ABSTRACT

STEARNS, SHEPHERD MICHAEL. Characterizing CALS: Performance Indicators, Pathways, and Pre-College Characteristics of the Undergraduate Student Body at NC State's College of Agriculture and Life Sciences. (Under the direction of Drs. John Dole and Katherine McKee).

The purpose of this study was to characterize undergraduate student populations as they enter the College of Agriculture and Life Sciences (CALS) at NC State, track their success in the college, and determine the usefulness of numerous factors related to these populations as predictors of success at NC State. This study establishes a clearer picture of the demographics of a single cohort of undergraduate students that entered CALS in the fall semester of 2013. We used existing data from NC State's records to compare the demographics of the cohort with the overall population of North Carolina to determine how well the student population at CALS represents the state it serves. Next, we utilized personal statements written by the students in the target cohort to determine what interactions with agriculture, food, and natural resource (AFNR) fields played an important role in applicants' decision to apply to the college. Finally, we analyzed the narratives embedded in the undergraduate personal statements of the 40 students in the target cohort who were considered nontraditional undergraduates – meaning they were age 25 years and older when they were accepted into the college. We conducted a narrative analysis of the students' personal statements to determine their level of personal development upon entering the college.

Characterizing CALS: Performance Indicators, Pathways, and Pre-College Characteristics of the Undergraduate Student Body at NC State's College of Agriculture and Life Sciences

by
Shepherd Michael Stearns

A thesis submitted to the Graduate Faculty of
North Carolina State University
in partial fulfillment of the
requirements for the degree of
Master of Science

Agricultural and Extension Education

Raleigh, North Carolina
2021

APPROVED BY:

_____   _____
Dr. John M. Dole   Dr. Katherine E. McKee
Committee Co-Chair   Committee Co-Chair

_____
Dr. Jonathan W. Duggins

BIOGRAPHY

Shepherd Stearns grew up on his family's dairy farm in Storrs, Connecticut. He earned a bachelor's degree in African American Studies in 2012 from the University of Connecticut. Since then, he has occupied various roles in the food system working to promote education and access to healthy food for all. Upon completing his master's degree in Agricultural and Extension Education he hopes to continue working to promote an agricultural economy in the US that is more durable and equitable.

ACKNOWLEDGMENTS

I am at a loss to express the amount of gratitude that I feel for everyone who helped me through the process of writing this thesis. Much of that process coincided with a time of pain and suffering in the world that is beyond any one person's comprehension. I am so humbled by the fact that so many people put their own stress and personal tragedy aside to lend support and guidance to me over the last year.

My wife Leah was there every step of the way offering encouragement and motivation on a task that sometimes felt insurmountable. Leah, thank you for being my partner and best friend. Thank you for the fun and the constant confidence boosts.

Additionally, I would like to offer thanks to my commitee. Dr. John Dole, Dr. Katherine McKee, and Dr. Jonathan Duggins. Thank you for your wisdom, your patience, and your generosity.

Next, I would like to extend a special thanks to the following members of NC State faculty and staff who played an instrumental role in helping me to make this project a reality. Dr. Jackie Bruce went above and beyond in providing feedback on chapter IV of this thesis. Thank you, Dr. Bruce, for your incisive feedback. Associate Vice Provost, Steven White, in the Enrollment Systems and Operations office was unfailingly helpful and friendly in providing the data that underpins this thesis. Dr. Alex Graves provided invaluable insights into the assets and needs of students at CALS. Dr. Wendy Warner provided helpful advice and resources for the literature review portion of this project. Keondra Jenkins, Joanna Eglinton, and Anne Hubbard in the Academic Programs office were extremely generous with their time. Breanna Collins, also from

the AP office, was always there, getting me access to the information I needed and helping to coordinate the work of the undergraduates who helped with the data collection for this project. Speaking of my undergraduate helpers: Calliope Carion, Lauren Winslow, and Cameron Womack all did a wonderful job helping me to collect and organize data.

Finally, I would like to thank my fellow graduate students Kamal Bell, Tiera George, and Tatiana Height in the Agricultural and Extension Education program for their friendship and commiseration on the unique trials and tribulations of being in grad school.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1

Introduction

Colleges of Agriculture (COAs) have an outsized role to play in the future of the United States and the world at large. Cascading challenges face our society as we seek to feed the world without bringing the life sustaining systems of the Earth to a breaking point. A major determining factor in our ability to meet these fundamental challenges will be our degree of success in producing a new generation of well-trained graduates in the fields of agriculture, food, and natural resources (AFNR). The fate of the planet, our society, and economy rests in no small part on the shoulders of the current and future enrollees in our nation's COAs.

The success of these students is therefore a matter of the utmost importance. Recruitment, admissions, advisory and teaching faculty and staff at these institutions are charged with a heavy responsibility. As the challenges we face as a society evolve, COAs will have to adapt to address them. The student demographics that these institutions serve are likely to continue changing as well. Gaining an intimate understanding of who is being trained in COAs and what they need to be successful should be a top priority to all involved in AFNR education at the post-secondary level.

Student Demographics

Over the past few decades COAs have undergone major changes in the student population that they serve (Archibeque-Engle and Gloeckner, 2016; Buchanan, 2008; Martin and Wesolowski, 2018; Nokes and Gustafson, 1994; Peffer, 2011; Setterbo et al., 2017). Faculty and staff at COAs need to understand student demographics better in order to create an environment that is

conducive to the growth and achievement of students from many different backgrounds. COAs at 1862 Land Grant universities, such as NC State, have historically catered to a student body that was White, male, and from a farm setting (George, 1978). However, many reports document a more recent influx of female students from urban or sub-urban backgrounds with a strong interest in animal and veterinary science (Buchanan, 2008; Dyer et al. 1999; Geocker, 1982; Peffer, 2010). Scholars have noted that in many cases these female students from suburban or urban backgrounds are high achievers academically (Lancaster and Robinson, 2011; McMillan et al., 2009; Soberon et al., 2012), yet they also face challenges with being accepted by their peers from a more traditional agricultural background and may be more inclined to transfer out of the COA in favor of a major housed in another college (Martin and Wesolowski, 2018; Nokes and Gustafson, 1994; Setterbo et al., 2017).

In addition to recruiting and retaining female students from urban and sub-urban backgrounds, many authors note that the future viability of COA programs will depend on attracting a much larger number of students from minoritized racial and ethnic groups (Archibeque-Engle and Gloeckner, 2016; Foreman et al., 2018; Powell, 2017). This assumption is largely premised on the changing demographics of the undergraduate population overall, which is projected to become significantly less White in the years to come (Foreman et al., 2018; Hoover, 2013; Nuñez, and Murakami-Ramalho, 2012). However, according to Archibeque-Engle and Gloeckner (2016), the College of Agriculture Science at Colorado State University actually became less representative of the racial and ethnic diversity of Colorado between 1990 and 2010. The authors also found that White non-Hispanic students were 1.78 times more likely to graduate in four years as compared to minorized students (Archibeque-Engle and Gloeckner, 2016).

Opportunity gaps have been identified by authors across many student demographic groups in addition to those associated with gender, race, and ethnicity (Archibeque-Engle and Gloeckner, 2016; Burk et al., 2013; Byun et al., 2012; Terenzini and Pascarella, 2005). Scholars have identified rural students (Byun et al., 2012; Corley et al., 1991), Pell Grant recipient students (Archibeque-Engle and Gloeckner, 2016, Schudde and Scott-Clayton, 2016), transfer students (Archibeque-Engle and Gloeckner, 2016; Terenzini and Pascarella, 2005), in-state students (Archibeque-Engle and Gloeckner, 2016; Burk et al., 2013), first-generation students (Archibeque-Engle and Gloeckner, 2016; Stephens et al. 2012; Terenzini and Pascarella, 2005), and nontraditional students (e.g., undergraduates who are 25 years old or above) (Burk et al., 2013; Murtaugh et al., 1999; Lancaster and Robinson, 2011; Goings, 2016) as being at elevated risk for experiencing hardship. In their comprehensive study, Archibeque-Engle and Gloeckner (2016) argue that many of these opportunity gaps have remained consistent for decades, and, in order to close them, COA faculty and staff need to carefully track performance among higher risk groups and set growth goals for improvement.

