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The National Physical Therapist Assistant Examination's First Time Pass Rates and Their Relationships to Education Program Faculty Attributes

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ABSTRACT

Background and Purpose. There is a paucity of published literature regarding the correlation between faculty attributes and education program pass rates on the National Physical Therapy Examination (NPTE) particularly regarding the physical therapist assistant (PTA). The purpose of this study was to 1) determine if there is a relationship between faculty attributes in PTA educational programs and program outcomes on the NPTE for Physical Therapist Assistants (NPTE-PTA) and 2) construct a prediction model for PTA program outcomes based on faculty attributes. **Subjects.** The 233 United States' PTA programs accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE) in 2006 were studied. **Methods.** Using a retrospective design, data were obtained regarding the PTA programs from the dataset of CAPTE's PTA annual accreditation report and the Federation of State Boards of Physical Therapy's pass rate database. Selected faculty attributes (designation of highest degree conferred, years of teaching experience, employment status, license designation [physical therapist or physical therapist assistant] and clinical specialization) were correlated to first time program pass rates. Backward deletion regression was used to predict the first time pass rate on the NPTE-PTA. **Results.** Based on data from 190/233 PTA programs, seven attributes had a statistically significant relationship to the outcomes on the NPTE-PTA. They were the number of: 1) full-time faculty; 2) adjunct faculty with an associate's degree; 3) full-time faculty with a terminal degree; 4) core faculty with a terminal degree; 5) all faculty with a terminal degree 6) years of teaching experience of the full-time faculty; 7) years of teaching experience of the core faculty. Backward deletion regression analyses demonstrated an overall model of two combined predictor factors (full-time faculty years of teaching and full-time faculty terminal degree) that significantly predicted the first time pass rate on the NPTE-PTA accounting for 6.5% of the variance. **Discussion and Conclusion.** Faculty attributes of the institutions providing PTA programs are associated with first time pass rates of their graduates. This study provides a foundation for future studies by identifying some of the faculty attributes that relate to NPTE-PTA outcomes.

INTRODUCTION AND REVIEW OF LITERATURE

In the United States, physical therapists (PTs) are healthcare professionals who diagnose and manage movement dysfunction. They maintain and promote optimal physical function, wellness, and quality of life related to movement and health. PTs prevent the onset and/or progression of impairments that result from health conditions.¹⁻³ The physical therapist assistant (PTA) is a technically educated healthcare provider who provides select components of physical therapy interventions under the direction and supervision of a PT.^{2,3}

In the United States, most PTA educational programs are housed at two-year post-secondary institutions that are accredited and have the authority to grant an associate's degree that is completed in the equivalent of five full-time semesters.^{1,2} All physical therapy educational programs are subject to professional accreditation by the Commission on Accreditation in Physical Therapy Education (CAPTE). CAPTE requires PTA programs to analyze performance outcome measures of its graduates including the achievement of an ultimate three-year pass rate of at least 80% on the National Physical Therapy Examination for Physical Therapist Assistants (NPTE-PTA).^{1,4,5}

The Federation of State Boards of Physical Therapy promotes and protects the health, welfare, and safety of the American public by developing, administering, and validating the psychometric soundness of the National Physical Therapy Examination that is used to assess basic entry-level competence of first-time PT or PTA licensees or registrants within the United States' jurisdictions.⁶⁻⁹ Currently, 50/53 (94.3%) of United States' jurisdictions require PTAs to be licensed, registered, or certified.¹⁰

When evaluating the quality of educational programs, conceptually, there are three elements that must be analyzed: data on the students, the learning environment (faculty, curriculum, facilities, peers), and the educational program outcomes.¹¹ The post-secondary education literature supports the use of outcomes such as retention, graduation rates, and performance on professional licensure examinations as appropriate measurements of a program's quality.¹²⁻¹⁸ Quality is also influenced by student attributes such as standardized test scores and faculty attributes such as teaching experience and terminal degree (Doctor of Philosophy [Ph.D.] or its equivalent [Ed.D., Dr.PH., D.Sc.]).¹⁸⁻²⁴ Past studies about the variables that influence success on the National Physical Therapy Examination have focused primarily on the candidate characteristics rather than the faculty attributes.^{7,18,21,25} The impact of faculty attributes on the student outcomes that define PTA program quality vary and are difficult to measure.²⁶⁻³⁰

