Were the study patients similar to my own?	Yes	No	Unknown
b. Will the results lead directly to selecting or avoiding Admission Criteria?	Yes	No	Unknown
c. Are the results useful for reassuring or counseling Program directors & Faculty?	Yes	No	Unknown

Figure B1.2. ATI Study RCA

General Appraisal Overview for All Studies

Date: June 17, 2018	**Reviewer(s) name(s)**: Gabrielle O. Davis
Article citation (APA): Chen, S., & Voyles, D. (2013). HESI Admission Assessment scores: Predicting student success. *Journal of Professional Nursing, 29*(2 Suppl 1), S32-7	
PICOT Question: In a vocational nursing program how does changing the admission criteria, compared to the current methodology for admission, affect student attrition within one level one semester?	
Overview/General Description of Study: **Purpose of study**: The purpose of the study was to determine the value of the HESI in predicting student attrition in the first semester of an ADN program	
Study Design: Quantitative Retrospective cohort study **General Description of Study**: HESI is the Health Education Systems, Inc (HESI) exam administered for evaluating pre-admission qualification to a nursing program. The curriculum review at one college included correlating the preadmission HESI with the level 1 ADN grades. Study examined attrition after level one and HESI scores	
Research question(s) or hypotheses: Does the HESI predict ADN first-semester student attrition/first semester student success?	
Study aims: Generate data to determine efficacy of admission policy	
Sampling Technique, Sample Size & Characteristics: N=156 ADN students records single school 4 cohorts (2 years) data	
Major variables studies: **Independent variable**: 1. Composite HESI scores 2. HESI math scores 3. HESI reading comprehension scores 4. HESI vocab/general knowledge scores 5. HESI grammar scores 6. HESI A & P scores **Dependent (outcome) variable(s)**: 1 - 5 Nursing 1 & 2, and pharmacology course grades	
Variable Analysis Used (include whether appropriate to answer research questions/hypothesis or discover themes): Mean, SD, t-test Yes, these are appropriate	

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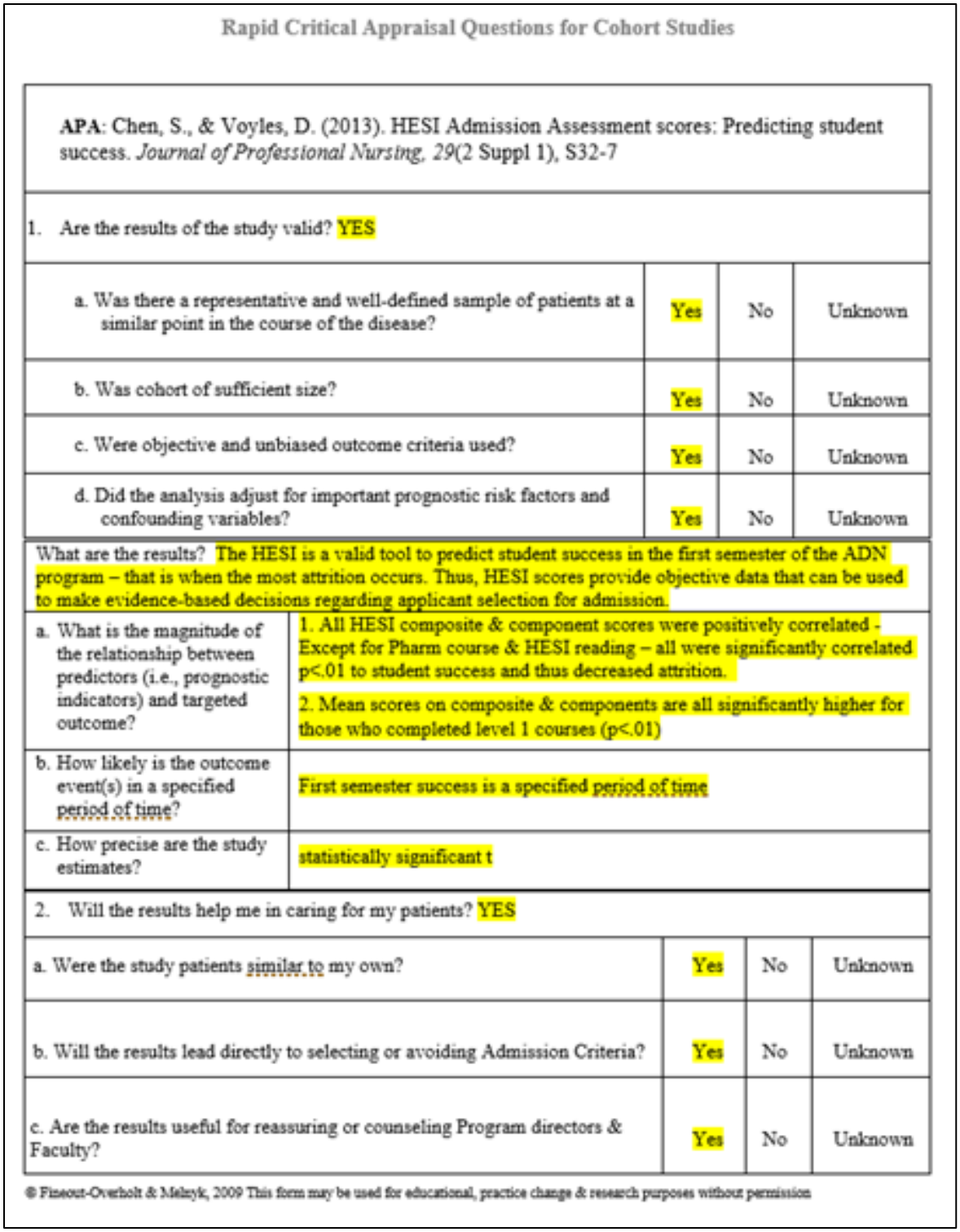
Figure B2.1. Chen Study GAO



Rapid Critical Appraisal Questions for Cohort Studies

APA: Chen, S., & Voyles, D. (2013). HESI Admission Assessment scores: Predicting student success. *Journal of Professional Nursing, 29*(2 Suppl 1), S32-7			
1. Are the results of the study valid? YES			
a. Was there a representative and well-defined sample of patients at a similar point in the course of the disease?	Yes	No	Unknown
b. Was cohort of sufficient size?	Yes	No	Unknown
c. Were objective and unbiased outcome criteria used?	Yes	No	Unknown
d. Did the analysis adjust for important prognostic risk factors and confounding variables?	Yes	No	Unknown
What are the results? The HESI is a valid tool to predict student success in the first semester of the ADN program – that is when the most attrition occurs. Thus, HESI scores provide objective data that can be used to make evidence-based decisions regarding applicant selection for admission.			
a. What is the magnitude of the relationship between predictors (i.e., prognostic indicators) and targeted outcome?	1. All HESI composite & component scores were positively correlated - Except for Pharm course & HESI reading – all were significantly correlated p<.01 to student success and thus decreased attrition. 2. Mean scores on composite & components are all significantly higher for those who completed level 1 courses (p<.01)		
b. How likely is the outcome event(s) in a specified period of time?	First semester success is a specified period of time		
c. How precise are the study estimates?	statistically significant t		
2. Will the results help me in caring for my patients? YES			
a. Were the study patients similar to my own?	Yes	No	Unknown
b. Will the results lead directly to selecting or avoiding Admission Criteria?	Yes	No	Unknown
c. Are the results useful for reassuring or counseling Program directors & Faculty?	Yes	No	Unknown

Figure B2.2. Chen Study RCA

General Appraisal Overview for All Studies

Date: June 10, 2018	**Reviewer(s) name(s)**: Gabrielle O. Davis
Article citation (APA): Cline, April P. (2013). *Mostly likely to achieve: Predicting early success of the practical nurse student* (Doctoral dissertation). Retrieved from ProQuest LLC, Ella. (Accession Order No. 3567837)	
PICOT Question: In a vocational nursing program how does changing the admission criteria, compared to the current methodology for admission, affect student attrition within one level one semester?	
Overview/General Description of Study: **Purpose of study**: The purpose of the study was to predict the correlation between the TEAS V and prior academic performance as a means of predicting early academic success of the PN student.	
Study Design: Quantitative descriptive correlational design cohort study. **LOE**: IV **General Description of Study**: Using preexisting student records - examine the relationship between prior academic performance (GPA), TEAS scores, and quantity/type of co-requisites taken prior to admission and first semester grades and success. Then to evaluate that data to determine changing admission requirements and/or the creation of remediation program.	
Research question(s) or hypotheses: 1. What relationship exists between GPA and first semester success for the PN student? 2. What relationship exists between the TEAS and students who are successful in the first semester of the PN program? 3. What relationship exists between completion of co-requisite courses prior to entering the PN program and student success in the first semester of the PN program?	
Study aims: To predict success and increase attrition rates via the TEAS and/or GPA	
Sampling Technique, Sample Size & Characteristics: Retrospective student records, Single school in North Carolina, 3 years of data, Q 1 &2 N= 73 PN students; Q3 N=111. 89% female, 78% White. 95% pass rate and 70% three year on-time completion rate.	
Major variables studies: **Independent variable**: 1. Pre-nursing GPA 2. TEAS scores subtests 3. Co-requisites taken prior to admission to PN program **Dependent (outcome) variable(s)**: 1. First semester success 2. Final scores for first semester 3. First semester success	
Variable Analysis Used (include whether appropriate to answer research questions/hypothesis or discover themes): 1. Logistic regression -Wald Chi-Square, p-value (results = not statistically significant, i.e. pre-nursing GPA does not predict P/F first semester) 2. Logistic regression -Wald Chi-Square, p-value (results = statistically significant, i.e. TEAS is predictive of first semester grade, NOTE – this is not testing pass/fail as only 5/73 had failed – too small to test) 3. ANOVA and t-test, p value (results = number of co-requisites nor individual co-requisites were not statistically significant – except for English is statistically significant)	