To predict the level of success students are likely to attain in college, many indicators have been tested by scholars. High school GPA (HSGPA) has been touted as one of the most useful factors in assessing the likelihood that students will be successful in college (Burk et al., 2013; Zwick and Himelfarb, 2011; Geiser and Santelices, 2007; Garton et al., 2002). While some perceive HSGPA as an inconsistent metric granted the variations in curricula and quality of instruction between the nation's high schools, empirical evidence suggests that it is a highly dependable indicator of performance in college (Allensworth and Clark, 2020; Geiser and Santelices, 2007; Zwick and Himelfarb, 2011). In a study of 17,753 students who graduated from Chicago public

schools between 2006 and 2009, Allensworth and Clark (2020) found that HSGPA had a larger effect on graduation than the high school the student attended or standardized tests score (ACT).

The value of SAT and ACT standardized tests as admissions criteria is considered controversial by many (Geiser and Santelices 2007; Zwick and Himelfarb, 2011; Maruyama, 2012). Scholars note that performance on standardized tests is strongly correlated with student socioeconomic status (SES) (Geiser and Santelices 2007; Zwick and Himelfarb, 2011). When used in admissions decision making, standardized tests exacerbate inequities (Geiser and Santelices 2007; Zwick and Himelfarb, 2011). According to Geiser and Santelices (2007) "rank-ordering students by test scores produces much sharper racial/ethnic stratification than when the same students are ranked by HSGPA" (p.2). However, there is evidence that standardized test scores may include information that adds to the explanatory power of statistical modeling. Garton et al. (2002) found that a combination of HSGPA and ACT explained a greater proportion of the variance in first year GPA for freshmen in the College of Agriculture, Food, and Natural Resources at the University of Missouri, than other combinations of available predictors such as learning style and high school class rank. Similarly, Zahner et al. (2012) found the inclusion of SAT along with HSGPA increased the amount of variance that was accounted for in modeling that was used to predict the GPA of college sophomores. These studies suggest that, where available, standardized testing data may have value as a diagnostic tool, if not as a criterion for admissions decision-making.

Some scholars have found that first term (FTGPA) and freshman year GPA (FYGPA) are also valuable indictors of success (Barkley and Forst, 2004; Gayles, 2012; Gershenfeld et al., 2016).

Barkley and Forst (2004) found that standardized test results were useful in predicting FTGPA, but FTGPA was more useful in predicting grades for the second academic term. As the authors put it "the college record, once it becomes available at the end of the first semester, becomes paramount in explaining grades in subsequent semesters" (Barkley and Forst, 2004, p. 440). Tracking FTGPA has the added benefit of giving an early indication of student performance at the collegiate level, meaning that faculty and staff can intervene early for students who show signs of distress. According to Gershenfeld et al. (2016) FTGPA was a statistically significant factor in predicting whether under-represented students would graduate within six years from a public university in the mid-west.

Scholars of higher education are in universal agreement that facilitating on-time graduation, especially for groups from under-represented and low-access backgrounds, has a huge impact on their future life chances (Turner and Thompson, 2014; Tinto, 1993). The need for qualified graduates to fill positions in AFNR fields is also a matter of great importance to the health of our economy and world (Alston et al., 2019; Goecker, 1982).

Precollege Experiences of Agriculture, Food, and Natural Resource Students
Understanding and addressing the recruitment and retention problems that colleges of agriculture face has been a matter of keen interest for scholars and university administrators for several decades. Many who have contributed to this body of research have argued for the need to characterize undergraduate populations at COAs because of one seminal event in particular – the farm crisis of the late 70's and early 80's (Donnermeyer and Kreps, 1994; Dyer et al., 1999; Dyer, et al., 1996). This crisis was a pivotal event that caused enrollment in COAs to plumet

nationwide, thus imperiling the future of academic programs in agriculture (Donnermeyer and

Kreps, 1994; Dyer et al., 1999; Dyer, et al., 1996). According to Dyer et al. (2002) between 1978

and 1988 enrollment in COAs at Land Grant universities declined by 24% from 1978 to 1988.

Some have argued that the economic downturn in the agricultural economy around this time led

to public perception that agriculture was not a tenable field to study at the post-secondary level.

Donnermeyer and Kreps (1994) advanced the perspective that the crisis had created a "generally

negative view of agriculture", which caused parents, teachers, and guidance counselors to

encourage "high school graduates to consider non-agricultural careers" (p.45). The persistence of

this view meant that many students were discouraged from pursuing a degree in agriculture even

after opportunities in the sector rebounded (Wildman and Torres, 2001).

Many have noted that in spite of the negative perception of the prospects associated with

agriculture as a career path, there is actually a large unmet need for agriculturalists with a college

degree in the US economy (Alston et al., 2019; Goecker et al., 2010; Setterbo et al., 2017). Over

the past several decades there has been a persistent and well-documented trend for a large

number of jobs in the agricultural sector requiring a bachelor's degree or higher to either remain

vacant or be filled by applicants with degrees from other fields (Goecker et al., 2010; Setterbo et

al., 2017). Setterbo et al. (2017) states that "of the 54,000 annual job openings that were

estimated to occur within agriculture, food and natural resources between 2010 - 2015, an

average of 29,300 graduates from colleges of agriculture and life sciences, forestry and natural

resources and veterinary medicine were expected to fill those jobs each year" (p.46). Authors

have also noted that the sub-fields associated with agriculture have grown more complex,

dynamic, and technical over recent decades as compared to the public's view of agriculture as an exclusively dirty and labor-intensive field (Jones and Larke, 2001).

The belief that perceptions of agriculture were playing a key role in enrollment outcomes caused scholars to undertake a large amount of research that was intended to characterize the opinions about agriculture held by undergraduate students at COAs (Baker et al., 2013; Donnermeyer, and Kreps, 1994; Dyer et al., 1999; Dyer et al., 1996; George, 1978; Wildman and Torres, 2001). These authors used surveys to gain a better understanding of the factors that influenced COA undergraduates to apply to their programs. Student exposure to agriculture and related fields prior to enrollment in a COA has been widely studied as an important pathway to enrolling in a COA (Dyer et al., 1999; George, 1978; Smith et al., 2010; Wildman and Torres, 2001). This pathway has been considered to include various different experiential factors including prior coursework in AFNR, membership in FFA/4-H, having grown up on a farm or in a rural setting, having engaged in work on a farm or ranch, and having taken part in agriculture related hobbies (Dyer et al., 1999; George, 1978; Smith et al., 2010; Wildman and Torres, 2001). Dyer et al. (1999) found that the strongest predictors of retention in agricultural programs was previous experience with agriculture. Smith et al. (2010), meanwhile found inconclusive results with regard to the predictive power of agricultural student group participation (FFA) and coursework at the high school level on student success in college.

The influence that parents, professionals and other associates have on students' decision to enroll in a COA has also been considered (Dyer et al., 1999; Dyer et al., 1996; George, 1978; Shrestha et al., 2011). In one early study, George (1978) collected survey data on 150 randomly selected

agriculture students from Murray State University which he compared and contrasted with existing data from 1862 Land Grant institutions. He found that for both Murray State students and students of the 1862 Land Grant institutions, slightly more than 60% listed influence from their parents as a factor in their decision to enroll in an agricultural major. Subsequent work has corroborated the important role that parents play in encouraging undergraduates to enroll as a student in an AFNR major (Dyer et al., 1999; Dyer et al., 1996; Rayfield et al., 2013; Rocca and Washburn, 2005; Shrestha et al., 2011).