PTA program faculty attributes are defined to a degree by CAPTE in documents such as the annual accreditation report.⁸ Annually, data are collected regarding employment status (full- or part-time, core or adjunct); teaching experience (classroom, clinical, in-service, and/or presentation of continuing education courses); educational degree; licensure (if a PT), or licensure, certification, or registration in states where applicable (if a PTA); and clinical specialization (if a PT).⁴

Current, statistically strong, definitive predictors of success on professional licensure examinations is lacking in all fields, including physical therapy, nursing, and occupational therapy. Although the ultimate three-year pass rate on the NPTE-PTA is used by CAPTE and by program administrators as an important indicator of a PTA program's quality, there is little known about the impact of faculty attributes on this particular outcome.^{7,13,15,25,29,31,32} As such, any information about these attributes provides a basis for more informed decisions by program administrators that may impact the quality of student learning and outcomes.

Purpose and Significance of This Study

The purposes of this study were to 1) determine the relationship between faculty attributes in PTA educational programs, such as educational degree designation, employment status, license designation (physical therapist or physical therapist assistant), clinical specialization of the physical therapist, and years as an educator and the first time program pass rate on the NPTE-PTA and 2) construct a prediction model for PTA program first time pass rates based on faculty attributes. In general, there is little published research regarding PTA education. This study is the first to look solely at the impact that PTA faculty attributes have on the outcome of the NPTE-PTA.

The physical therapy education community has expressed a need for such a contribution to its knowledge base as noted by the American Physical Therapy Association's 2007 document, *Education Research Questions in Rank Order*.³³ Faculty attributes that were studied have been identified in the literature as being significant to student achievement and are also collected annually from all accredited PTA programs by CAPTE on the annual accreditation report. Knowledge about these relationships is important to multiple stakeholders including PTA program graduates, faculty, program administrators, CAPTE, and the general public.

METHODS

Research Design

This was a retrospective study aimed at studying the relationship between faculty attributes in PTA educational programs and the first time program pass rate on the NPTE-PTA.

Justification of the Methodology

The non-experimental study design was appropriate because the factors that were analyzed were not able to be controlled or manipulated by the investigators. To study the relationship between faculty attributes and the NPTE-PTA pass rate, the input-

output model was used. The input-output model has been used by other investigators as the theoretical framework for investigating educational outcomes.^{7,11,24,34,35} To measure changes in system output(s), one must look at the changes in the quantity and quality of system inputs.^{11,35} In applying this model to PTA education, it was assumed that the educational achievement of the student (output) was influenced by all factors related to the educational experience (input).^{24,35} In this study, the input was the faculty attributes. System outputs that are often utilized in this model are reports of student performance on standardized tests such as the licensure examinations, which in this study is the NPTE-PTA.^{12,17,26,34-37}

Inclusion Criteria

All of the PTA programs that were accredited by CAPTE in 2006 (n = 233) were sampled. In programs with more than one site, the second site is classified by CAPTE as an expansion program. Data from expansion programs (n = 8) were captured within the parent program's annual accreditation report and were treated as data from a single program.

Exclusion Criteria

PTA programs that had less than five graduates in 2006 (n= 25) who took the NPTE-PTA were excluded from the study to ensure confidentiality of those programs. Data that was not accessible on the CAPTE electronic database were also excluded from the study.

Data Studied

The following input attributes were used in this study (see Appendix 1 for definitions):

- Employment Status
 - Full-time faculty
 - Part-time faculty
 - Adjunct faculty
 - Core faculty
- Clinical specialization
- Years of teaching
- Educational degree designation
 - Terminal Degree
- Licensure designation
 - Physical Therapist
 - Physical Therapist Assistant

The output factor for this study was the first time program NPTE-PTA pass rate.

Data Sources

Based on the literature, faculty traits (designation of educational degree, years of teaching experience, employment status, professional designation (physical therapist or physical therapist assistant), and clinical specialization) were obtained from the 2006 dataset of CAPTE's PTA annual accreditation report. Data were also obtained from the 2006 Federation of State Boards of Physical Therapy's pass rate database because post-2006 data may have been inconsistent after the change in the content outline of the NPTE-PTA.

