A Pilot Study of Adult Literacy Student Pathways between Secondary and Postsecondary Education

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Objective:

A growing issue in adult literacy programs is moving students who have passed the General Education Development (GED) tests to postsecondary education (Alamprese, 2005; National College Transition Network, 2006; National Commission on Adult Literacy, 2008). This adult literacy issue is in line with a national movement to successfully transition high school graduates to postsecondary education (Symonds, 2011). Much of the research on this topic refers to this transition as pathways. The limitation of this national discourse is that we visualize what a pathway to postsecondary education looks like but we have not conducted relevant research that identifies what type of student is moving through a particular pathway. For example, when looking at high performing students (those who completed 10^{th} and 11^{th} grade before dropping out of high school) will white students follow the same pathway as African American students? Will rural students follow the same pathway as urban students? And do older adult literacy students follow the same pathway as younger students between 16 and 25 years? Instead when pathways are discussed the focus is on gross percentages of students who successfully make this transition to postsecondary programs. A question adult educators have not answered is, are there any demographic-specific patterns that define specific pathways for adult literacy students transitioning to a post secondary program? This quantitative research uses sophisticated statistical methods to explore state adult literacy students datasets to better understand demographic factors and patterns of factors that influence student progression from secondary to postsecondary education.

Theoretical Framework:

Earning a GED for many adult literacy students is their educational goal, a needed credential to enter postsecondary education or apply for many jobs such as the military. Heckman, Humphries and Mader (2010) report that when controlling for scholastic ability, "On average, obtaining a GED does not increase the wages of dropouts. While GEDs go to college at higher rates than dropouts, few finish more than one semester" (p.4). Based on scholastic tests though, "GEDs are as smart as ordinary high school graduates…yet as a group fail to perform at the level of high school graduates" (p. 4). This discrepancy is related to self-efficacy, persistence and past experience in high school. Yet the national push in adult literacy to increase the number of students who will transition into postsecondary programs, such as skill-based certificates or degree granting programs at community and technical colleges, will only be successful if there is a more accurate understanding of what type of student enters and successfully navigates a specific pathway.

Bragg, Kim and Barnett (2006) look at multiple pathways to postsecondary education where the GED path is merely one that is a bridge to college for those who dropout of high school. This pathway structure fails to capture the factors that lead students in and out of adult literacy programs. Quigley, Patterson and Zang (2011) in a large qualitative study of 75 GED passers, describe four pathway phases that GEDs go through: Phase I, Deciding to drop of high school; Phase II Deciding to take the GED test or not; Phase III, Deciding to Enroll in postsecondary; and Phase IV deciding to drop out (or stop out) or to persist and graduate (p. 3). Though this study is robust, the described pathways and phases are structurally the same for everyone and therefore over simplify the learner's experience. Moreover this study does not investigate the influence adult learning or literacy centers have in these pathways. Guison-Dowdy and Patterson (2011) look at the barriers GED passers face when attending postsecondary programs and discover that issues such as financial stress and work demands present stronger barriers to success than high school graduates experience. Another barrier they identify is that a higher percentage of GED students than high school graduates are required to take developmental courses when entering postsecondary programs, which extends the time to graduation. This study does exceptionally well at capturing the GED passer's experience and identifying some demographic factors but does not add new understanding to the complexity of pathways to postsecondary education, and again does not consider the experience, if any, a learner has in preparing for the GED at an adult literacy center.

Data Source:

The problem most previous studies encounter is that researchers do not have quality demographic data to analyze and synthesize. When analyzing state datasets, there are many potential problems. One is that most state P-12 datasets are not compatible with adult literacy student datasets, and neither is compatible with postsecondary student data.

The Office of Vocational and Adult Educations requires each state to report statewide statistical measures that include metrics like: participant's age, ethnicity and sex, educational gains and attendance by functioning levels and for pre- and posttested participants, and core follow-up outcome measures (http://wdcrobcolp01.ed.gov/CFAPPS/OVAE/NRS/tables/index.cfm). Though these statewide datasets are invaluable they create confounded results when comparing one state to another, and even when comparing one center to another within a state, as there often is no uniform data management protocol or standardized testing instrument (one center may use CASAS and another may use TABE unless the state requires all centers to use the same assessment test to measure educational gain). In other words, there are too many data quality problems between states and often between in-state literacy centers to allow reliable and valid data analysis beyond what is already recorded. The suspect quality of national, state and local adult literacy data, and the difficulty of tracking individual students from secondary to adult basic education to postsecondary programs, suggests that fully understanding the demographic factors or sets of factors that create the highest odds for success will be difficult.

In 2012 Kansas announced that for the first time its P-12 student dataset is compatible with the state's adult literacy student and with postsecondary student datasets. This means if a student dropouts of a public high school, sits out for a couple years and then enters a state supported adult literacy center, and after a year successfully passes their GED and enrolls in a state technical or community college, this students demographics and performance throughout their entire educational career can be easily collected from one source. Moreover, Kansas requires that all adult literacy centers use the same assessment test, and collect the same student demographic information. This statewide dataset has continuous student data dating back to 2007. Annually 8000-11000 students are enrolled in one of 25 adult literacy centers, 1700-2000 students pass the GED in Kansas, and approximately 1000 enter a postsecondary program. Assuming that most of these students were at one time enrolled in a Kansas public school, and that most who transition to a postsecondary program will enter a state technical, community or 4-year college, we have for the first time the ability to explore in great detail an adult literacy student's educational pathway.