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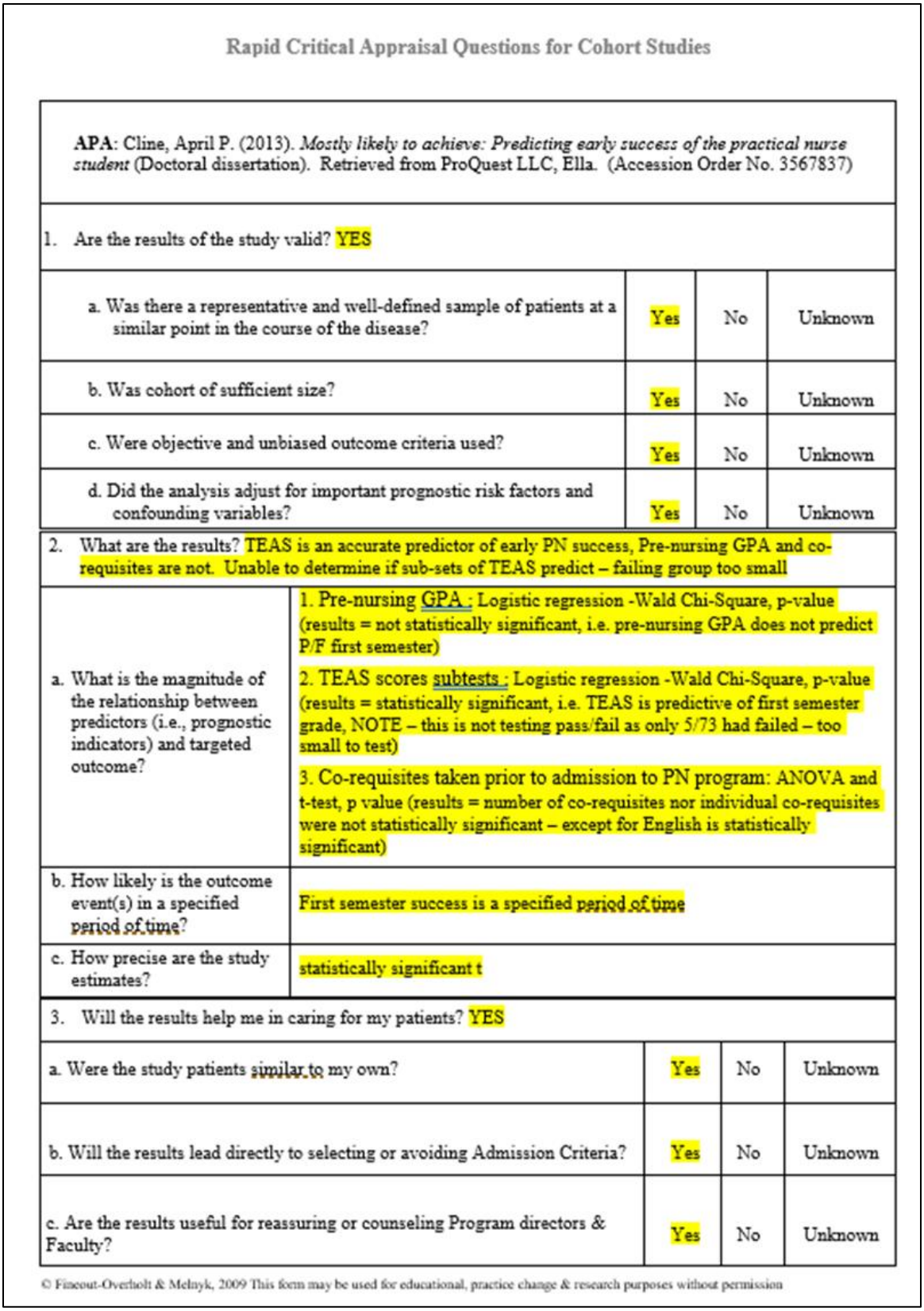
Figure B3.1. Cline Study GAO



Rapid Critical Appraisal Questions for Cohort Studies

APA: Cline, April P. (2013). *Mostly likely to achieve: Predicting early success of the practical nurse student* (Doctoral dissertation). Retrieved from ProQuest LLC, Ella. (Accession Order No. 3567837)			
1. Are the results of the study valid? YES			
a. Was there a representative and well-defined sample of patients at a similar point in the course of the disease?	Yes	No	Unknown
b. Was cohort of sufficient size?	Yes	No	Unknown
c. Were objective and unbiased outcome criteria used?	Yes	No	Unknown
d. Did the analysis adjust for important prognostic risk factors and confounding variables?	Yes	No	Unknown

2. What are the results? TEAS is an accurate predictor of early PN success, Pre-nursing GPA and co-requisites are not. Unable to determine if sub-sets of TEAS predict – failing group too small	
a. What is the magnitude of the relationship between predictors (i.e., prognostic indicators) and targeted outcome?	1. Pre-nursing GPA : Logistic regression -Wald Chi-Square, p-value (results = not statistically significant, i.e. pre-nursing GPA does not predict P/F first semester) 2. TEAS scores subtests : Logistic regression -Wald Chi-Square, p-value (results = statistically significant, i.e. TEAS is predictive of first semester grade, NOTE – this is not testing pass/fail as only 5/73 had failed – too small to test) 3. Co-requisites taken prior to admission to PN program: ANOVA and t-test, p value (results = number of co-requisites nor individual co-requisites were not statistically significant – except for English is statistically significant)
b. How likely is the outcome event(s) in a specified period of time?	First semester success is a specified period of time
c. How precise are the study estimates?	statistically significant t

3. Will the results help me in caring for my patients? YES			
a. Were the study patients similar to my own?	Yes	No	Unknown
b. Will the results lead directly to selecting or avoiding Admission Criteria?	Yes	No	Unknown
c. Are the results useful for reassuring or counseling Program directors & Faculty?	Yes	No	Unknown

Figure B3.2. Cline Study RCA

General Appraisal Overview for All Studies

Date: June 10, 2018	**Reviewer(s) name(s)**: Gabrielle O. Davis
Article citation (APA): Dunham, M. L. & Alameida, M. (2017). ATI TEAS V cut score for the California community college nursing programs. *Teaching and Learning in Nursing, 12*(2), 89-94.	
PICOT Question: In a vocational nursing program how does changing the admission criteria ,compared to the current methodology for admission, affect student attrition within one level one semester?	
Overview/General Description of Study: **Purpose of study**: The purpose of the study was to evaluate the efficacy of using a TEAS cut score for admission to the California Community College (CCC) system.	
Study Design: Quantitative descriptive correlational design cohort study. **LOE**: IV **General Description of Study**: Using preexisting data the 62% TEAS cut score was examined for efficacy in predicting program completion for all of CCC RN programs	
Research question(s) or hypotheses: 1. How does the TEAS composite score perform as a predictor of program outcome? 2. What is the relationship between initial TEAS result (above/ below 62% cut score) and program outcome? 3. How does the current 62% cut score compare with nearby potential alternative cut scores both above and below the current cut, particularly on questions of classification accuracy and ethnic diversity of the probable admitted class?	
Study aims: Evaluate existing admissions cut scores for the CCC RN programs	
Sampling Technique, Sample Size & Characteristics: Previously collected data for the student population of the 62 CCC's RN programs. For q 1 &2 N=6604; Q3 N=8174 Demographics: 53.6% female; Hispanic 38.9%, White 31%, Asian 10.8%, African American 7.3%, Unknown 4.4%, Multi-Ethnicity 3.5%, Filipino 3.1%, Native American 0.5%, Pacific Islander 0.5	
Major variables studies: **Independent variable**: 1. TEAS score mean 2. TEAS cut score of >62% or < 62%. 3. Cut scores of 62.00%, 60.00%, 62.60%, 64.60%, and 66.60% **Dependent (outcome) variable(s)**: 1. Students who completed the program in four semesters of less (typical length of programs) 2. Students who completed in more than 4 semesters with or without dropping (assumes greater faculty requirements) 3. Students who fail to complete the program	
Variable Analysis Used (include whether appropriate to answer research questions/hypothesis or discover themes): 1. logistic regression analysis dichotomous MEAN and SD. program completion or non-completion and TEAS mean score. (results= for those who complete was 74.5% for on-time no drops and 75.8% for "success candidate" (more than 4 semesters w/wo drops) versus 70.9% for those who fail to graduate. Each point TEAS goes up is a 1.046 increase in completion.) 2. Chi-squared (results = those who met the cut score & complete is 84.7% versus not complete 15.3%; Those with TEAS < 62% Complete 70.1%, non-complete 29.9%; Also answered in Odds Ratio = measure of effect size, the odds ratio for completing the program 2.35, meaning that a student who meets the 62% TEAS cut score on first attempt is 2.35 times more likely to complete the program than someone who scores below the cut score on first attempt.) 3. Odds Ratio (results = for program completion and score cuts scores of 60% are 2.11; 62% 2.35; 62.60% 2.37; 64.6% 2.47; 66.6% 2.34)	
Authors conclusions: Keep the 62% cut score.	

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Figure B4.1. Dunham Study GAO

Rapid Critical Appraisal Questions for Cohort Studies

APA: Dunham, M. L. & Alameida, M. (2017). ATI TEAS V cut score for the California community college nursing programs. *Teaching and Learning in Nursing, 12*(2), 89-94			
1. Are the results of the study valid? YES			
a. Was there a representative and well-defined sample of patients at a similar point in the course of the disease?	Yes	No	Unknown
b. Was cohort of sufficient size?	Yes	No	Unknown
c. Were objective and unbiased outcome criteria used?	Yes	No	Unknown
d. Did the analysis adjust for important prognostic risk factors and confounding variables?	Yes	No	Unknown
2. What are the results? TEAS is an accurate predictor of early RN success, the cut score of 62% is valid			
a. What is the magnitude of the relationship between predictors (i.e., prognostic indicators) and targeted outcome?	The TEAS cut score is an accurate predictor of lower attrition, those with a cut score or 62% are 2.35 times more likely to finish the program, every point the TEAS goes up is a 1.046 increase in completion rates		
b. How likely is the outcome event(s) in a specified period of time?	First semester success is a specified period of time		
c. How precise are the study estimates?	statistically significant t		
3. Will the results help me in caring for my patients? YES			
a. Were the study patients similar to my own?	Yes	No	Unknown
b. Will the results lead directly to selecting or avoiding Admission Criteria?	Yes	No	Unknown
c. Are the results useful for reassuring or counseling Program directors & Faculty?	Yes	No	Unknown

Figure B4.2. Dunham Study RCA

General Appraisal Overview for All Studies

Date: June 10, 2018	**Reviewer(s) name(s)**: Gabrielle O. Davis
Article citation (APA): Grace, J. (2017). *A correlational study of the relationship between TEAS V and success in licensed practical nursing students* (Doctoral dissertation). Retrieved from ProQuest LLC. (Accession Order No. 10681194)	
PICOT Question: In a vocational nursing program how does changing the admission criteria, compared to the current methodology for admission, affect student attrition within one level one semester?	
Overview/General Description of Study: **Purpose of study**: The purpose of the study was to determine if the TEAS examination successfully identified potential nursing students capable of completing nursing programs based on correlational analysis that established the relationship between the predictor variables, TEAS V score and criterion variables, student completion of a practical nursing program and passing the NCLEX-PN	
Study Design: Quantitative descriptive correlational design cohort study. **LOE**: IV **General Description of Study**: Using 3 years of preexisting student records a correlational analysis was examined TEAS scores and program completion of a PN program in SW Alabama.	
Research question(s) or hypotheses: 1. What is the relationship between the TEAS composite score and student successful completion of a licensed practical nursing program? 2. What is the relationship between the TEAS composite score and student successful passing of the NCLEX-PN? 3. What is the relationship between confounding variables (age, race, gender, GPA) and student successful completion of a licensed practical nursing program? 4. What is the relationship between confounding variables (age, race, gender, GPA) and student successful passing of the NCLEX-PN?	
Study aims: The aim of the study was to identify whether a relationship existed between TEAS V score and completion of a licensed practical nursing program and NCLEX-PN success.	
Sampling Technique, Sample Size & Characteristics: Retrospective student records, Single school in SW Alabama, 3 years of data, N=271 PN students; 94.4% female; 48.7% AA, 48.3 White. 72.6% aged ≥25 yrs old., 27.4% 17-24 yrs old. Mean age =30.6 years. N = 271 @ 46.9%. graduation rate; Mean completion GPA 3.00 (N=233). NCLEX pass rate for graduates = 82.4%. **N= 271 TEAS Mean 48.82; min 5; Max 83.3; SD 13.06.**	
Major variables studies: **Independent variable**: 1. TEAS Score 2. TEAS Score 3. Confounding variables (age, race, gender and GPA) 3. Confounding variables (age, race, gender and GPA) **Dependent (outcome) variable(s)**: 1. Program completion 2. Pass NCLEX 3. Program completion 4. Pass NCLEX	
Variable Analysis Used (include whether appropriate to answer research questions/hypothesis or discover themes): Binary logistic regression Descriptive analysis of each demographic variable including gender, race and age was conducted. Descriptive tests including the mean, maximum, frequency, and percentage for gender, race, age, GPA, and TEAS V score were conducted. Inferential analysis of data included using the following statistical test: Chi square for independence if success with graduation and the NCLEX success rate were different among the six cohorts. **RESULTS**: No statistical significance p=0.156 Grad; p=0.850 NCLEX success Shapiro-Wilkes test: The normality of the continuous predictor variables (GPA, age, TEAS V score). **RESULTS**: No significance in GPA or age. **Significance** in TEAS for grad or no grad ($Z = -3.672$, $p = 0.000$). Mann-Whitney U test. For independent groups (pass/ no pass) (NCLEX/ No NCLEX); No sig. for NCLEX and GPA. **Significance** for successful NCLEX and TEAS scores ($Z = -3.332$, $p = 0.001$).	