In a more recent study, Shrestha et al. (2011) explains that "the most influential individuals as information sources for students were parents and family members, other relatives, friends, alumni, high school agriculture teachers, and college faculty members" (p.34). Studies have shown mixed results of the importance of agricultural educators and other professionals in the decision-making process leading students to enroll in a COA (Donnermeyer and Kreps, 1994; Duncan, et al., 2015; Wildman and Torres, 2001). Donnermeyer and Kreps (1994) found that teachers and extension workers were ranked as the least influential factor impacting students' decision-making. Duncan et al. (2015) found that the importance of teachers versus parents or other family as influencers for agriculture undergraduates depended on previous experience with agriculture related clubs. For students with experience in 4-H, family ranked highest, for those with prior FFA experience, agriculture teachers ranked as the most influential adult (Duncan, et al., 2015).

Authors have noted that there is a tension between the need to expand the recruitment pool for COAs and the shrinking number of students from the traditional profile that these institutions

have previously recruited from. Dyer et al. (1999) bemoaned the fact that an increasing number of students were enrolling in COAs with an urban background and no previous involvement with agriculture. He claimed urban students with no agriculture exposure were less committed to AFNR fields than students with more agriculture exposure and were more likely to transfer out of the college to another program (Dyer et al., 1999). According to Peffer (2010) "an increasing number of animal sciences students are urban, female, and declare career interests that are dominated by the veterinary profession" (p.25). Many COAs are now majority female and serve a population with less direct exposure to agriculture than their peers from previous decades (Dyer et al. 1999; Lancaster and Robinson, 2011; McMillan et al., 2009; Peffer, 2010; Soberon et al., 2012).

There is significant evidence that suggests that COA's will need to continue to accommodate an increasingly diverse set of students in order to stay viable (Foreman, et al., 2018; Powell, 2017). The total number of graduates produced by high schools in the US has been projected to decline from 2014 until 2023 (Foreman, et al., 2018). This decline is fueled by a decrease in the number of White and Black graduating students, but partly offset by an increase in the number of Latinx and Asian and Pacific Islander graduates entering the university system (Foreman et al., 2018). Many have predicted that to keep up with demographic trends, COAs will need to continue to broaden their recruitment efforts to attract students from many different backgrounds (Archibeque-Engle and Gloeckner, 2016; Foreman et al., 2018; Powell, 2017).

Precollege Experiences of Nontraditional Students

Nontraditional students represent a group that has been neglected in the literature and by the institutions of higher learning that they attend. They are defined in a de facto way in opposition to the students that universities and colleges expect to accommodate. As Linzmeier (2014) notes "most previous research on undergraduate students has been based on an understanding of a 'traditional' student as an individual 17-22 years of age, and the curriculum and institutional culture has been designed exclusively for this age demographic" (p.21). Nontraditional students therefore are implicitly understood as a sort of "out-group" when it comes to most university and college systems. And yet, as the fastest growing group in national admissions, the need to understand and accommodate them better is of growing importance (Goings, 2016).

Nontraditional students form a large contingent of the undergraduate population in the US. In 2011, one third of all enrolled undergraduates in the US were considered nontraditional students (Markle, 2015). They are also a population at a very elevated risk of dropout. According to Gail Markle (2015), "64% of 18-year-old students enrolled in 2003-2004 graduated within 6 years compared to 20% of those aged 24 to 29 years, and 16% of those aged 30 and older" (p. 268). Forming a clearer picture of the challenges that face these students could have an enormous impact on graduation rates for institutions across the country.

Conclusion

To continue to meet our society's needs Colleges of Agriculture will have to attract a robust population of students, train them well and ensure their success after graduation. In our study we contribute to this effort by identifying the core groups that are being educated at CALS, the

pathways that brought them to the college, and some of the individual and group characteristics that play a vital role in determining their level of success. This work will lead to new insights for faculty and staff working in recruitment, admissions, advising, and teaching both within CALS and at other institutions around the country with a similar academic mission.

REFERENCES

Allensworth, E. M. and K. Clark. 2020. High school GPAs and ACT scores as predictors of college completion: examining assumptions about consistency across high schools. Educational Researcher, 49(3):198-211.

Alston, A. J., R. Roberts and C. W. English. 2019. Building a sustainable agricultural career pipeline: effective recruitment and retention practices used by colleges of agriculture in the United States. Journal of Research in Technical Careers, 3(2):1-23

Archibeque-Engle, S. and G. Gloeckner. 2016. Comprehensive study of undergraduate student success at a Land Grant university college of agricultural sciences. NACTA Journal, 60 (4):432-440.

Baker, L. M., Q. Settle, C. Chiarelli and T. Irani. 2013. Recruiting strategically: Increasing enrollment in academic programs of agriculture. Journal of Agricultural Education, 54(3):54-66.

Barkley, A. P. and J.J. Forst. 2004. The determinants of first-year academic performance in the College of Agriculture at Kansas State University, 1990-1999. Journal of Agricultural and Applied Economics, 36(2):437-448.

Buchanan, D. S. 2008. ASAS centennial paper: Animal science teaching: A century of excellence. Journal of Animal Science, 86(12):3640-3646.

Burk, S. V., M. G. Rossano, W.J. Silva, E.S. Vanzant, A.J. Pescatore and R.J. Harmon. 2013. Factors associated with course withdrawal and final course grade in an introductory animal science course. NACTA Journal, 57(2):16-23.

Byun, S., J.L. Meece and M.J. Irvin. 2012. Rural-nonrural disparities in postsecondary educational attainment revisited. American Educational Research Journal, 49(3):412-437.

Corley, E., R. Goodjoin and S. York. 1991. Differences in grades and SAT scores among minority college students from urban and rural environments. The High School Journal, 74(3):173-177.

Donnermeyer, J. F., and G.M. Kreps. 1994. Assessing college of agriculture freshmen. NACTA Journal, 38(1):45-48.

Duncan, D. W., E. Carter, N. Fuhrman and J.K. Rucker. 2015. How does 4-H and FFA involvement impact freshmen enrollment in a college of agriculture. NACTA Journal, 59(4):326-330.

Dyer, J.E., L.M. Breja, and R.J. Andreasen. 1999. Attitudes of college of agriculture freshmen toward agriculture. Journal of Agricultural Education 40(2):1-10.

Dyer, J.E., L.M. Breja and P.S. Wittier. 2002. Predictors of student retention in colleges of agriculture. Retrieved from ERIC database (ED462290).

Dyer, J.E., R. Lacey, and E.W Osborne. 1996. Attitudes of University of Illinois College of Agriculture freshmen toward agriculture. Journal of Agricultural Education. 37(3):33-42.

Foreman, B., M. Retallick and S. Smalley. 2018. Changing demographics in college of agriculture and life sciences students. NACTA Journal, 62(2):161-167.

Gayles, J. 2012. Race, late bloomers and first-year GPA: Predicting beyond the freshman year. Educational Research Quarterly, 36(1):13-29.

Garton, B. L., A.L. Ball and J.E. Dyer. 2002. The academic performance and retention of college of agriculture students. Journal of Agricultural Education, 43(1):46-56.

Geiser, S., and M.V. Santelices. 2007. Validity of high-school grades in predicting student success beyond the freshman year: High-school record vs. standardized tests as indicators of four-year college outcomes. Center for Studies in Higher Education. https://cshe.berkeley.edu/publications/validity-high-school-grades-predicting-student-success-beyond-freshman-yearhigh-school

George, K. M. 1978. A profile of agriculture students at Murray State University. Retrieved from ERIC database (ED168794).