Data Collection and Instrumentation

Data collection began on May 7, 2009, after obtaining an exempt level Institutional Review Board approval from Nova Southeastern University. A Data Collection Form was created for this study (See Appendix 2) because no standardized survey instrument exists for this purpose. There is no established validity or reliability for the annual accreditation report or the Data Collection Form that were used in this study.

The data were collected electronically by the researchers using the data collection form. (See instructions for data collection-Appendices 3 and 4). Steps were taken at all stages of data collection to ensure that the anonymity of the programs and individuals involved were maintained. The Federation of State Boards of Physical Therapy recorded the following data from each PTA program: the number of candidates from each program who took the NPTE-PTA, the number of candidates who passed the NPTE-PTA on the first attempt, the number of candidates who failed the NPTE-PTA on the first attempt, and the first time NPTE-PTA pass rate for each PTA program. The Federation of State Boards of Physical Therapy sent the data to CAPTE electronically who recorded the data previously described. The completed Data Collection Form was electronically returned by CAPTE to the researchers.

For 14 programs, there were discrepancies noted between the number of program graduates that were documented by CAPTE and the number of candidates who took the NPTE-PTA as reported by the Federation of State Boards of Physical Therapy. These differences were reconciled by the Federation of State Boards of Physical Therapy electronically contacting the program directors to confirm the number of program graduates for 2006. This validated data were electronically communicated to the primary investigator who then corrected the data on the Data Collection Form.

Data Analysis

The data from the Data Collection Form were transferred into the Statistical Package for Social Science (SPSS-14) program. Once transferred into SPSS-14, the study data were assessed visually by boxplot graphs for missing values and outliers to ensure that all fields were filled. All raw data were at the ratio level of measurement. Descriptive statistics were analyzed for all factors in the study. Factors that did not apply to a program were coded as "99" so as not to be confused with fields that had missing data.

The first time program pass rates and most factors in this study were found to be leptokurtic (a distribution that is too peaked for a normal bell shaped curve) as calculated by the kurtosis statistic.³⁸ The kurtosis statistic for the first time NPTE-PTA pass rate was 1.69 while the standard error was .351 yielding significant leptokurtosis of ± 4.82 SD. Therefore, the Spearman rho correlation coefficient (r_s) was utilized to assess the relationship between factors in this study because the data were not normally distributed. Simple regression was performed for all factors in this study first to determine factors that would be appropriate for the backward deletion regression analyses (a form of stepwise multiple regression used to determine which variables make a meaningful contribution to an overall prediction model)³⁹ that were subsequently conducted.

RESULTS

Data Included in the Study

Ultimately, data from 190/233 (81.5%) accredited programs were used in this study (see Figure 1).

Figure 1. Programs Included in the Study

NPTE-PTA Candidate and Program Descriptive Statistics

In 2006, there were 3,063 known graduates from the 190 accredited PTA programs in the United States' jurisdictions that were included in this study. There was a mean of 16.12 (SD = ± 6.87) graduates per program with a range of 5 to 53. Of those graduates, 2,847 (92.9%) candidates took the NPTE-PTA. Across all programs, there were 2,130 (74.8%) candidates who successfully passed the NPTE-PTA on the first attempt. Program pass rate data are summarized in Table 1. The mean NPTE-PTA first time pass rate for 2006 for all programs was 76.12% (SD = ± 16.68). Throughout this study, the 2006 NPTE-PTA first time pass rate was represented as a percentage.

Table 1. 2006 Program Specific NPTE-PTA First Time Pass Rates (n=190)

% of Candidates That Passed The NPTE-PTA On The First Attempt By Program		
Category	# of programs	Overall % of total
Programs That Had An 80% or Higher NPTE-PTA First Time Pass Rate	86	45.3%
Programs That Had A 100% First Time NPTE-PTA Pass Rate	19	10%

In the 19 PTA programs with a 100% first time NPTE-PTA pass rate, the mean number of years of teaching experience of full-time faculty was 9.2 years with a mode of 7.5 years compared to the mean number of years of teaching experience of all full-time faculty in the study which was 9.6 years with a mode of 7.5 years.

Faculty Descriptive Findings

The composition of the faculty is summarized in Table 2.