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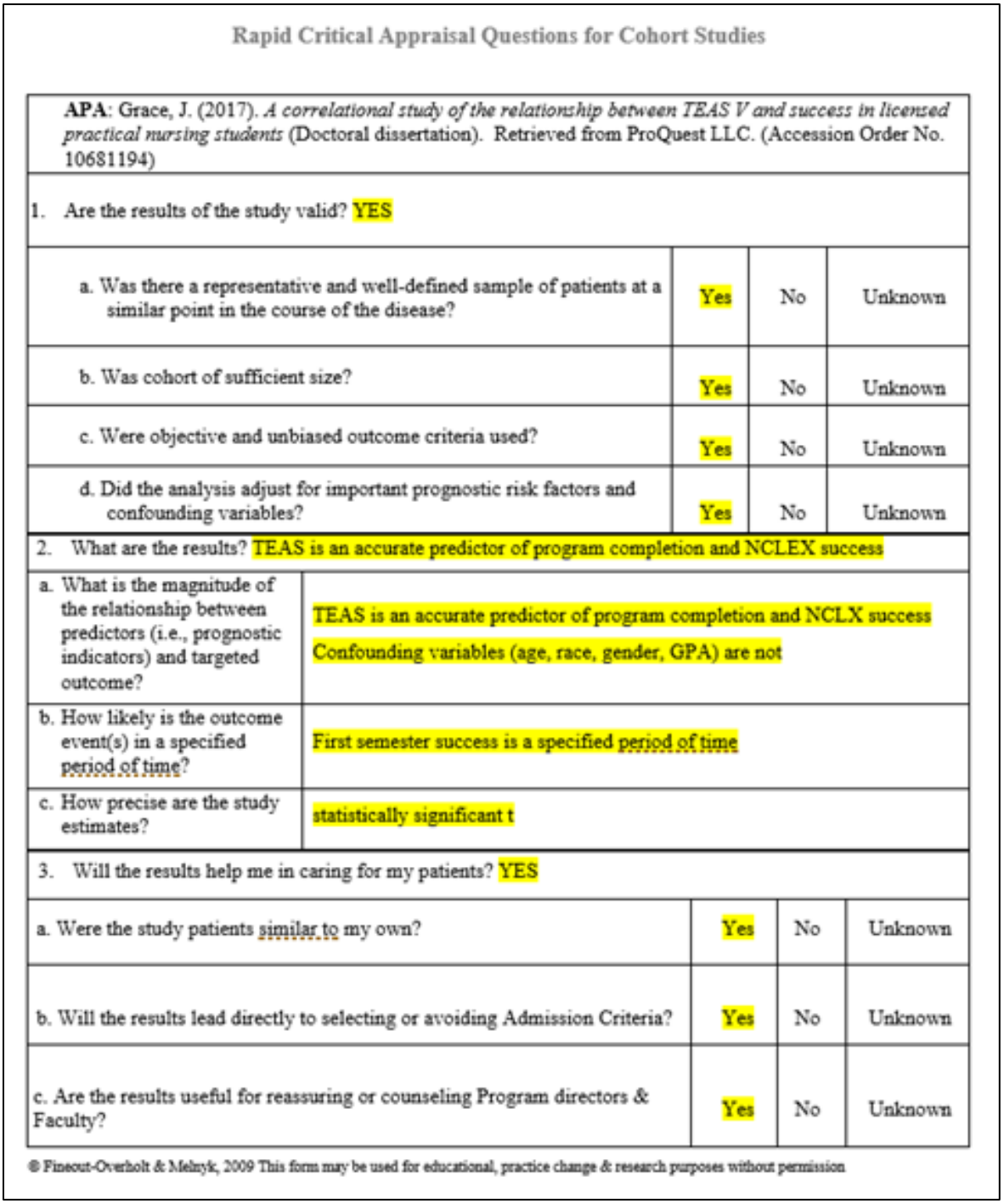
Figure B5.1. Grace Study GAO



Rapid Critical Appraisal Questions for Cohort Studies

APA: Grace, J. (2017). *A correlational study of the relationship between TEAS V and success in licensed practical nursing students* (Doctoral dissertation). Retrieved from ProQuest LLC. (Accession Order No. 10681194)			
1. Are the results of the study valid? YES			
a. Was there a representative and well-defined sample of patients at a similar point in the course of the disease?	Yes	No	Unknown
b. Was cohort of sufficient size?	Yes	No	Unknown
c. Were objective and unbiased outcome criteria used?	Yes	No	Unknown
d. Did the analysis adjust for important prognostic risk factors and confounding variables?	Yes	No	Unknown
2. What are the results? TEAS is an accurate predictor of program completion and NCLEX success			
a. What is the magnitude of the relationship between predictors (i.e., prognostic indicators) and targeted outcome?	TEAS is an accurate predictor of program completion and NCLX success Confounding variables (age, race, gender, GPA) are not		
b. How likely is the outcome event(s) in a specified period of time?	First semester success is a specified period of time		
c. How precise are the study estimates?	statistically significant t		
3. Will the results help me in caring for my patients? YES			
a. Were the study patients similar to my own?	Yes	No	Unknown
b. Will the results lead directly to selecting or avoiding Admission Criteria?	Yes	No	Unknown
c. Are the results useful for reassuring or counseling Program directors & Faculty?	Yes	No	Unknown

Figure B5.2. Grace Study RCA

General Appraisal Overview for All Studies

Date: June 17, 2018	**Reviewer(s) name(s)**: Gabrielle O. Davis
Article citation (APA): Knauss, P. J., & Willson, P. (2013). Predicting Early Academic Success: HESI Admissions Assessment Exam. *Journal of Professional Nursing*, *29*S28-31. doi:10.1016/j.profnurs.2012.07.001	
PICOT Question: In a vocational nursing program how does changing the admission criteria, compared to the current methodology for admission, affect student attrition within one level one semester?	
Overview/General Description of Study: **Purpose of study**: The purpose of the study was to determine if a HESI cut score is an accurate predictor of student success	
Study Design: Quantitative retrospective correlational cohort **General Description of Study**: HESI is the Health Education Systems, Inc (HESI) exam administered for evaluating pre-admission qualification to a nursing program. the faculty implemented a HESI cut score of 75%	
Research question(s) or hypotheses: Does the HESI accurately predict level 1 ADN success?	
Study aims: Evaluate a faculty enacted admission rubric requiring HESI math, reading, grammar, & general knowledge/vocab. scores to be 75%	
Sampling Technique, Sample Size & Characteristics: N=506 ADN student records 3 years of data	
Major variables studies: **Independent variable**: 1. Composite HESI scores 2. HESI component math scores 3. HESI component reading comprehension scores 4. HESI component vocab/general knowledge scores 5. HESI component grammar scores **Dependent (outcome) variable(s)**: 1 - 5 Nursing 1 & 2 course grades	
Variable Analysis Used (include whether appropriate to answer research questions/hypothesis or discover themes): R^2 and significance Yes this is appropriate analysis	

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Figure B6.1. Knauss Study GAO

Rapid Critical Appraisal Questions for Cohort Studies

APA: Knauss, P. J., & Willson, P. (2013). Predicting Early Academic Success: HESI Admissions Assessment Exam. *Journal of Professional Nursing*, *29*S28-31. doi:10.1016/j.profnurs.2012.07.001			
1. Are the results of the study valid? YES			
a. Was there a representative and well-defined sample of patients at a similar point in the course of the disease?	Yes	No	Unknown
b. Was cohort of sufficient size?	Yes	No	Unknown
c. Were objective and unbiased outcome criteria used?	Yes	No	Unknown
d. Did the analysis adjust for important prognostic risk factors and confounding variables?	Yes	No	Unknown

What are the results? The HESI test scores are valid predictors of students' success in the first-semester nursing courses, where students are most vulnerable to failure and attrition rates are highest.	
a. What is the magnitude of the relationship between predictors (i.e., prognostic indicators) and targeted outcome?	HESI Composite & HESI sub-set scores were all statically significant p<.01 with nursing 1 & 2 course grades.
b. How likely is the outcome event(s) in a specified period of time?	First semester success is a specified period of time
c. How precise are the study estimates?	statistically significant correlational study

2. Will the results help me in caring for my patients? YES			
a. Were the study patients similar to my own?	Yes	No	Unknown
b. Will the results lead directly to selecting or avoiding Admission Criteria?	Yes	No	Unknown
c. Are the results useful for reassuring or counseling Program directors & Faculty?	Yes	No	Unknown