Goecker, A.D., E. Smith, P.G. Smith and R. Goetz. 2010. Employment opportunities for college graduates in food, energy, and the environment: United States, 2010-2015. https://securelb.imodules.com/s/1342/images/editor_documents/usda.pdf?sessionid=8b8f9c65-8f8b-4690-9f42-8fc853d5e1ff&cc=1

Goings, R. B. 2016. (Re)defining the narrative. Adult Education Quarterly, 66(3):237-253.

Gershenfeld, S., D. Ward Hood and M. Zhan. 2016. The role of first-semester GPA in predicting graduation rates of underrepresented students. Journal of College Student Retention: Research, Theory and Practice, 17(4):469-488.

Jones, W. A., and A. Larke. 2001. Factors influencing career choice of African American and Hispanic graduates of a Land-Grant college of agriculture. Journal of Agricultural Education, 42(1):39-49.

Lancaster, S. H., and J.S. Robinson. 2011. Factors associated with student success in an introductory plant science course. NACTA Journal, 55(2):26-31.

Linzmeier, K. 2014. Deconstructing "non-traditional": What it means to be a "non-traditional" undergraduate student (Order No. 3646905). Available from ProQuest Dissertations & Theses Global. (1637727002).

Markle, G. 2015. Factors influencing persistence among nontraditional university students. Adult Education Quarterly, 65(3):267-285.

Martin, M. J., and D. Wesolowski. 2018. Experiences of non-conventional agriculture majors in a college of agriculture. NACTA Journal, 62(1):11-15.

Maruyama, G. 2012. Assessing college readiness: should we be satisfied with ACT or other threshold scores? Educational Researcher, 41(7):252-261.

North Carolina Department of Commerce. 2020. 2020 North Carolina development tier. https://www.nccommerce.com/grants-incentives/county-distress-rankings-tiers.

Pascarella, E. T., and P.T. Terenzini. 2005. How college affects students: A third decade of research, Vol. 2. Jossey Bass, Indianapolis, IN.

Peffer, P.A.L. 2011. Demographics of an undergraduate animal sciences course and the influence of gender and major on course performance. NACTA Journal 55(1):26-31.

Powell, L. A. 2017. Urban cowboys: Demographics confirm that agriculture and natural resources recruiting plans cannot be one-size-fits-all. NACTA Journal, 61(2):121-126.

Rayfield, J., T.P. Murphrey, C. Skaggs and J. Shafer. 2013. Factors that influence student decisions to enroll in a college of agriculture and life sciences. NACTA Journal, 57(1):88-93.

Rocca, S. J., and S.G. Washburn. 2005. Factors influencing college choice of high school and transfer matriculants into a college of agriculture. NACTA Journal, 49(1):32-38.

Schudde, L., and J. Scott-Clayton. 2016. Pell grants as performance-based scholarships? An examination of satisfactory academic progress requirements in the nation's largest need-based aid program. Research in Higher Education, 57(8):943-967.

Setterbo, K., C. Akers, T. Tarpley, L. Kennedy, D. Doerfert and C. Gibson. 2017. Going against the grain: Recruiting atypical students into a college of agriculture. NACTA Journal, 61(1):46-51.

Shrestha, K. M., M. Suvedi and E.F. Foster. 2011. Who enrolls in agriculture and natural resources majors: A case from Michigan State University. NACTA Journal, 55(3):33-43.

Smith, A. R., B.L. Garton and T.J. Kitchel. 2010. Beyond mere enrollment: Level of youth organization participation as a predictor of collegiate academic success and retention. Journal of Agricultural Education, 51(2):24-35.

Stephens, N. M., S.A. Fryberg, H.R. Markus, C.S. Johnson, and R. Covarrubias. 2012. Unseen disadvantage: How American universities' focus on independence undermines the academic performance of first-generation college students. Journal of Personality and Social Psychology, 102(6):1178–1197.

Tinto, V. 1975. Dropout from higher education: A theoretical synthesis of recent research. Review of Educational Research, 45(1), 89-125.

Tinto, V. 1993. Leaving college: rethinking the causes and cures of student attrition. Second Edition. The University of Chicago Press, Chicago, IL.

Turner, P., and E. Thompson. 2014. College retention initiatives meeting the needs of millennial freshmen students. College Student Journal, 48(1):94-104.

Wildman, M. and R.M. Torres. 2001. Factors identified when selecting a major in agriculture. Journal of Agricultural Education, 42(2):46-55.

Zahner, D., L.M. Ramsaran and J.T. Steedle. 2014. Comparing alternatives in the prediction of college success. Council for Aid to Education. https://cae.org/wp-content/uploads/2021/02/Zahner-Ramsaran-Steedle-2012-Comparing_Alternatives_in_the_Prediction_of_College_Success.pdf

Zwick, R. and I. Himelfarb. 2011. The effect of high school socioeconomic status on the predictive validity of SAT scores and high school grade point average. Journal of Educational Measurement, 48(2):101-121.

CHAPTER 2

Indicators of Student Success and Hardship in CALS

Shep Stearns[1], Katherine E. McKee[1], John M. Dole[2], Jonathan W. Duggins[3]

[1]Department of Agriculture and Human Sciences, North Carolina State University, Raleigh, NC 27695

[2]Academic Programs, College of Agriculture and Life Science, North Carolina State University, Raleigh, NC 27695

[3]Department of Statistics, North Carolina State University, Raleigh, NC 27695

Abstract

This paper establishes a clearer picture of the demographics of a single cohort of undergraduate students that entered NC State's College of Agriculture and Life Sciences (CALS) in the fall semester of 2013. We compared the demographics of the cohort with the overall population of North Carolina to determine how well the student population at CALS represents the state it serves. We found that female students, White students, and students from economically developed counties were over-represented in the cohort as compared to the general population of the state. Using descriptive statistics, we created academic profiles for student groups of interest. The comparisons we made between groups show evidence that male, Latinx, out-of-state, and nontraditional students have mean graduation rates which are troublingly low. This paper will serve as a basis for professionals in academic programs at NC State to target their efforts and resources more precisely as they seek to support student success in CALS.

Introduction

Colleges of Agriculture (COAs) have an outsized role to play in the future of the United States and the world at large. Cascading challenges face our society as we seek to "feed the world" without bringing the life sustaining systems of the Earth to a breaking point. A major determining factor in our ability to meet these fundamental challenges will be our degree of success in producing a new generation of well-trained graduates in the fields of agriculture, food, and natural resources (AFNR). The fate of the planet, our society, and economy rests in no small part on the shoulders of the current and future enrollees in our nation's COAs.

The success of these students is therefore a matter of the utmost importance. Recruitment, admissions, advisory and teaching faculty and staff at these institutions are charged with a heavy responsibility. As the challenges we face as a society evolve, COAs will have to adapt to address them. The student demographics that these institutions serve are likely to continue changing as well. Gaining an intimate understanding of who is being trained in COAs and what they need to be successful should be a top priority to all involved in AFNR education at the post-secondary level.

Student Demographics

Over the past few decades COAs have undergone major changes in the student population that they serve (Archibeque-Engle and Gloeckner, 2016; Buchanan, 2008; Martin and Wesolowski, 2018; Nokes and Gustafson, 1994; Peffer, 2011; Setterbo et al., 2017). Faculty and staff at COAs need to understand student demographics better in order to create an environment that is conducive to the growth and achievement of students from many different backgrounds. COAs at 1862 Land Grant universities, such as NC State, have historically catered to a student body that was White, male, and from a farm setting (George, 1978). However, many reports document a more recent influx of female students from urban or sub-urban backgrounds with a strong interest in animal and veterinary science (Buchanan, 2008; Dyer et al. 1999; Geocker, 1982; Peffer, 2010). Scholars have noted that in many cases these female students from suburban or urban backgrounds are high achievers academically (Lancaster and Robinson, 2011; McMillan et al., 2009; Soberon et al., 2012), yet they also face challenges with being accepted by their peers from a more traditional agricultural background and may be more inclined to transfer out of the

COA in favor of a major housed in another college (Martin and Wesolowski, 2018; Nokes and Gustafson, 1994; Setterbo et al., 2017).