Table 2. PTA Faculty of All Included Institutions (n=839)

	Total #s	Mean	SD	Range	Mode
Full-time Faculty	426	2.24	+/- .723	2 – 6	2
Part-time Faculty	64	.34	+/- .824	0 – 6	0
Core Faculty (Full- & Part-Time Combined)	490	2.57	+/- .945	2 - 6	2
Adjunct Faculty	349	1.84	+/- 2.1	0 - 11	1

Results of Faculty Composition and Program Outcomes

Seven factors had a statistically significant relationship to the outcomes on the NPTE-PTA (See Table 3). Because of the number of correlations that were analyzed, only those with statistically significant relationships (at the $\alpha = 0.05$ level) are presented.

Table 3: Significant Correlations Between Faculty Composition and First Time Program Outcomes on the NPTE-PTA

Factors	r_s^*
Number of Full-Time Faculty	-.169
Number of Adjunct Faculty With An Associate's Degree	.200
Number of Full-Time Faculty With A Terminal Degree	-.175
Number of Core Faculty With A Terminal Degree	-.158
Number of All Faculty With a Terminal Degree	-.152
Number of Years of Teaching Experience of Full-Time Faculty	.159
Number of Years of Teaching Experience of Core Faculty	.143

* Significant at $\alpha = 0.05$

Regression Results

Backward deletion regression demonstrated an overall model of two predictor factors (full-time years of teaching and full-time faculty with a terminal degree) that significantly predicted the first time pass rate on the NPTE-PTA ($R^2 = .065$, $R^2_{adj} = .050$, $F(2,184) = 4.301$, $p = .006$). This model accounted for 6.5% of the variance on the first time pass rate on the NPTE-PTA. The more years of teaching experience for full-time faculty, the higher the pass rate on the NPTE-PTA ($B = .694$).

There were 15 total faculty [15/839 (1.8%)] in the study who had a terminal (academic) degree. The average first time NPTE-PTA pass rate for the nine programs with full-time faculty with a terminal degree was 63.92% compared to 76.12% for all PTA programs in the study. The amount of variance explained by the terminal degree was small: 3.06 % for full-time faculty with a terminal degree, 2.50% for core faculty with a terminal degree, and 2.31% for all faculty with a terminal degree. This study found

that the greater the number of full-time faculty with a terminal degree, the lower the first time pass rate on the NPTE-PTA ($B = -15.158$).

DISCUSSION

This study is the most recent to demonstrate a relationship between faculty attributes and the NPTE-PTA pass rate. The number of full-time faculty with a terminal degree was one of the factors that was significant in predicting the first time pass rate on the NPTE-PTA. When combined with the number of years of teaching experience of full-time faculty, these factors explained 6.5% of the variance on the NPTE-PTA. PTA programs that had full-time faculty with a terminal degree had a lower first time pass rate on the NPTE-PTA.

Our results are similar to those of Stevens who also found a negative correlation between faculty with a doctorate and the National Council Licensing Examination for Registered Nurses pass rate. Her study included 19 entry-level nursing programs (one diploma program, ten associate degree programs, and nine baccalaureate degree programs). She speculated that the correlation may be because of the research and publication expectations of doctorally prepared faculty which places less emphasis on teaching and clinical practice especially for faculty on a tenure-track. Stevens recommended that faculty in entry-level nursing programs continue to be required to have an earned master's degree because the primary responsibility for faculty in entry-level nursing education is teaching whereas faculty in graduate nursing education have research and publication requirements.^{24,40} The current CAPTE degree requirements and APTA expectations for faculty in a PTA program, a master's degree for the program director and a baccalaureate degree for all other academic faculty, are similar to entry-level associate's degree nursing faculty.⁴¹ This may be because of the emphasis on teaching rather than scholarship for educators at the community college level.^{2,4}

There were weak relationships found between the number of years of teaching for both full-time and core faculty and the first time pass rate on the NPTE-PTA. The number of years of teaching experience of full-time faculty accounted for only 2.9% of the variance on the first time NPTE-PTA pass rate. The higher the number of years of teaching experience for full-time faculty, the higher the first time pass rate on the NPTE-PTA. Program administrators may want to consider teaching experience when hiring faculty because our results suggested that faculty teaching experience has a weak positive impact on NPTE-PTA pass rates.