Figure B6.2. Knauss Study RCA

General Appraisal Overview for All Studies

Date: June 10, 2018	**Reviewer(s) name(s)**: Gabrielle O. Davis
Article citation (APA): Pritchard, T. L. E. (2010). *COMPASS and prerequisite course scores as predictors of success in practical nursing school* (Doctoral dissertation). Retrieved from ProQuest LLC. (Accession Order No. 3398867)	
PICOT Question: In a vocational nursing program how does changing the admission criteria, compared to the current methodology for admission, affect student attrition within one level one semester?	
Overview/General Description of Study: **Purpose of study**: The purpose of the study was to identify preadmission criteria that accurately identify applicants to practical/vocational nursing (P/VN) schools who will graduate.	
Study Design: Quantitative correlational design cohort study **General Description of Study**: Using student records a correlational analysis was done to examine the relationship between the completion of pre-allied health courses, COMPASS scores and graduation.	
Research question(s) or hypotheses: 1. Is there a significant relationship between successful completion of the pre-allied health literacy (reading and language) courses and student retention? 2. Is there a significant relationship between successful completion of the pre-allied health math and science courses and student retention? 3. Is there a significant relationship between COMPASS scores and successful completion of the Practical Nursing program and NCLEX-PN status?	
Study aims: Identify if completing pre-allied health courses and the COMPASS score accurately predicts graduation from a PN program	
Sampling Technique, Sample Size & Characteristics: Convenience sample single PN program. N=89 from 3-years of enrollment. 96.6% female, 73% white, 19.1% AA; 56.2% completers, 43.8% non-completers;	
Major variables studies: **Independent variable**: 1. Completing pre-allied health literacy courses 2. Completing pre-allied health science & math courses 3. COMPASS scores **Dependent (outcome) variable(s)**: 1. Student retention 2. Student retention 3. Successful PN program completion and NCLEX scores	
Variable Analysis Used (include whether appropriate to answer research questions/hypothesis or discover themes): t-Test, ANOVA, and descriptive analysis Results: 1. Insufficient sample size to determine. 2. Taking the the pre-allied health science course does not predict student success. 28 took the course, 13 completed pgm, and 15 did not complete: completed the PN program (M=3.923, SD =.277), the remaining subjects (n=15) did not complete the program (M=3.600, SD=.632). The difference was not significant, t (26) = -1.702 p<.05. 3. Only the subsection of reading on the COMPASS had statistical significance (p.002) in completion	

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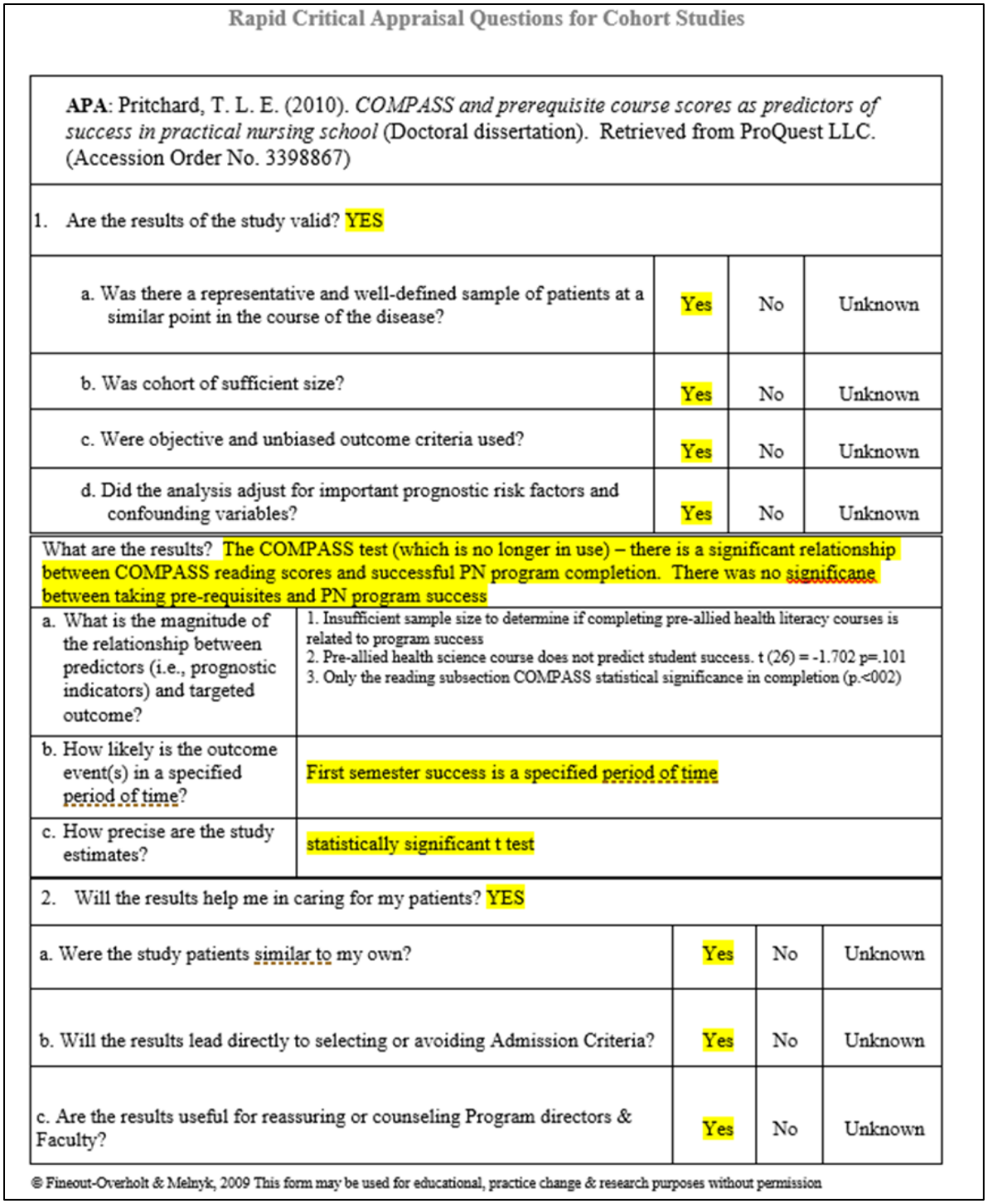
Figure B7.1. Pritchard Study GAO



Rapid Critical Appraisal Questions for Cohort Studies

APA: Pritchard, T. L. E. (2010). *COMPASS and prerequisite course scores as predictors of success in practical nursing school* (Doctoral dissertation). Retrieved from ProQuest LLC. (Accession Order No. 3398867)			
1. Are the results of the study valid? YES			
a. Was there a representative and well-defined sample of patients at a similar point in the course of the disease?	Yes	No	Unknown
b. Was cohort of sufficient size?	Yes	No	Unknown
c. Were objective and unbiased outcome criteria used?	Yes	No	Unknown
d. Did the analysis adjust for important prognostic risk factors and confounding variables?	Yes	No	Unknown

What are the results? The COMPASS test (which is no longer in use) – there is a significant relationship between COMPASS reading scores and successful PN program completion. There was no significane between taking pre-requisites and PN program success	
a. What is the magnitude of the relationship between predictors (i.e., prognostic indicators) and targeted outcome?	1. Insufficient sample size to determine if completing pre-allied health literacy courses is related to program success 2. Pre-allied health science course does not predict student success. t (26) = -1.702 p=.101 3. Only the reading subsection COMPASS statistical significance in completion (p.<002)
b. How likely is the outcome event(s) in a specified period of time?	First semester success is a specified period of time
c. How precise are the study estimates?	statistically significant t test

2. Will the results help me in caring for my patients? YES			
a. Were the study patients similar to my own?	Yes	No	Unknown
b. Will the results lead directly to selecting or avoiding Admission Criteria?	Yes	No	Unknown
c. Are the results useful for reassuring or counseling Program directors & Faculty?	Yes	No	Unknown

Figure B7.2. Pritchard Study RCA

General Appraisal Overview for All Studies

Date: June 10, 2018	**Reviewer(s) name(s)**: Gabrielle O. Davis
Article citation (APA): Twidwell, J., & Records, K. (2017). An integrative review on standardized exams as a predictive admission criterion for RN programs. *International Journal of Nursing Education Scholarship, 14*(1), S32-S37.	
PICOT Question: In a vocational nursing program how does changing the admission criteria ,compared to the current methodology for admission, affect student attrition within one level one semester?	
Overview/General Description of Study: **Purpose of study**: The purpose of the study was to examine which standardized admission test is most predictive of nursing GPA and NCLEX-RN first-time pass rates in U.S. programs of professional nursing?	
Study Design: Qualitative Integrative Review. **LOE**: I **General Description of Study**: Systematic search yield of 15 articles that evaluated the relationship between standardized testing as a predictor of RN program success and NCLEX pas rate. Findings show that HESI, TEAS and ACT are all valid predictors of student success and NCLEX pass rate.	
Research question(s) or hypotheses: Which standardized admission test is most predictive of nursing GPA and NCLEX-RN first-time pass rates in U.S. programs of professional nursing?	
Study aims: To identify which standardized exams are most predictive of student success in RN programs.	
Sampling Technique, Sample Size & Characteristics: Database: MEDLINE, CINHAL, PsycINFO, and Academic Search Complete. 15 articles (13,852 students). Limited for 2006 to 2016. Focus on admission criteria and standardized exams (HESI, TEAS, SAT, CAAP PAX-RN or ACT), various geographic areas in the US.	
Major variables studies: **Independent variable**: Admission test **Dependent (outcome) variable(s)**: Student success (program completion, or first semester completion) NCLEX pass rates	
Variable Analysis Used (include whether appropriate to answer research questions/hypothesis or discover themes): Integrative review – discussion of findings answers question: inclusion of standardized admission exams in the nursing program admission criteria can predict program success and NCLEX-RN success.	

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Figure B8.1. Twidwell Study GAO

Rapid Critical Appraisal of Integrative Review

Date: June 10, 2018	**Reviewer(s) name(s)**: Gabrielle O. Davis	
Article citation (APA): Twidwell, J., & Records, K. (2017). An integrative review on standardized exams as a predictive admission criterion for RN programs. *International Journal of Nursing Education Scholarship, 14*(1), S32-S37.		
1. Are the results of the review valid?		
A. Are the designs of the articles in the review identified?	YES	NO
B. Does the review include a detailed description of the search strategy to find all relevant studies and was it systematic?	YES	NO
C. Do the reviewers use standard criteria to describe the validity of the individual studies (e.g., criteria about methodological quality?)	YES	NO
D. Were the results consistent across studies?	YES	NO
2. What were the results? TEAS is an accurate predictor of early program success and the sub section of Science is the best predictor of the four areas		
A. Were the results described across the studies or were the findings described study-by-study (hint: is there a synthesis table?)	YES	NO
B. What are the sources of bias within the report that make the literature review unreliable (see validity questions above)? NO		
C. Does the bias within the literature review methodology make the results as described unusable? (If so stop here!)	YES	NO
3. Will the results assist me in caring for my patients?	YES	NO
A. Are my patients similar to the ones included in the review?	YES	NO
B. Is it feasible to implement the findings in my practice setting?	YES	NO
C. Were all clinically important outcomes considered, including risks & benefits of the treatment?	YES	NO
D. What is my clinical assessment of the patient & are there any contraindications of circumstances that would inhibit me from implementing the treatment?	YES	NO
E. What are my patient's & their family's preferences& values about the treatment that is under consideration? The program uses a ranking criterion, so TEAS alone is unlikely but changing the ranking, so TEAS is the determinant weight is possible		