In addition to recruiting and retaining female students from urban and sub-urban backgrounds, many authors note that the future viability of COA programs will depend on attracting a much larger number of students from minoritized racial and ethnic groups (Archibeque-Engle and Gloeckner, 2016; Foreman et al., 2018; Powell, 2017). This assumption is largely premised on the changing demographics of the undergraduate population overall, which is projected to become significantly less White in the years to come (Foreman et al., 2018; Hoover, 2013; Nuñez, and Murakami-Ramalho, 2012). However, according to Archibeque-Engle and Gloeckner (2016), the College of Agriculture Science at Colorado State University actually became less representative of the racial and ethnic diversity of Colorado between 1990 and 2010. The authors also found that White non-Hispanic students were 1.78 times more likely to graduate in four years as compared to minorized students (Archibeque-Engle and Gloeckner, 2016).

Opportunity gaps have been identified across many student demographic groups in addition to those associated with gender, race, and ethnicity (Archibeque-Engle and Gloeckner, 2016; Burk et al., 2013; Byun et al., 2012; Terenzini and Pascarella, 2005). Scholars have identified rural students (Byun et al., 2012; Corley et al., 1991), Pell Grant recipient students (Archibeque-Engle and Gloeckner, 2016, Schudde and Scott-Clayton, 2016), transfer students (Archibeque-Engle and Gloeckner, 2016; Terenzini and Pascarella, 2005), out-of-state students (Murtaugh et al., 1999), first-generation students (Archibeque-Engle and Gloeckner, 2016; Stephens et al. 2012; Terenzini and Pascarella, 2005), and nontraditional students (e.g., undergraduates who are 25

years old or above) (Burk et al., 2013; Murtaugh et al., 1999; Lancaster and Robinson, 2011; Goings, 2016) as being at elevated risk for experiencing hardship. In their comprehensive study, Archibeque-Engle and Gloeckner (2016) argue that many of these opportunity gaps have remained consistent for decades, and, in order to close them, COA faculty and staff need to carefully track performance among higher risk groups and set growth goals for improvement.

To predict the level of success students are likely to attain in college, many indicators have been tested by scholars. High school GPA (HSGPA) has been touted as one of the most useful factors in assessing the likelihood that students will be successful in college (Burk et al., 2013; Zwick and Himelfarb, 2011; Geiser and Santelices, 2007; Garton et al., 2002). While some perceive HSGPA as an inconsistent metric granted the variations in curricula and quality of instruction between the nation's high schools, empirical evidence suggests that it is a highly dependable indicator of performance in college (Allensworth and Clark, 2020; Geiser and Santelices, 2007; Zwick and Himelfarb, 2011). In a study of 17,753 students who graduated from Chicago public schools between 2006 and 2009, Allensworth and Clark (2020) found that HSGPA had a larger effect on graduation than the high school the student attended or standardized tests score (ACT).

The value of SAT and ACT standardized tests as admissions criteria is considered controversial by many (Geiser and Santelices 2007; Zwick and Himelfarb, 2011; Maruyama, 2012). Scholars note that performance on standardized tests is strongly correlated with student socioeconomic status (SES) (Geiser and Santelices 2007; Zwick and Himelfarb, 2011). When used in admissions decision making, standardized tests exacerbate inequities (Geiser and Santelices 2007; Zwick and Himelfarb, 2011). According to Geiser and Santelices (2007) "Rank-ordering

students by test scores produces much sharper racial/ethnic stratification than when the same students are ranked by HSGPA" (p.2). However, there is evidence that standardized test scores may include information that adds to the explanatory power of statistical modeling. Garton et al. (2002) found that a combination of HSGPA and ACT explained a greater proportion of the variance in first year GPA for freshmen in the College of Agriculture, Food, and Natural Resources at the University of Missouri, than other combinations of available predictors such as learning style and high school class rank. Similarly, Zahner et al. (2012) found the inclusion of SAT along with HSGPA increased the amount of variance that was accounted for in modeling that was used to predict the GPA of college sophomores. These studies suggest that, where available, standardized testing data may have value as a diagnostic tool, if not as a criterion for admissions decision-making.

Some scholars have found that first term (FTGPA) and freshman year GPA (FYGPA) are also valuable indictors of success (Barkley and Forst, 2004; Gayles, 2012; Gershenfeld et al., 2016). Barkley and Forst (2004) found that standardized test results were useful in predicting FTGPA, but FTGPA was more useful in predicting grades for the second academic term. As the authors put it "the college record, once it becomes available at the end of the first semester, becomes paramount in explaining grades in subsequent semesters" (Barkley and Forst, 2004, p. 440). Tracking FTGPA has the added benefit of giving an early indication of student performance at the collegiate level, meaning that faculty and staff can intervene early for students who show signs of distress. According to Gershenfeld et al. (2016) FTGPA was a statistically significant factor in predicting whether under-represented students would graduate within six years from a public university in the mid-west.

Scholars of higher education are in universal agreement that facilitating on-time graduation, especially for groups from under-represented and low-access backgrounds, has a huge impact on their future life chances (Turner and Thompson, 2014; Tinto, 1993). The need for qualified graduates to fill positions in AFNR fields is also a matter of great importance to the health of our economy and world (Alston et al., 2019; Goecker, 1982).

Theoretical Frame

This study utilizes Vincent Tinto's Interactionalist Theory of Student Departure (1975). Many authors have noted that the relatively high rate of attrition among students who enter four-year colleges is an urgent matter that has adverse effects for students, universities and society at large (Turner and Thompson, 2014; Tinto, 1993). Tinto (1975) postulated that an undergraduate's level of success in becoming integrated into the social and academic systems of their school depends on student characteristics including "family background, individual attributes, and pre-college schooling" (1975). According to the author, student success, and therefore retention, depends on successful integration into the university environment. In other words, students who attain a high degree of integration in the social and academic environment of college will remain in college (Tinto, 1975). In this paper we seek to draw a detailed demographic profile of the students in the target cohort which will help us to gain a better understanding of the student characteristics that impact success or hardship.

Methods

In order to characterize the target cohort of students for this study, information from each student's application and transcripts was drawn from NC State's Enrollment Services and

Management Office. The data analysis was conducted with the approval of the university's Internal Review Board (IRB). This study followed an observational approach (Privitera 2014). The findings cannot and are not intended to be interpreted through the lens of causation. We instead wish to present 1) a clearer demographic profile of the CALS student body, and 2) a suggestion of some of the groups who show signs of thriving and others that may be struggling. To accomplish this, we amassed a detailed dataset on the fall 2013 cohort of CALS students. We selected this group so that students could be tracked from entry through departure or graduation over a six-year timeline. This study is limited in that it deals with just one cohort of CALS students. The experiences of these students are subject to a particular historical context that may limit the degree to which their experiences are comparable to students from subsequent cohorts (Privitera, 2019).

Results and Discussion

As has been documented at other COAs, the gender makeup of the undergraduate student population in CALS is heavily skewed female (Archibeque-Engle and Gloeckner, 2016; Buchanan, 2008; Dyer et al. 1999; Geocker, 1982; Peffer, 2010). We found that of the 505 students in the cohort, 328 of them were female, meaning that female students accounted for about 65% of the students entering CALS in fall 2013 (see Table 1). Correspondingly there were only 177 male students enrolled, accounting for 35% of the cohort. Students were only allowed to pick between male and female on the application they were not offered a non-binary choice. Were this choice available, some students may have chosen not to identify as male or female.