Cohn further suggested that teacher experience can be both a positive and negative factor. With experience, an educator saves considerable time in lesson preparation, but experience can also lead to professional obsolescence.¹¹ This point was further supported by Skinner Turner who found that nursing programs that had more faculty with greater than 30 years of teaching experience had lower pass rates on the National Council Licensing Examination for Registered Nurses ($r = -.205$, $p = .005$). Despite little strength to this relationship, Skinner Turner speculated that her findings may be explained by the failure of these experienced educators to stay current on new information, technologies, and teaching innovations. Her work also failed to find a significant relationship between other faculty attributes such as a higher terminal educational degree, percentage of part-time faculty, faculty national certification, and student performance on the licensure examination.²²

Similarly, Landry reported that the mean educational level of the classroom faculty and the average years of teaching experience were negatively correlated to success on the National Council Licensing Examination for Registered Nurses ($r = -.1133$ and $r = -.1272$ respectively at $p = .05$). Graduates who failed the licensure examination had more full-time classroom faculty with a higher terminal educational degree and more teaching experience than those students who passed the exam.³⁰ The study by Stevens also found a weak positive relationship between the licensure pass rate ($r = .029$) in programs with faculty who had an average of five years of teaching experience.²⁴

The relationship between the number of adjunct faculty with an associate's degree and the first time pass rate on the NPTE-PTA accounted for 4% of the variance on the first time NPTE-PTA pass rate. It is speculated that these faculty may be PTAs who contribute to the curriculum in their area of clinical expertise. The use of adjunct faculty for their content expertise in defined circumstances such as a laboratory experience has been supported by others.^{26,42-46} Therefore, it is suggested that adjunct faculty may be utilized within the PTA curriculum to supplement the content in which they are experts without particular regard to their educational degree.

There was no relationship found between the number of faculty with clinical specialization or the faculty license designation and the first time program pass rate on the NPTE-PTA. Based on the results of this study, no conclusion may be reached regarding either the impact of clinical specialization or the license designation on the first time program outcomes on the NPTE-PTA.

Limitations

A lack of recent publications on this topic made the literature review challenging. The retrospective design of our study prevented quality control of data collection and interpretation by PTA program directors. This may have resulted in inconsistencies between programs.

The ultimate three-year pass rate was not studied because the NPTE-PTA content was revised in 2007 to reflect the contemporary practice of physical therapy. All candidates taking the NPTE-PTA were exposed to the new content on March 1, 2008. This change in content may have led to a temporary decrease in pass rates and was a possible confounding factor.^{47, 48} Further, using one year of data ensured consistency of data across schools.

There was no attempt to control the variance introduced by either the candidates, such as grade point average or learning style, or institutional and environmental factors that affect learning such as curriculum design or program budget because that was not the focus of this study. This was intentional because we wanted to explicitly and solely study faculty attributes. Future studies could be conducted to determine if factors that were not studied, such as educator quality (knowledge of subject matter, ability to organize the content, clarity of presentation, impartiality, interest, and enthusiasm), influence the outcome on the NPTE-PTA.

The annual accreditation report reflected data about the faculty that were at each institution at the time of its submission. Faculty new to a program may not have taught the graduates included in the 2006 NPTE-PTA data. Similarly, data for faculty that may have left the program but who instructed the 2006 graduates were not gleaned from the 2006 annual accreditation report.

Because core faculty, by definition, are comprised of full-time and part-time and all are composed of core and adjunct, multicollinearity (variables that are highly related) was found to be a factor during analysis. In our analyses, we were attempting to identify any and all faculty factors that impact NPTE-PTA program outcomes while trying to maintain continuity with the variable definitions as defined on the annual accreditation report.

This study is one of the first to fill the void in PTA pedagogical research. Despite the limitations associated with the retrospective nature of our study, we believe that the results provide important new evidence to guide future inquiry into factors that impact the outcome on the NPTE-PTA.

CONCLUSION

Two factors (full-time years of teaching and full-time faculty with a terminal degree) had significance in predicting the first time pass rate on the NPTE-PTA. This study laid the foundation for future studies by identifying some of the faculty attributes that seem to relate to NPTE-PTA outcomes.

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KEY TERMS

National Physical Therapy Examination, Physical Therapist Assistant, faculty attributes, program outcomes

APPENDIX 1

Definitions of Factors Studied

Employment status

Full-time faculty – a faculty appointment of nine months which is equivalent to one full-time equivalent (FTE). A 12 month full-time appointment is equivalent to 1.33 FTEs.