Figure B8.2. Twidwell Study RCA

General Appraisal Overview for All Studies

Date: June 10, 2018	**Reviewer(s) name(s)**: Gabrielle O. Davis
Article citation (APA): Wolkowitz, A., & Kelley, J. (2010). Academic predictors of success in a nursing program. *The Journal of Nursing Education, 49*(9), 498-503.	
PICOT Question: In a vocational nursing program how does changing the admission criteria ,compared to the current methodology for admission, affect student attrition within one level one semester?	
Overview/General Description of Study: **Purpose of study**: The purpose of the study was to determine which academic areas of the TEAS exam are the best predictors of early success in a nursing program.	
Study Design: Quantitative descriptive correlational design cohort study. **LOE**: IV **General Description of Study**: Correlational analysis of the four subareas of the TEAS (science/reading/math/English) to performance on the Fundamentals exam (an early measure of student success) to determine which subarea is most predictive of success.	
Research question(s) or hypotheses: Are science and reading abilities better predictors of success than mathematics or English abilities (as measured on the TEAS entrance exam)	
Study aims: Apply a multiple regression model to student test scores to determine the relative strength of science, mathematics, reading, and English content areas in predicting early nursing school success	
Sampling Technique, Sample Size & Characteristics: Convenience (after a survey of nursing program directors), 49 RN programs that use TEAS for admission criteria - 4105 RN students 1st time test takers for TEAS entrance exam and for Fundamentals test.	
Major variables studies: **Independent variable**: TEAS Scores **Dependent (outcome) variable(s)**: Success on RN fundamentals exam	
Variable Analysis Used (include whether appropriate to answer research questions/hypothesis or discover themes): Multiple regression analysis. Multiple correlation coefficient (R) indicates the strength of the relationship between the TEAS and TEAS subsections and the Fundamental scores. R^2 evaluates the accuracy of the prediction. Significance (p) indicates statistical significance all test sub-areas (except math for ADNs) were statistically significant The linear combination of the four TEAS sub-scores to the RN Fundamentals score was statistically significant, $R2 = 0.20$, $F(4, 4100) = 256.467$, $p < 0.01$, indicating that the linear combination of the four TEAS subtest scores explains 20% of the variance in the Fundamentals scores. In the test of sub-area, the science area has the highest correlation in all programs (ADN & BSN)	

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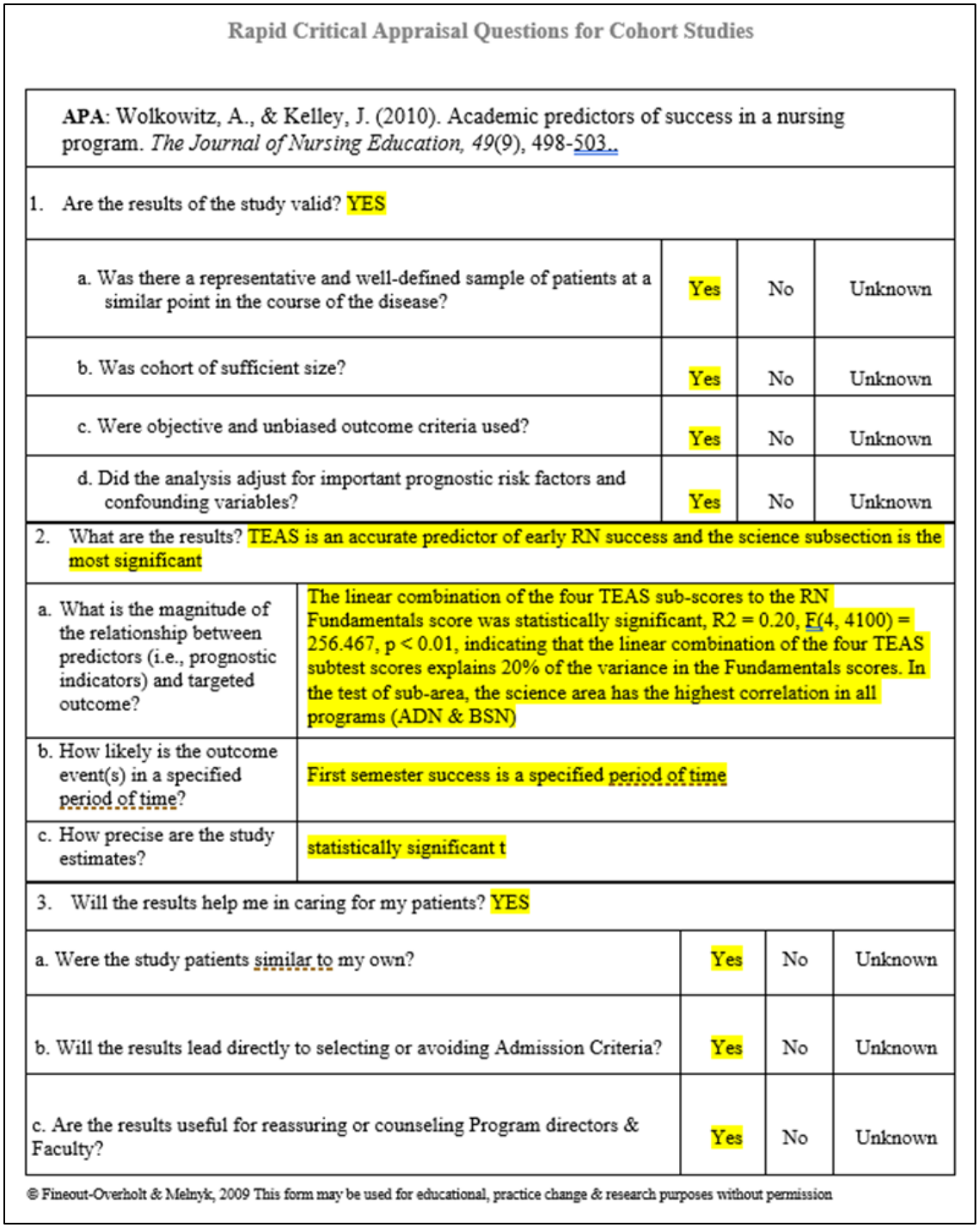
Figure B9.1. Wolkowitz Study GAO



Rapid Critical Appraisal Questions for Cohort Studies

APA: Wolkowitz, A., & Kelley, J. (2010). Academic predictors of success in a nursing program. *The Journal of Nursing Education, 49*(9), 498-503..			
1. Are the results of the study valid? YES			
a. Was there a representative and well-defined sample of patients at a similar point in the course of the disease?	Yes	No	Unknown
b. Was cohort of sufficient size?	Yes	No	Unknown
c. Were objective and unbiased outcome criteria used?	Yes	No	Unknown
d. Did the analysis adjust for important prognostic risk factors and confounding variables?	Yes	No	Unknown
2. What are the results? TEAS is an accurate predictor of early RN success and the science subsection is the most significant			
a. What is the magnitude of the relationship between predictors (i.e., prognostic indicators) and targeted outcome?	The linear combination of the four TEAS sub-scores to the RN Fundamentals score was statistically significant, R2 = 0.20, F(4, 4100) = 256.467, p < 0.01, indicating that the linear combination of the four TEAS subtest scores explains 20% of the variance in the Fundamentals scores. In the test of sub-area, the science area has the highest correlation in all programs (ADN & BSN)		
b. How likely is the outcome event(s) in a specified period of time?	First semester success is a specified period of time		
c. How precise are the study estimates?	statistically significant t		
3. Will the results help me in caring for my patients? YES			
a. Were the study patients similar to my own?	Yes	No	Unknown
b. Will the results lead directly to selecting or avoiding Admission Criteria?	Yes	No	Unknown
c. Are the results useful for reassuring or counseling Program directors & Faculty?	Yes	No	Unknown

Figure B9.2. Wolkowitz Study RCA

Appendix C

Evaluation Table

CLINICAL QUESTION: In a vocational nursing program how does changing the admission criteria, compared to the current methodology for admission, affect student attrition within one level one semester?

Citation auth., yr, title	Purpose of Study	CF? DM?	Sample/Setting	Major Variables	Meas. Variables	Data Analysis Method	Data Findings	Appraisal of Worth Note: LOE per Table 5.1 in Melnyk, et al. (2017).
1. ATI. (2011). Is the TEAS V predictive of early nursing school success?	Predictive reliability of TEAS as early indicator of PN/VN student SUC	**CF**: None **DM:** QAN Retro COH	3 Studies PN: N= 4899 PN records from 393 schools' data bases. RN: N=8198 RN records 509 schools' databases	**IV**: 1. TEAS scores 2. TEAS scores 3. TEAS scores **DV**: 1. FUN scores 2. Early nsg SCH SUC 3. SUC FUN scores	QAN -	**1.** Pearson correlation coefficients **2**. Logistic regression **3**. Mean, SD & t-test & p-value	**PN** studies: **1**. R = 0.455, p<.0001 **2.** X^2 = 794.00, df=1, p<.001, Nagelkerke R^2 =0.20; β=.08 (Wald=637.88, p<.001). **3**. Sig. mean differ btwn. SUC (m=65.19, SD= 10.21, d=0.84) and unsuccessful (m=56.39, SD=10.21, t=29.43, p<.0001 **RN** studies: **1**. R=0.459, p<.0001 **2**. X^2 = 1100.75, df=1, p<.001, Nagelkerke R^2 =0.18; β=.074 (Wald 914.51, p<.0001) **3**. Sig. mean differ btwn. SUC (m=72.70, SD= 10.27, d=0.81) and unsuccessful (m=63.98, SD=11.22, t=33.85, p<.0001	**LOE**: I **Strengths**: Strong evidence to ↑ value of TEAS 4 admit criteria **Weaknesses**: none noted **Feasibility**: Feasible **Study Conclusion:** TEAS predictive value & can ↓ attrition **Rationale:** TEAS use can ↓ attrition **Recommendation**: ↑value of TEAS in ranking
2. Chen (2013). HESI Admission Assessment scores: Predicting student success	determine the value of the HESI in predicting ADN first-semester student attrition	**CF**: None **DM:** QAN Retro COH	N=506 ADN student records 3 years data	**IV**: 1. Composite HESI scores 2. HESI math scores 3. HESI reading comprehension scores 4. HESI vocab/general knowledge scores 5. HESI grammar scores 6. HESI A & P scores **DV**:	QAN	Mean, SD, t-test	All HESI composite & component scores were positively correlated - Except for Pharm course & HESI reading – all were significantly correlated p<.01 Mean scores on composite & components are all significantly higher for those who completed level 1 courses (p<.01)	**LOE: IV** **Strengths:** examined a different standardized admission test **Weaknesses:** ADN program **Feasibility:** another test may not be feasible due to contractual agreements but is supportive of preadmission testing **Study Conclusion:** The HESI is a valid pre-assessment tool to reduce attrition **Rationale:** EBP decision making in admission **Recommendation:** ↑value of TEAS in ranking