Table 1. Male and Female Students in CALS

Gender	N	%
Female	328	65.0
Male	177	35.0

In keeping with other studies which have long found that the low levels of representation for racial and ethnic minoritized student groups in COAs at 1862 Land Grant universities, the cohort was found to be overwhelmingly White as well (Archibeque-Engle and Gloeckner, 2016; Dyer et al., 2002; George, 1978). We used the state population as a point of comparison to gauge the representativeness of the student population at CALS (see Table 2). We found that in comparison to the 64.4% of North Carolinians who identified as non-Hispanic White according to 2013 census estimates, about 80.4% or 406 of the CALS cohort students identified as non-Hispanic White. Asian and Pacific Islander students were also over-represented in the CALS cohort, accounting for 5% or 25 students, compared to 2.5% of the state population.

The racial and ethnic groups underrepresented in the CALS population included African American, Native American, and Latinx students. An estimated 21.3% of the North Carolina population identified as African American in 2013 compared to just 3.2% of the cohort or 16 students. Similarly, 8.9% of the state population was Latinx, while just 3.4% of the cohort or 17 students identified this way. Only a single individual in the cohort identified as Native American accounting for less than 1% of the student population, compared with the 1.1% of North Carolinians who identified as Native American in 2013.

These numbers portray an alarmingly low rate of representation for most minoritized racial and ethnic groups in CALS. This situation likely has ripple effects in the low rates of representation in AFNR professions requiring a bachelor's degree or higher (Alston et al., 2019). The dearth of minoritized students may also create an atmosphere where students of color feel less supported and empowered and are, therefore, less able to successfully integrate themselves into the academic and social systems of the college and achieve success (Terenzini and Pascarella, 2005).

Table 2. Racial and Ethnic Representation of CALS and State Populations

	CALS Population		North Carolina Population	
Race and Ethnicity	N	%	N	%
White	406	80.4	6,342,703	64.4
Asian	25	5.0	246,223	2.5
Latinx	17	3.4	876,554	8.9
Black or African American	16	3.2	2,097,819	21.3
Native American	1	<0.1	108,338	1.1
Two or More Races	25	5.0	-	-
Race or Ethnicity Unknown	10	2.0	-	-
Nonresident Alien	5	0.1	-	-

We also collected data on the number of students from North Carolina counties with low, moderate, and high levels of economic development and compared the rates at which these groups were represented in the state population and in CALS (See Table 3). North Carolina employs a county tier designation system whereby each of its 100 counties are categorized as being in Tier 1, 2, or 3. County tier designation is based on four factors: average unemployment rate, median household income, percentage growth in population, and adjusted property tax base per capita (North Carolina Department of Commerce, 2020). The 40 counties considered the least developed according to these criteria are termed Tier 1 counties, the second least developed 40 counties are termed Tier 2, and the most developed 20 counties are termed Tier 3. We found

that among the students who were assigned a tier designation, there was a higher rate of representation of students from Tier 3 counties as compared to the overall North Carolina population by nearly ten percentage points.

Table 3. Tier Designations of CALS and State Populations

Tier Designation for County of Origin	CALS Population		NC Population	
	N	%	N	%
1 (Least Development)	48	11.1	1504129	15.3
2 (Medium Development)	138	32.0	3717782	37.8
3 (Most Development)	245	56.8	4619937	46.9

*Table does not include 74 students in the cohort with no tier designation

Finally, we tracked student group dyads (see Table 4) that have been established elsewhere in the literature as experiencing elevated levels of academic difficulty or success due to experiential and background factors. Our literature review led us to identify in-state vs. out-of-state students (Burk et al., 2013; Archibeque-Engle and Gloeckner, 2016), traditional vs. nontraditional (Burk et al., 2013; Murtaugh et al., 1999; Lancaster and Robinson, 2011; Goings, 2016), transfer vs. first-year (Archibeque-Engle and Gloeckner, 2016), first generation vs. continuing generation (Archibeque-Engle and Gloeckner, 2016; Stephens et al. 2012; Terenzini and Pascarella, 2005), and Pell Grant recipient vs. non-recipient students (Archibeque-Engle and Gloeckner, 2016, Schudde and Scott-Clayton, 2016) as groups of interest in determining those thriving in CALS or experiencing elevated levels of hardship.

Table 4. Student Dyad Rates of Representation in CALS Population

Student Dyads	N	%
In-State	448	88.7
Out-of-State	57	11.3
Traditional	465	92.0
Nontraditional	40	8.0
First Year	312	61.8
Transfer	193	38.2
Continuing Generation	345	68.3
First Generation	79	15.6
Missing Data	81	16.0
Pell Non-Recipient	356	70.5
Pell Recipient	149	29.5

Student Performance Profiles

We have assembled student academic profiles (See Table 5) which include indicators for the student groups of interest. The data is provided as a cross tabulation to provide easy comparison between groups. It should be noted that many of these groups inevitably overlap and intersect with one another. We do not intend to imply a causal link between membership in any one of these groups and outcomes such as graduation. Rather, our intention is to give a basis for comparison between groups to show where targeted intervention might be considered based on more in depth and specific future analysis of the factors impacting performance for each of the respective groups. We followed the example of past researchers in selecting academic indicators which included mean unweighted high school GPA on a 4.0 scale (HSGPA) (Allensworth and Clark, 2020; Geiser and Santelices, 2007; Zwick and Himelfarb, 2011), highest SAT score (High_SAT) (Garton et al., 2002), and first academic term NC State GPA (FTGPA) (Barkley

and Forst, 2004). We used four, five, and six-year graduation rates (as a percent) to demonstrate the outcomes that student groups experience (Turner and Thompson, 2014; Tinto, 1993).

Based on our comparison it seems that the gap in representation between male and female students may extend to academic performance and graduation rates as well. Male students underperformed their female counterparts across mean HSGPA, High_SAT, and FTGPA. The gap between FTGPA was particularly wide between male and female students, with females earning a mean of 3.06 and males earning a mean of 2.85. Males also lagged behind in terms of graduation rates across all three years. In both years four and five the gap was 8%. In year six it narrowed only slightly to 7%.

Among the racial groups in our target cohort, Latinx students presented the greatest cause for concern. As a group, Latinx students performed across the three academic indicators at a level which appears comparable to (and in some cases better than) the other student ethnic and racial groups. However, the graduation rate for Latinx students was much lower than the other groups. As compared to the overall mean four-year graduation rate for all of CALS, which was 67%, the four-year graduation rate for Latinx students was just 53%, a difference of fourteen percentage points. As a group Latinx students stagnated between years five and six, remaining at a graduation rate of just 65%. Once again, this appears to be drastically lower than the overall graduation rate for the college which climbed from 79% in year five to 82% in year six. According to Nuñez and Murakami-Ramalho (2012) Latinx students are a fast-growing portion of the undergraduate student population in the US, but the hostile policy environment at the

national level toward this group is negatively impacting their ability to persist to graduation in many cases.

We did not find clear disparities based on the economic development of students' county of origin. Grouping students according to North Carolina's county tier system did not highlight student groups experiencing elevated degrees of success or hardship. All three of the groups performed at a level which is comparable to the CALS average across the academic indicators and in terms of graduation rate.

Among the student dyad groups clearer opportunity gaps emerged. In state vs. out-of-state, and traditional vs. nontraditional students presented the largest disparities in graduation rates after six years. However, the in-state vs. out-of-state student dyad presented a contradiction since the out-of-state students performed at a higher rate across the academic indicators (HSGPA, High SAT, and FTGPA) as compared to their in-instate peers, yet they lagged behind in terms of graduation rate. After six years, only 70% of the out-of-state students had graduated as compared to the CALS average of 82% and the in-state average of 83%. Nontraditional students lagged behind across all three academic indicators. The six-year graduation rate was just 68% as compared to their traditional student peers who had a mean graduation rate of 83% and the college-wide mean of 82%. Nontraditional students are a fast -growing group among the undergraduate population and have been demonstrated to be at elevated risk of not completing a dgree (Burk et al., 2013; Murtaugh et al., 1999; Lancaster and Robinson, 2011; Goings, 2016).