Part-time faculty – a paid faculty appointment that is one half or less of a full-time appointment. Part-time faculty are distinguished from adjunct faculty in that part-time faculty are employed by an institution whereas adjunct faculty are not.

Core faculty – Individuals employed by an institution, primarily full-time but may be part-time, who have authority regarding the curriculum. For this study, core faculty were the combination of both full-time and part-time faculty.

Adjunct faculty – individuals who contribute to the classroom and/or laboratory experiences in the PTA program but who are not employed or classified as full-time or part-time by the institution. Adjunct faculty may be appointed with a faculty title and may or may not be paid for specific activities such as teaching a class or entire course or laboratory experience.⁸

Clinical specialization

An earned credential conferred by the American Physical Therapy Association to physical therapists (physical therapist assistants are not eligible for this designation) who have completed a designated process thereby demonstrating advanced clinical expertise in a specific area of physical therapy practice. One of the requirements is that a physical therapist have direct clinical practice for a minimum of 2000 hours (500 hours which must be completed during the three years immediately prior to sitting for the respective specialization certification).⁴⁹

Years of teaching:

Summarized as the average of all of the years of teaching, regardless of venue (classroom, clinical, in-service and/or presentation of continuing education courses), of all faculty within any one program.

Educational degree designation:

The highest educational degree earned by a faculty member.

License designation:

The professional license held by a faculty member, either a physical therapist or a physical therapist assistant.

First time program NPTE-PTA pass rate:

The percentage of graduates from a physical therapist assistant education program who passed the NPTE-PTA on the first attempt. A graduate is successful in passing the NPTE-PTA by achieving a scaled score of 600 or higher.⁹

Terminal Degree:

Doctor of Philosophy [Ph.D.] or its equivalent [Ed.D., Dr.PH., D.Sc.]

APPENDIX 3

FSBPT Instructions for Completing Datasheet

All data is to be from the year 2006.

1. Place:

- A. each Physical Therapist Assistant (PTA) Program's school code in the yellow Code column.
- B. each PTA Program's name in the yellow Name column.
- C. the number of 2006 PTA graduates who took the National Physical Therapy Examination (NPTE-PTA) from each program in the peach NPTE column.
- D. the number of 2006 PTA graduates who passed the NPTE-PTA on the first attempt from each program in the peach Passed column.
- E. the number of 2006 PTA graduates who failed the NPTE-PTA on the first attempt from each program in the peach Failed column.
- F. the first time pass rate (as a percentage) for each PTA program in the peach Pass Rate Column

2. Save the flowsheet.

3. Copy the flowsheet and forward it to Mary Jane Harris, PT, MS, at the Commission on Accreditation in Physical Therapy Education (CAPTE) at maryjaneharris@apta.org.

APPENDIX 4

CAPTE Instructions for Completing Datasheet

All data is to be from the year 2006.

1. In the lavender column, list the:

- A. number of Physical Therapist Assistant (PTA) graduates from each PTA program Grad column.
- B. total number of faculty from each program in the Total Faculty column.
- C. total number of full-time faculty from each program in the FT column.
- D. total number of part-time faculty (a faculty appointment that is one half or less of a full-time appointment. Part-time faculty are distinguished from adjunct faculty in that part-time faculty are employed by an institution whereas adjunct faculty are not) from each program in the PTE column.
- E. total number of adjunct faculty (individuals who contribute to the classroom and/or laboratory experiences in the PTA program but who are not employed or classified as full-time or part-time by the institution) from each program in the Adjunct column.
- F. total number of faculty who are physical therapists from each program in the PT column.
- G. total number of faculty who are physical therapist assistants from each program in the PTA column.
- H. total number of faculty who have neither a physical therapist nor physical therapist assistant designation from each program in the Neither column.
- I. total number of faculty with the respective terminal educational degree designation (Associate's, Bachelor's, Master's, Professional Doctorate, [EdD, DrPH,DSc, MD,Ph.D., etc.],Other) from each program in the appropriate corresponding lavender column.
- J. total number of years that each core faculty member has been teaching, separated by a comma, in the Years Teaching column. For example, a program had three faculty members with 3, 5, and 9 years of teaching experience respectively. This would be entered as 3,5,9 in the Years column.

2. Save the flowsheet.

3. Copy the flowsheet and delete the yellow columns of the flow sheet. Send this flowsheet to XXX at XXX.