				1 - 5 Nursing 1 & 2, and pharmacology course grades:				
3. Cline, (2013). *Mostly likely to achieve: Predicting early success of the practical nurse student*	predict success & increase attrition rates via TEAS and/or GPA & corequisites	**CF**: Tinto's **DM:** QAN Retro COH	Q 1 &2 N= 73 PN student records; Q3 N=111 student records, Single school in North Carolina, 3 years of data.	**IV**: 1. Pre-NSG GPA 2. TEAS scores subtests 3. Co-reqs prior to PN admission **DV**: 1. First-semester SUC 2. Final scores first semester 3. First-semester SUC	QAN -	1. Wald Chi-Square, p-value 2. Wald Chi-Square, p-value 3. ANOVA and t-test, p-value	1. $p > .05$ (no sig) 2. of passing students all sub score areas except math are $p \leq .05$. (sig) 3. Only English is $p \leq .05$ (sig)	**LOE**: IV **Strengths**: Also examined other aspects in current ranking criteria **Weaknesses**: too few fails to test/not test pass/fail **Feasibility**: Feasible **Study Conclusion:** TEAS predict pgm success; pre-nsg GPA/co-req's do not predict SUC **Rationale:** TEAS predicts student SUC, other ranking factors do not **Recommendation**: ↑value of TEAS in ranking
4. Dunham (2017). ATI TEAS V cut score for the California community college nursing programs	Evaluate existing admissions cut scores for the CCC RN programs	**CF**: None **DM:** QAN Retro COH	For q 1 &2 N=6604; Q3 N=8174 Student records from 62 CCC's RN pgms.	**IV**: 1. TEAS score mean 2. TEAS cut score of >62% or < 62%. 3. Cut scores of 62.00%, 60.00%, 62.60%, 64.60%, and 66.60% **DV**: 1. Students completed pgm. in $\leq$ 4 semesters. 2. Students completed >4 semesters w/wo dropping 3. Students who don't complete pgm	QAN	1. MEAN & SD. pgm complete or non-complete & TEAS mean. **2**. Chi^2 & OR **3**. OR	**1**.Chi^2 ($\chi 2 = 149.51$, $p < .001$, $df = 1$), TEAS score means for complete pgm =74.5% versus 70.9% for fail to graduate. Each point TEAS ↑ = 1.046 ↑in completion. **2.** TEAS $\geq$ 62% = complete 84.7%; non- complete 15.3%; TEAS < 62% Complete 70.1%, non-complete 29.9%; OR =2.35 **3.** Pgm complete & score cuts scores OR -60% = 2.11; 62% = 2.35; 62.60% = 2.37; 64.6% =2.47; 66.6% =2.34	**LOE**: IV **Strengths**: through. **Weaknesses**: none **Feasibility**: A cut score might be feasible **Study Conclusion:** Retain 62% cut score **Rationale:** Cut score is clear delineation of expectations for success **Recommendation**: ↑value of TEAS in ranking, consider cut scores
5. Grace, (2017). *A correlational study of the relationship*	identify whether a relationship existed btwn TEAS V score &	**CF**: Jeffreys' NURS model	N=271 PN student records, Single school in SW Alabama, 3	**IV**: 1. TEAS Score 2. TEAS Score 3. Confounding variables (age, race, gender, & GPA)	QAN	Chi^2 ; Shapiro-Wilkes test; Mann-Whitney test Significance	1. Mann Whitney (Z =-3.672, p = 0.000) Highly significant **2**. Mann Whitney (Z = -3.332, p =0.001). average TEAS 63.89 pass NCLEX VS. average TEAS 36.67 fail NCLEX.	**LOE**: IV **Strengths**: examined other ranking components **Weaknesses**: none **Feasibility**: Feasible

between TEAS V and success in licensed practical nursing students	completion of PN pgm & NCLEX-success	**DM:** QAN Retro COH	years of data,	3. Confounding variables (same) **DV**: 1. Pgm completion 2. Pass NCLEX 3. Pgm completion 4. Pass NCLEX			**3**. Chi^2 Only race is significant (χ2 (2, N = 260) = 6.554, p = 0.038). **4**. Chi^2 Only race is significant (χ2 (1, N = 119) = 9.509, p = 0.002).6,78% Caucasian fail, 28.33% AA fail. Other variables not statistically significant	**Study Conclusion:** Admission criteria should support graduation & passing NCLEX **Rationale:** TEAS is better valued than other ranking factors **Recommendation**: ↑value of TEAS in ranking
6. Knauss, 2013. Predicting Early Academic Success: HESI Admissions Assessment Exam	determine if a HESI score is an accurate predictor of early student success	**CF**: None **DM:** QAN Retro COH	N=157 ADN students records single school 4 cohorts data	**IV**: 1. Composite HESI scores 2. HESI math scores 3. HESI reading comprehension scores 4. HESI vocab/general knowledge scores 5. HESI grammar scores **DV**: 1 - 5 Nursing 1 & 2 course grades	QAN	R^2 and significance	Composite & sub-set scores were all statically significant p<.01 with nursing 1 & 2 course grades.	**LOE: IV** **Strengths:** examined a different standardized admission test **Weaknesses:** ADN program **Feasibility:** another test may not be feasible due to contractual agreements but is supportive of preadmission testing **Study Conclusion:** Change admission criteria to require all sections of HESI to be 75% not just composite score **Rationale:** Lower attrition **Recommendation:** ↑value of TEAS in ranking
7. Pritchard (2010). *COMPASS and prerequisite course scores as predictors of success in practical nursing school*	identify preadmission criteria that accurately identify applicants to P/VN schools who will graduate	**CF**: Tinto's **DM:** QAN Retro COH	N=89 PN students records single school	**IV**: 1. Completing pre-allied health literacy courses 2. Completing pre-allied health science & math courses 3. COMPASS Sub-scores **DV**: 1. Student retention 2. Student retention 3. Successful PN program completion and NCLEX scores	QAN	t-Test, ANOVA, significance, descriptive analysis	1. Insufficient sample size to determine. 2. Pre-allied health science course does not predict student success. t (26) = -1.702 p=.101 3. Only the reading subsection COMPASS statistical significance in completion (p.<002)	**LOE**: IV **Strengths**: examined other ranking components and a different standardized admission test **Weaknesses**: none **Feasibility**: Feasible **Study Conclusion:** Cut-score for COMPASS should be raised & stop exempting those who completed other courses from pre-allied health courses **Rationale:** Low COMPASS scorers are ↑non-completers **Recommendation**: ↑value of TEAS in ranking
8.Twidwell. (2017). An integrative review	which standardized exams are most predictive	**CF**: None **DM**: IG	Databases: MED; CIN, Psyc & ACS. 15 articles RE:	**IV** Admission test type **DV**: Student SUC NCLEX pass rate	Descriptive of QAN	Descriptive	TEAS, HESI SAT & ACT are predictors of program success. PAX-RN is not HESI better predictor than pre-nursing GPA.	**LOE**: I **Strengths**: Examined value of preadmission tests for predictive factors & in comparison to each other

on standardized exams as a predictive admission criterion for RN programs	of student success in RN programs	Descriptive Cohort	standardized admission testing in nursing programs					**Weaknesses**: RN only **Feasibility**: Feasible in considering other exams **Study Conclusion:** Admission criteria based on predictive testing HESI, ACT, TEAS **Rationale** HESI, ACT & TEAS are predictive of program success **Recommendation**: ↑value of TEAS in ranking
9. Wolkowitz, (2010). Academic predictors of success in a nursing program	determine areas of the TEAS exam are the best predictors of early success in a nursing program.	**CF**: None **DM:** QAN Retro COH	N=4105 RN student records from 49 RN pgms 1st-time test takers for TEAS & FUN.	**IV** TEAS scores **DV**: SUC on RN FUN exam	QAN	(R) indicates the strength of the relationship; R^2 evaluates the accuracy of the prediction; p Significance	TEAS to RN fundamentals: $R2 = 0.20$, F (4, 4100) = 256.467, $p < 0.01$ TEAS subsection All sections for all RN's p<.0001: Note for ADN's math subsection p=.61333	**LOE**: IV **Strengths**: Large sample **Weaknesses**: RN only **Study Conclusion:** Total TEAS score best predictor of all RN SUC; science subsection strongest overall **Rationale** Total TEAS score best predictor of SUC **Recommendation**: ↑value of TEAS in ranking Composite only.

Legend: ACT=American College Test; ASC=Academic Search Complete; CF? =Conceptual framework; CI=Confidence interval; CIN=CINAHL; COH=cohort study; Co-reg.=Co-requisite courses; COM= Computer-adaptive Placement Assessment and Support System; DV=dependent variable; FUN=Nursing Fundamentals test; HESI=Health Education Systems, Inc.; IG = Integrative Review; IV=independent variable; MED=Medline; NSG=Nursing; OR= Odds Ratio; PAX-RN=Pre-Admission Exam Registered Nurse; Pgm =Program; PN/VN=Practical or Vocational Nurse; PUB= PubMED; PRO=Proquest Dissertations and Theses; Psyc=PsycINFO; QAN= quantitative research; Retro=Retrospective; SCH=School; SUC=Success/Successful; TEAS=Test of Essential Academic Skills

Appendix D

Synthesis Tables

Table 1D

Level of Evidence Table for all Studies

Evidence Level for Intervention Question(s) Note: LOE per Table 5.1 in Melnyk, et al. (2017).	**Studies**								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Level I: Systematic Review, Meta-Analysis, Integrative Review	√							√	
Level II: Randomized Controlled Trials									
Level III: Controlled Trials without Randomization									
Level IV: Case-Control or **Cohort** Study		√	√	√	√	√	√		√
Level V: Systematic Review of qualitative or descriptive studies									
Level VI: Qualitative or Descriptive Study									
Level VII: Expert Opinion or Consensus									

Legend: 1. ATI; 2. Chen; 3. Cline; 4. Dunham; 5. Grace; 6. Knauss; 7. Pritchard; 8. Twidwell; 9. Wolkowitz.

Table 2D

Effect of Admission Criteria on Decreased Attrition or other Student Success Metrics

Admission Criteria	**Study Number**								
	1	**2**	**3**	**4**	**5[a]**	**6[a]**	**7**	**8**	**9[a]**
TEAS composite score	↑***	NE	NE	↑***	↑***	NE	NE	↑	↑**
TEAS sub-scores	NE	NE	↑*	NE	NE	NE	NE	NE	↑*** (ADN & BSN)
HESI composite score	NE	↑**	NE	NE	NE	↑**	NE	↑	NE
HESI sub-scores	NE	↑** (Except reading w/ pharm class completion)	NE	NE	NE	↑**	NE	NE	NE
GPA	NE	NE	**NS**	NE	**NS**	NE	NE	NE	NE
Pre-requisite courses	NE	NE	↑* (English only)	NE	NE	NE	**NS**	NE	NE
NCLEX success	NE	NE	NE	NE	↑***	NE	NE	NE	NE
COMPASS sub-score	NE	NE	NE	NE	NE	NE	↑* (Reading only)	NE	NE
SAT/ACT composite score	NE	NE	NE	NE	NE	NE	NE	↑	NE

Note: NS= Not significant. *p<.05; **p<.01; ***p<.001

Legend: 1. ATI; 2. Chen; 3. Cline; 4. Dunham; 5. Grace; 6. Knauss; 7. Pritchard; 8. Twidwell; 9. Wolkowitz.

Table 3D

Student Population and Admission Criteria Metrics

Admission Criteria	**Study Number**								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
TEAS composite score	**PN RN**	NE	NE	**ADN**	**PN**	NE	NE	**RN**	**RN**
TEAS sub-scores	NE	NE	**PN**	NE	NE	**ADN**	NE	NE	NE
HESI composite score	NE	**ADN**	NE	NE	NE	**ADN**	NE	**RN**	NE
HESI sub-scores	NE	**ADN**	NE	NE	NE	NE	NE	NE	NE
GPA	NE	NE	**PN**	NE	NE	NE	NE	**RN**	NE
Pre/co-requisite courses	NE	NE	**PN**	NE	NE	NE	**PN**	NE	NE
Compass sub-scores	NE	NE	NE	NE	NE	NE	**PN**	NE	NE
ACT composite score	NE	NE	NE	NE	NE	NE	NE	**RN**	NE

Note: RN is aggregate ADN and BSN.