Table 5. Academic Profiles by Race, Gender, and County of Origin

	N	HSGPA		High SAT		FTGPA		4-yr Grad	5-yr Grad	6-yr Grad
		Mean	SD.	Mean	SD.	Mean	SD.	%	%	%
Overall	505	3.55	0.38	1168	122	2.99	0.8	67	79	82
Gender										
Female	328	3.61	0.36	1175	120	3.06	0.77	70	82	84
Male	177	3.44	0.41	1156	127	2.85	0.85	62	74	77
Race and Ethnicity										
White	406	3.57	0.37	1168	123	2.99	0.78	68	81	83
Two or More Races	25	3.65	0.25	1116	103	2.91	0.64	56	68	72
Asian	25	3.4	0.47	1243	109	2.71	1.09	60	72	80
Latinx	17	3.55	0.48	1160	122	2.92	0.92	53	65	65
African American	16	3.36	0.47	1090	157	2.95	1.13	75	81	81
Race/Ethnicity Unk.	10	3.47	0.41	1167	79	3.41	0.43	80	90	90
Nonresident Alien	5	-	-	-	-	-	-	-	-	-
Native American	1	-	-	-	-	-	-	-	-	-
Tier Designation										
1	48	3.64	0.3	1116	118	2.81	0.86	69	79	81
2	138	3.63	0.35	1145	115	2.87	0.88	66	78	82
3	245	3.45	0.42	1175	123	2.98	0.77	69	82	85

Table 6. Academic Profiles by Student Dyad Groups

	N	HSGPA		High SAT		FTGPA		4-yr Grad	5-yr Grad	6-yr Grad
		Mean	SD.	Mean	SD.	Mean	SD.	%	%	%
Overall	505	3.55	0.38	1168	122	2.99	0.8	67	79	82
Student Dyads										
In-State	448	3.54	0.39	1160	121	2.94	0.81	67	81	83
Out of State	57	3.7	0.29	1225	120	3.36	0.61	63	70	70
First Year	312	3.69	0.25	1211	95	3.17	0.68	65	82	85
Transfer	193	3.2	0.44	1077	125	2.68	0.89	71	75	77
Continuing Generation	345	3.59	0.37	1183	120	3.09	0.75	71	84	86
First Generation	79	3.5	0.35	1118	131	2.77	0.74	58	72	77
Traditional	465	3.57	0.37	1169	122	3	0.78	67	81	83
Nontraditional	40	2.93	0.55	1106	147	2.81	1.04	63	65	68
Pell Non-Recipient	356	3.58	0.36	1175	121	3.01	0.78	67	81	83
Pell Recipient	149	3.5	0.44	1148	127	2.94	0.86	66	77	79

Recommendations

Leadership at CALS must continue to work hard to identify opportunity gaps within the college. As Archibeque-Engle and Gloeckner (2016) noted, these gaps pertain not only to the academic achievements and graduation rates for students who enroll in the college but also in the rates of representation of the college population as compared to the general population of the state the college serves. In terms of gender, race, and ethnicity CALS and other COAs should strive for equity. The fact that there were far more women enrolled at CALS than men may help to correct inequities in terms of gender representation in AFNR career fields in the years to come. However, more work needs to be done to understand why male students are not enrolling in COAs at a comparable rate to their female peers and to correct the imbalance in the future. This applies to the apparent gap in academic performance and graduation rates as well.

There is an equally urgent need to close the opportunity gap for minoritized racial and ethnic groups at CALS. The low rates of representation that we observed for all groups aside from Asian Pacific Islanders and Whites is a matter of serious importance for the future viability and credibility of CALS and other 1862 Land Grant COAs. CALS should work in tandem with other institutions of higher learning in the state that have academic programs in AFNR to make representation a top priority. This should involve setting statewide goals for achieving equitable representation at all levels of these institutions including undergraduate and graduate students as well as faculty and staff.

Adopting a statewide approach to fostering greater diversity in AFNR programs should also mean deepening ties and sharing resources with North Carolina's historically Black Land Grant

University, NC A&T. Doing so could be a crucial first step toward creating an atmosphere at CALS and NC State where students of color do not feel marginalized. Facilitating greater ease in allowing and encouraging students to take classes between the universities could reduce the isolation that students from minoritized student groups -especially Black students - often feel in the context of a majority White school (Terenzini and Pascarella, 2005). Strengthening these ties would also give students at NC A&T entre into the resources and opportunities that are only available at the state's largest public university. Although it is outside of the scope of this project, CALS leadership should also make a deliberate effort to increase collaboration in research between faculty and graduate students at the two institutions.

Future research should be conducted to evaluate the opportunity gap that Latinx students at CALS are facing in terms of graduation rates. The low number of students in our target cohort (just 17) means that the observed rate of underperformance could be due to random chance. However, if it is not, addressing the needs of these students is of paramount importance for CALS going forward. As has been noted, Latinx students are at the leading edge of a demographic shift which will profoundly change the pool of students that CALS recruits, trains, and sends out into the world (Foreman et al., 2018). Finding ways of addressing this population's needs will be central to the college's success going forward.

Finally, more research should also be done to identify other at-risk populations in the college. Out-of-state students and nontraditional students performed the worst among the student dyad groups that we collected data on. Further research should identify group specific interventions that could help retain these students until graduation.

Summary

This study was conducted to give a stronger basis for understanding the demographic makeup of CALS. We found that the target cohort of CALS students in our study was disproportionately female, White, and from more economically developed counties as compared to the general North Carolina state population. We also found that male students, Latinx students, out-of-state students, and nontraditional students graduated at rates which appeared to be low relative to their peers in the college as a whole. We hope that our findings will inform the efforts of faculty and staff at NC State and at similar institutions around the country as they work to recruit a new, more diverse, generation of AFNR undergraduate students. We hope that this research will help to guide efforts at these institutions to more effectively target resources to continue to facilitate success for student groups who are thriving and to better support those who are experiencing hardship.

REFERENCES

Allensworth, E. M. and K. Clark. 2020. High school GPAs and ACT scores as predictors of college completion: examining assumptions about consistency across high schools. Educational Researcher, 49(3):198-211.

Alston, A. J., R. Roberts and C. W. English. 2019. Building a sustainable agricultural career pipeline: effective recruitment and retention practices used by colleges of agriculture in the United States. Journal of Research in Technical Careers, 3(2):1-23

Archibeque-Engle, S. and G. Gloeckner. 2016. Comprehensive study of undergraduate student success at a Land Grant university college of agricultural sciences. NACTA Journal, 60 (4):432-440.

Barkley, A. P. and J.J. Forst. 2004. The determinants of first-year academic performance in the College of Agriculture at Kansas State University, 1990-1999. Journal of Agricultural and Applied Economics, 36(2):437-448.

Buchanan, D. S. 2008. ASAS centennial paper: Animal science teaching: A century of excellence. Journal of Animal Science, 86(12):3640-3646.

Burk, S. V., M. G. Rossano, W.J. Silva, E.S. Vanzant, A.J. Pescatore and R.J. Harmon. 2013. Factors associated with course withdrawal and final course grade in an introductory animal science course. NACTA Journal, 57(2):16-23.

Byun, S., J.L. Meece and M.J. Irvin. 2012. Rural-nonrural disparities in postsecondary educational attainment revisited. American Educational Research Journal, 49(3):412-437.

Corley, E., R. Goodjoin and S. York. 1991. Differences in grades and SAT scores among minority college students from urban and rural environments. The High School Journal, 74(3):173-177.

Dyer, J.E., L.M. Breja and P.S. Wittier. 2002. Predictors of student retention in colleges of agriculture. Retrieved from ERIC database (ED462290).

Gayles, J. 2012. Race, late bloomers and first-year GPA: Predicting beyond the freshman year. Educational Research Quarterly, 36(1):13-29.