This sample for this pilot study is 962 students who between 2007 and 2012: (1) Started in a Kansas public high school and left before graduating; (2) entered a Kansas adult education center and earned a GED; and (3) transitioned to a Kansas public postsecondary technical college, community college or four-year college.

The amount of missing data from the three datasets in the SLDS is small given the mandatory nature of the data collection protocol and quality control processes. To address missing data and avoid misleading results that can arise from not adequately addressing missing data, this research uses likelihood ratio tests to assess how informative the missingness is through comparison of the full model with reduced models corresponding to random missing.

Statistical Method

With the type of quality data available in Kansas, using logistic regression statistical method the contribution of predictor factors that lead to successful transition can be tracked, and participation, retention, and performance can be modeled (Peng, Lee and Ingersoll, 2002; Vogt, 2007). Dependent variables are defined passing the GED and (Z_1) entering a postsecondary program, and (Z_2) completing one year of postsecondary education, and (Z_3) completing a postsecondary certificate or degree.

The independent variables include these demographic factors: Ethnicity/race, age upon entering postsecondary, gender, years of high school completed prior to dropping out, state high school assessment scores, adult education center location (rural/urban/suburban), number of months enrolled in the adult literacy center, transition time between earning a GED and entering a postsecondary program, Pell Grant recipient (yes/no), receive public assistance (yes/no), enrolled in postsecondary developmental classes (yes/no), primary disability code, and type of postsecondary program (certificate/associates/bachelors).

The counts of the number of students in the three categories Z_1, Z_2, Z_3, defined for the dependent variable are modeled using a multinomial distribution with category-probability (P_1, P_2, P_3). Here P_i is the probability that a student pertains to the i^{th} category. This research bear a general regression equation

$$\log\left(\frac{P_i}{1-P_i}\right) = \beta_1 X_1 + \beta_2 X_2 + \cdots \beta_k X_k + a,$$

where X_j is the independent variable or factors that are dummy-coded, b_j is the coefficient, and a is a constant.

Using logistic regression we measure the odds or maximum likelihood that a certain combination of demographic-specific factors will lead to successful outcome of completion or dropping out pattern within the first or second year. Another advantage is that we can combine categorical and continuous factors, such as gender (categorical) and GED scores (continuous).

Scholarly Significance:

If states can develop and maintain high quality datasets, this type of quantitative research will enable researchers to better understand the complexity and nuances of the different pathways adult literacy students follow toward postsecondary education. The results can be used to design and implement state policy and new programs that seek to mitigate barriers and impediments to successful transition. The historical weaknesses of state adult literacy data, such as self-reporting of exceptionalities (disabilities) and socioeconomic status, are compensated by P-12 data where students are tested for disabilities and socioeconomic status is documented. We can also determine if location matters, or if age and prior success matter, as well as many other demographic factors. Until this type of research is conducted the adult education community at best is left to gross generalizations when describing pathways to postsecondary education. Though Kansas is not alone in integrating its p-12 database with its adult literacy and postsecondary databases, it has arguably made the most progress toward having one continuous student dataset the covers a student's entire educational career. In conclusion, this type of research has the potential to show why developing high quality data is important, and if high quality data is available then logistic regression will allow a better understanding of the complex pathways students follow when transitioning from an adult literacy program to postsecondary education.

1. Analyses

The data contains 19 variables: dev,dm, dany, pablo ged, hs comp, public asst flag , pell, GENDER, report race, last yr abe , FISCAL YEAR, FICE INST ID, psyear, time, ndev, ndm, TOTAL HOURS, AGE, passrateNew. Among these 19 variables, passrateNew, time, ndev, ndm, TOTAL HOURS, and AGE are included as continuous variables. The rest of them are treated as factors. For a factor with r levels, dummy coding was used to create r□1 features. A continuous variable is a single feature. The

main effect, 2-way and 3-way interactions of all the variables are included in the analysis yielding total 26534 features. This is also the degrees of freedom in a classical regression model. The total number of samples is 532. Since the sample size is much smaller than the total degrees of freedom of all the variables and their interactions, classical regression model will fail due to insufficient degrees of freedom for the sum of squares of error.

In this analysis, we employ three modern methods developed for high dimensional data, in which the number of features can be much higher than the sample size. During the model fitting and feature selection, some features contribute substantially to the prediction of the probability of successfully completing a program. They are selected to be used as predictors for prediction. Most of the feature selection methods (such as the group lasso logistic regression by Meier et al. (2008)) relies on a critical assumption that the design matrix of features has full rank. This assumption is not satisfied for our data. So we will not use group lasso in our analysis. In addition, after all the 26534 features are defined ahead of time, each of them forms a well defined variable that can be used alone. So we will not worry about hierarchical rule which is used in typical classical modeling.

1.1. Method

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