Legend: 1. ATI; 2. Chen; 3. Cline; 4. Dunham; 5. Grace; 6. Knauss; 7. Pritchard; 8. Twidwell; 9. Wolkowitz.

Appendix E

Model of Evidence-Based Practice Change Applied to Evidence-Based Practice Innovation Project

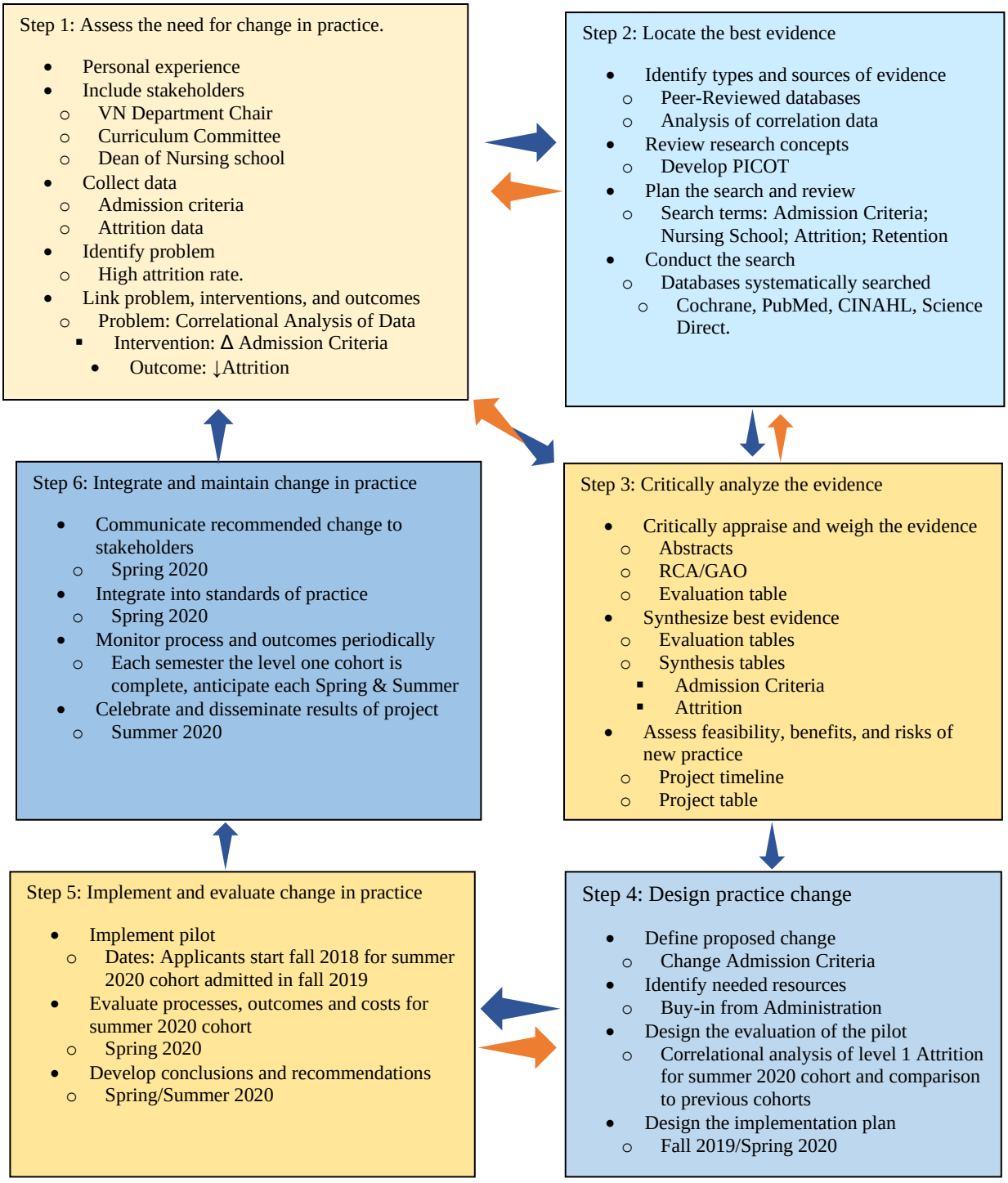
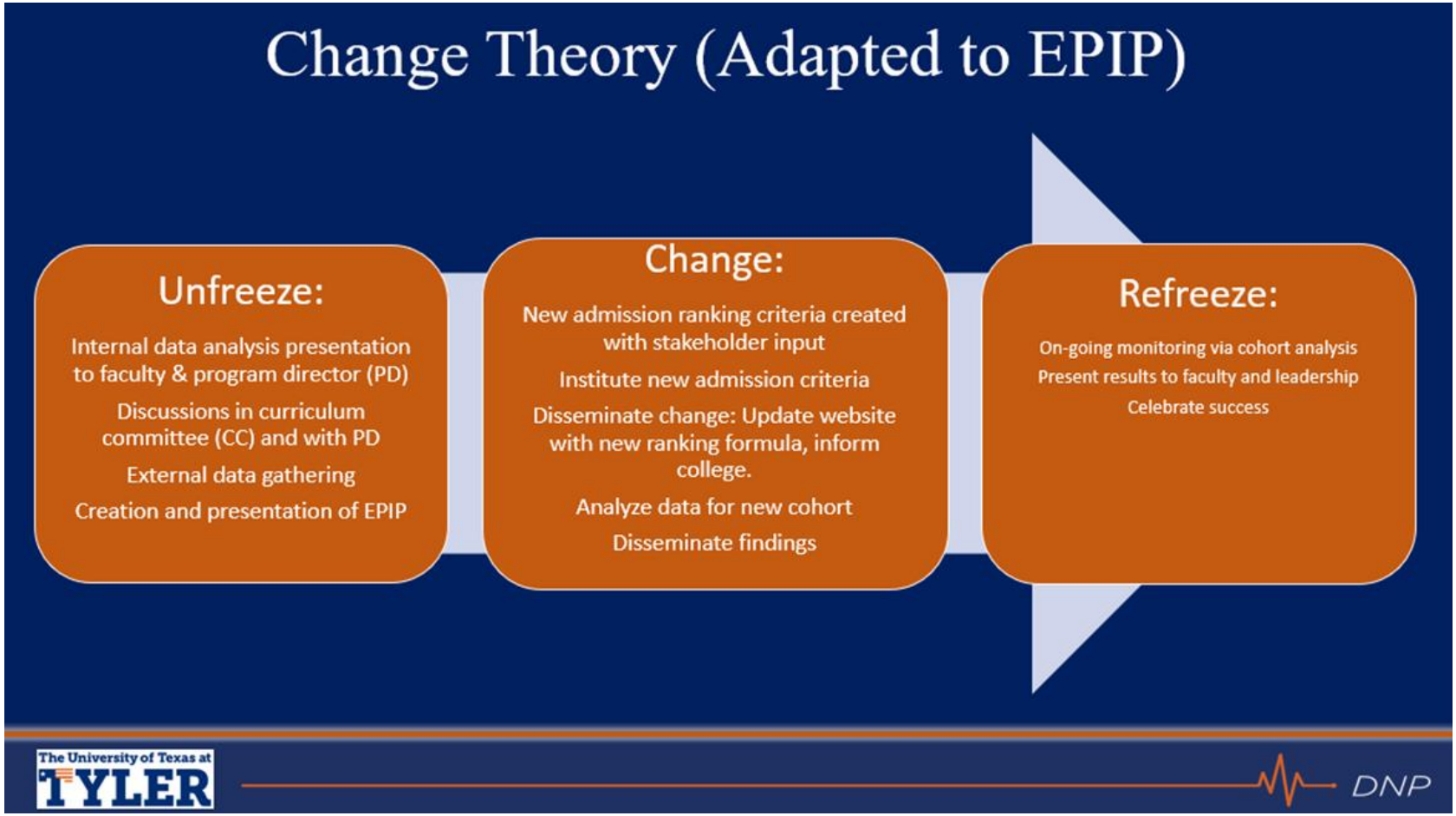


Figure E1. Graphic representation of the use of the Model for Evidence-Based Practice Change in the EPIP: Changing Admission Criteria in a Vocational Nursing Program to Decrease Attrition
Adapted from Larrabee (2008, p. 22).

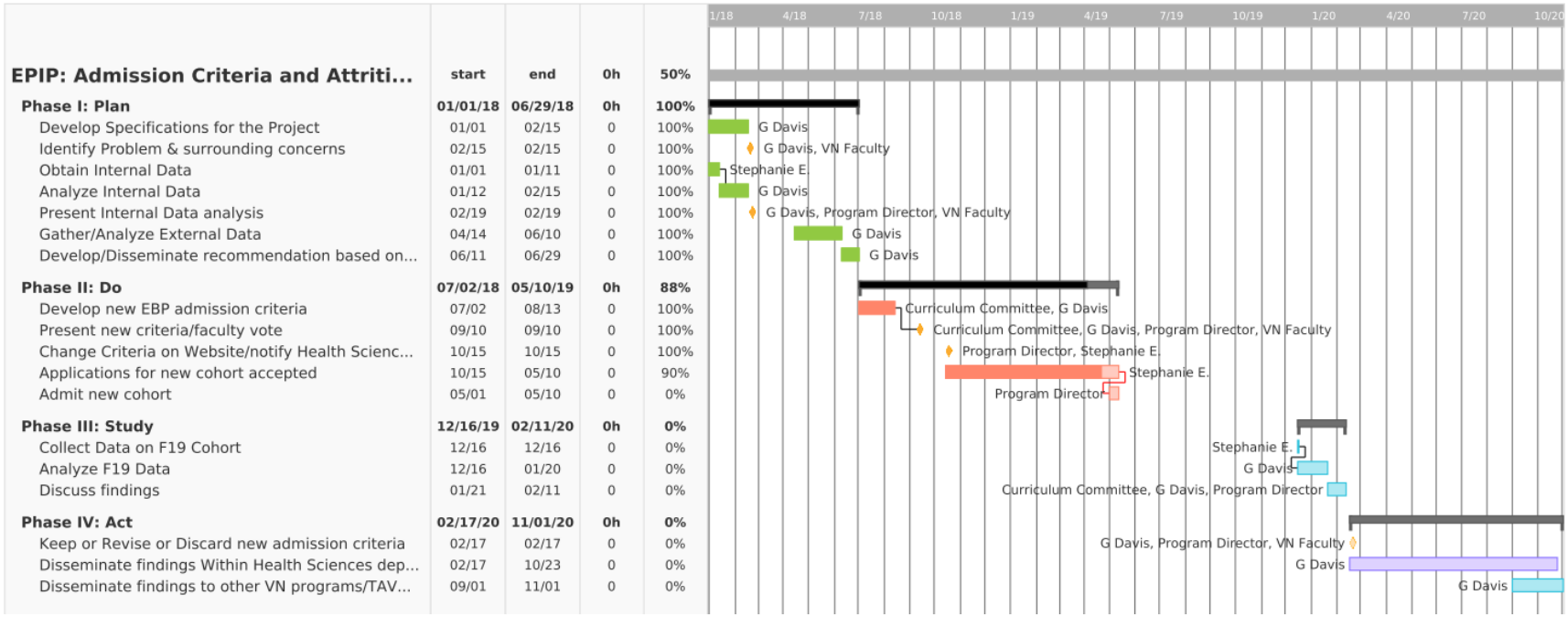
Appendix F

Lewin's Change Theory



Appendix G

Quality Innovation Process: PDSA/Gantt Chart



Appendix H

Logic Model

Program name: Decreasing attrition rate

Program Goals:
1. Change admission criteria formula to most heavily weigh high scoring TEAS students.
2. Reduce attrition rate in level one from 35.4% to under 30%.

Resources/ Inputs:
Human: Two people to manage the data (the author and the administrative assistant), Occasionally faculty members and program director to evaluate and approve, modify, or decline the proposal. One person to alter the wording for the admission criteria on the school website. **Data**: TEAS and records of passing/failing students in level one. **Office Supplies**: Laptop, Excel, PowerPoint . **Field or Organizational Resources:** Access to meeting room and presentation equipment at organization.

OUTPUTS		OUTCOMES		
Activities	**Audience**	**Short-Term**	**Mid-Term**	**Long-Term**
A. Discussion of high attrition rate	VN faculty	Notice problem and possible root causes	Agree on possible causes	EBP: data analysis internal & external data
B. Data analysis measuring the correlation between attrition and TEAS scores (internal data) and creation of data presentation	VN faculty/DNP faculty mentor	Understand if observed occurrence is statistically significant	Evaluate data and increase faculty understanding of internal data	Create sense of community in understanding root problem
C. Present internal data analysis to faculty	VN faculty/Program director	Educate faculty on statistical analysis answer any questions.	Increased faculty knowledge and awareness of problem.	Faculty advocacy or understanding in need for change.
D. Collect and analyze external data in standardized testing scores and attrition rates from peer reviewed sources.	VN Faculty/ DNP faculty mentor	Evaluate external evidence	Create tables presenting external data	Increase EBP practice in admission criteria
E. Create presentation of external data analysis and develop recommendation to change admission criteria; Present EBP analysis to program director	VN program director	Share supporting external data.	Increase understanding and buy in to change criteria	Change criteria to EBP process

F. Present EBP change to curriculum committee to change admission criteria. Get stakeholder input on change	VN curriculum committee	Consider committee preferences to modify criteria to meet data and preferences	Increase buy-in and meet program needs	Change criteria to EBP process
G. Present modified proposal to faculty (modification for curriculum committee preferences). Decision point: faculty vote to change criteria	VN faculty	Get faculty buy-in	Implement change in admission criteria for Fall 2019 incoming class	Decrease attrition rates and increase EBP culture
H. Change admission criteria on website	Prospective students/general public	Notify any potential applicants of change	Improve graduation and retention rates	Decrease attrition rates Actualize DNP role by implementing EBP change to practice & culture.
I. Implement EBP change in admission ranking criteria	VN program	Assess applicant pool with new weighting formula	Admit greater pool of higher scoring TEAS students	Decrease attrition by actualizing EBP
J. Evaluate results of first cohort admitted with new ranking. Data analysis of attrition correlated with TEAS scores.	VN program	Evaluate initial results	Disseminate results & review with program director/faculty	Determine: keep or modify ranking criteria
K. Review success & next steps	VN faculty	Evaluation of success and lessons learned, determine sustainability	Disseminate data beyond organization	Decrease attrition rate in other VN programs

Appendix I

Project Table & Summary

Project Table

Study	Sample/Setting	Intervention	Correlation Outcome	Process (what did they do in the study – that worked?!)	My Project – how will you use this information in your project?
1	SAM: metanalysis from 3 QAN N= (8198 RN) N=4899(PN/VN) SET: RN 509 schools and PN/VN 393 schools student record databases	TEAS composite scores	Early nursing school success	Found statistical significance in correlating the incoming TEAS composite scores with metrics of student success	External evidence to support the validity of TEAS as the most reliable admission criterion for decreasing attrition and increasing student success
2	SAM: N=156 SET: ADN students records single school 4 cohorts (2 years) data	HESI composite and sub-scores	Early nursing school success	Positive correlations between test scores and success (except between a pharm course and the HESI reading section)	External evidence to support the validity of composites cores in standardized testing as the most reliable admission criterion
3	SAM: Q 1 &2 N= 73; Q3 N=111 SET: PN student records; 3 yrs. data.	TEAS sub-scores, GPA, Pre-requisites courses	Early nursing school success	GPA not significant to early success; all sub-scores except math are significant to success; only an English class pre-requisite is significant to success	Do not alter criteria to include GPA; TEAS standardized testing is reliable predictor; discuss ESOL difficulties integration into (existing) tutoring program
4	SAM: q 1 &2 N=6604; Q3 N=8174 SET: RN Student records from 62 CCC's	TEAS composite scores	On-time program completion	Each point TEAS ↑ = 1.046 ↑in completion. TEAS $\geq$ 62% has an OR= 2.35 for completion.	External evidence to support the validity of TEAS as a predictor of program completion
5	SAM: N=271 SET: PN student records; 3 yrs. data	TEAS composite scores GPA	Program completion and NCLEX success	TEAS score highly significant to predict completion and NCLEX success. GPA not significant	Do not alter criteria to include GPA; TEAS standardized testing is reliable predictor;
6	SAM: N=506 SET: ADN student records 3 years data	HESI composite and sub-scores	Early nursing school success	HESI composite and sub-scores all significant to predict early nursing school success	External evidence to support the validity of standardized testing as the most reliable admission criterion

7	SAM: N=89 SET: PN students records	COMPASS sub-scores Pre-requisite courses	Retention, program completion and NCLEX success	Pre-req not predictive; only reading subsection significant in predicting program completion	Do not alter to include pre-req's; do not change to college acceptance test instead of TEAS
8	SAM: IR 15 articles SET: Databases: MED; CIN, Psyc & ACS	TEAS, HESI and ACT/SAT composite scores	Program success (passing/completion) and NCLEX success	TEAS, HESI, SAT/ACT are predictors of program success	External evidence to support the validity of standardized testing as the most reliable admission criterion
9	SAM: N=4105 SET: RN student records from 49 RN pgms	TEAS composite and sub-scores	Early nursing school success	TEAS scores significant to predict early nursing school success	External evidence to support the validity of TEAS as a predictor of early nursing school success

Summary: The clear patterns that emerged from the evidence is that the composite scores from standardized testing are the best predictors of program success. Based on this, it is proposed to give greater ranking weight to the TEAS score on the admission criteria matrix. This is proposed to the program director, curriculum committee, faculty, and dean.

Legend Studies: 1. ATI; 2. Chen; 3. Cline; 4. Dunham; 5. Grace; 6. Knauss; 7. Pritchard; 8. Twidwell; 9. Wolkowitz.

Legend Abbreviations: ADN=associate degree nursing; ASC=Academic Search Complete; BSN=bachelor's degree nursing; CCC=California community colleges; CIN=CINAHL; IR=integrative review; MED=Medline; Psyc=PsycINFO; PN=practical nursing program; QAN=quantitative study(ies); RN=aggregate ADN and BSN data; SAM=sample; SET=setting;

Appendix J

Budget

DNP (EPIP) Project Name: Changing Ad

	DNP (EPIP) PROJECT TASKS	LABOR HOURS	LABOR COST ($)	OTHER COST ($)	TOTAL PER TASK
ASSESSMENT	Develop Specifications for Project	8.0	$43.00	$0.00	$344.00
	Identify key stakeholders	2.0	$43.00	$0.00	$86.00
	Prepare project timeline	8.0	$43.00	$0.00	$344.00
	Assess organizational readiness	5.0	$43.00	$0.00	$215.00
	Gather internal data	3.0	$22.00	$0.00	$66.00
	Anayze internal data	9.0	$43.00	$0.00	$387.00
	Subtotal	**35.0**	**$41.20**	**$0.00**	**$1,442.00**
PROJECT PLANNING	Identify and task key stakeholders	8.0	$43.00	$0.00	$344.00
	Procure and analyze external data	8.0	$43.00	$0.00	$344.00
	Collaborate with Stakeholders	8.0	$43.00	$0.00	$344.00
	Set up plans to collect data and identify personnel	8.0	$43.00	$0.00	$344.00
	Internal data collection across timeline	8.0	$43.00	$0.00	$344.00
	Subtotal	**40.0**	**$43.00**	**$0.00**	**$1,720.00**
PROJECT IMPLEMENTATION	Train Faculty/staff on process	8.0	$43.00	$0.00	$344.00
	Perform Checkpoint Project Review	8.0	$43.00	$0.00	$344.00
	Modify program website	8.0	$43.00	$0.00	$344.00
	Archive Materials for future use as implementation rolls out	8.0	$43.00	$0.00	$344.00
	Subtotal	**32.0**	**$43.00**	**$0.00**	**$1,376.00**
PROJECT EVALUATION	Stakeholder Progress Meetings/Reports	8.0	$43.00	$0.00	$344.00
	Internal Status Meetings/Reports	8.0	$43.00	$0.00	$344.00
	Education with Other Internal Departments	8.0	$43.00	$0.00	$344.00
	Faculty Meeting updates	8.0	$43.00	$0.00	$344.00
	Quality Assurance: Analysis of data post implementation	8.0	$43.00	$0.00	$344.00
	Overall Project Management/Meetings with mentors	8.0	$43.00	$0.00	$344.00
	Subtotal	**48.0**	**$43.00**	**$0.00**	**$2,064.00**
SUSTAINABILITY	Promotion within Health Sciences Dept.	8.0	$43.00	$0.00	$344.00
	Dissemination via publication/networking	8.0	$43.00	$0.00	$344.00
	Subtotal	**16.0**	**$43.00**	**$0.00**	**$688.00**

Subtotals	**171.0**	**$42.63**	**$0.00**	**$7,290.00**
Risk (Contingency)	0.0	$0.00	$0.00	**$0.00**
Total (Scheduled)	**171.0**	**$42.63**	**$0.00**	**$7,290.00**

Appendix K

Organizational Approval

The University of Texas at TYLER

DNP Organizational Approval Letter

November 16, 2018

Gabrielle O. Davis, MSN, RN, CNE

Dear Gabrielle,

Thank you for seeking us out to conduct the DNP scholarly project (EPIP) entitled, *Changing Admission Criteria in a Vocational Nursing Program to Decrease Attrition,* in our organization. We have reviewed your project proposal and are happy to partner with you as you implement your evidence-based change project. WE realize that this project is part of your studies at the University of Texas at Tyler's DNP program. We also realize that the timeframe for the project is launching approximately the week of October 15, 2018 and concluding the week of January 17, 2020.

We believe this is a valuable endeavor and support your project. We look forward to working with you.

Sincerely,

Sandra McCrary- Marshall

Department Chair LVN Program, Austin Community College