Garton, B. L., A.L. Ball and J.E. Dyer. 2002. The academic performance and retention of college of agriculture students. Journal of Agricultural Education, 43(1):46-56.

Geiser, S., and M.V. Santelices. 2007. Validity of high-school grades in predicting student success beyond the freshman year: High-school record vs. standardized tests as indicators of four-year college outcomes. Center for Studies in Higher Education. https://cshe.berkeley.edu/publications/validity-high-school-grades-predicting-student-success-beyond-freshman-yearhigh-school

George, K. M. 1978. A profile of agriculture students at Murray State University. Retrieved from ERIC database (ED168794).

Gershenfeld, S., D. Ward Hood and M. Zhan. 2016. The role of first-semester GPA in predicting graduation rates of underrepresented students. Journal of College Student Retention: Research, Theory and Practice, 17(4):469-488.

Goings, R. B. 2016. (Re)defining the narrative. Adult Education Quarterly, 66(3):237-253.

Lancaster, S. H., and J.S. Robinson. 2011. Factors associated with student success in an introductory plant science course. NACTA Journal, 55(2):26-31.

North Carolina Department of Commerce. 2020. 2020 North Carolina development tier. https://www.nccommerce.com/grants-incentives/county-distress-rankings-tiers.

Peffer, P.A.L. 2011. Demographics of an undergraduate animal sciences course and the influence of gender and major on course performance. NACTA Journal 55(1):26-31.

Powell, L. A. 2017. Urban cowboys: Demographics confirm that agriculture and natural resources recruiting plans cannot be one-size-fits-all. NACTA Journal, 61(2):121-126.

Privitera, G. J. 2019. Research methods for the behavioral sciences. 3rd ed. Thousand Oaks, CA: Sage Publications.

Martin, M. J., and D. Wesolowski. 2018. Experiences of non-conventional agriculture majors in a college of agriculture. NACTA Journal, 62(1):11-15.

Maruyama, G. 2012. Assessing college readiness: should we be satisfied with ACT or other threshold scores? Educational Researcher, 41(7):252-261.

Nuñez, A., and E. Murakami-Ramalho. 2012. The demographic dividend. Academe, 98(1):32-37.

Schudde, L., and J. Scott-Clayton. 2016. Pell grants as performance-based scholarships? An examination of satisfactory academic progress requirements in the nation's largest need-based aid program. Research in Higher Education, 57(8):943-967.

Stephens, N. M., S.A. Fryberg, H.R. Markus, C.S. Johnson, and R. Covarrubias. 2012. Unseen disadvantage: How American universities' focus on independence undermines the academic performance of first-generation college students. Journal of Personality and Social Psychology, 102(6):1178–1197.

Tinto, V. 1975. Dropout from higher education: A theoretical synthesis of recent research. Review of Educational Research, 45(1), 89-125.

Tinto, V. 1993. Leaving college: rethinking the causes and cures of student attrition. Second Edition. The University of Chicago Press, Chicago, IL.

Turner, P., and E. Thompson. 2014. College retention initiatives meeting the needs of millennial freshmen students. College Student Journal, 48(1):94-104.

Zahner, D., L.M. Ramsaran and J.T. Steedle. 2014. Comparing alternatives in the prediction of college success. Council for Aid to Education. https://cae.org/wp-content/uploads/2021/02/Zahner-Ramsaran-Steedle-2012-Comparing_Alternatives_in_the_Prediction_of_College_Success.pdf

Zwick, R. and I. Himelfarb. 2011. The effect of high school socioeconomic status on the predictive validity of SAT scores and high school grade point average. Journal of Educational Measurement, 48(2):101-121.

CHAPTER 3

Uneven Paths: The AFNR Pathways that Lead Students to Enroll in CALS

Shep Stearns[1], Katherine E. McKee[1], John M. Dole[2], Jonathan W. Duggins[3]

[1]Department of Agriculture and Human Sciences, North Carolina State University, Raleigh, NC 27695

[2]Academic Programs, College of Agriculture and Life Science, North Carolina State University, Raleigh, NC 27695

[3]Department of Statistics, North Carolina State University, Raleigh, NC 27695

Keywords: Agriculture, Colleges of Agriculture, Ethnicity, Food, Gender, Natural Resources, Race, Success, Undergraduate

Abstract

For colleges of agriculture (COAs) throughout the US recruitment and retention of undergraduate students is a matter of existential importance. Many scholars have utilized surveys to determine the role that students' opinions, experiences, and aspirations regarding agriculture, food, and natural resources (AFNR) play in recruitment and retention. In this paper we utilized personal statements written by applicants accepted to an undergraduate degree program at NC State's College of Agriculture and Life Sciences (CALS) to determine what interactions with AFNR played an important role in applicants' decision to apply to the college. The 491 students who submitted written materials as a part of their application to CALS described a diverse array of AFNR pathways that led them to apply. We classified them under the categories of work and volunteer experience, clubs, coursework, personal history, and leisure. Our study found that 319 students, or 65%, of the admitted cohort for whom data was available, described at least one type of AFNR-related pathway that played a role in their choice to apply to CALS. When we looked at the racial and ethnic background of students in the AFNR pathway groups, we found that most were dominated by Whites. Just 8.8% of students with at least one AFNR pathway characteristic were from a minoritized group. Finally, we calculated the mean first term NC State GPA (FTGPA) and graduation rate after six years for each of the pathway groups. We found that students who discussed FFA participation had relatively high FTGPAs and graduation rates, while students that discussed having taken secondary coursework in AFNR had relatively low FTGPAs. Additionally, students with a career intention to become a veterinarian had relatively high FTGPA but relatively low six-year graduation rates.

Introduction

Understanding and addressing the recruitment and retention problems that colleges of agriculture face has been a matter of keen interest for scholars and university administrators for several decades. Many who have contributed to this body of research have argued for the need to characterize undergraduate populations at COAs because of one seminal event in particular – the farm crisis of the late 70's and early 80's (Donnermeyer and Kreps, 1994; Dyer et al., 1999; Dyer, et al., 1996). This crisis was a pivotal event that caused enrollment in COAs to plumet nationwide, thus imperiling the future of academic programs in agriculture (Donnermeyer and Kreps, 1994; Dyer et al., 1999; Dyer, et al., 1996). According to Dyer et al. (2002) between 1978 and 1988 enrollment in COAs at Land Grant universities declined by 24% from 1978 to 1988. Some have argued that the economic downturn in the agricultural economy around this time led to public perception that agriculture was not a tenable field to study at the post-secondary level. Donnermeyer and Kreps (1994) advanced the perspective that the crisis had created a "generally negative view of agriculture", which caused parents, teachers, and guidance counselors to encourage "high school graduates to consider non-agricultural careers" (p.45). The persistence of this view meant that many students were discouraged from pursuing a degree in agriculture even after opportunities in the sector rebounded (Wildman and Torres, 2001).

Many have noted that in spite of the negative perception of the prospects associated with agriculture as a career path, there is actually a large unmet need for agriculturalists with a college degree in the US economy (Alston et al., 2019; Goecker et al., 2010; Setterbo et al., 2017). Over the past several decades there has been a persistent and well-documented trend for a large number of jobs in the agricultural sector requiring a bachelor's degree or higher to either remain

vacant or be filled by applicants with degrees from other fields (Goecker et al., 2010; Setterbo et al., 2017). Setterbo et al. (2017) states that "of the 54,000 annual job openings that were estimated to occur within agriculture, food and natural resources between 2010 - 2015, an average of 29,300 graduates from colleges of agriculture and life sciences, forestry and natural resources and veterinary medicine were expected to fill those jobs each year" (p.46). Authors have also noted that the sub-fields associated with agriculture have grown more complex, dynamic, and technical over recent decades as compared to the public's view of agriculture as an exclusively dirty and labor-intensive field (Jones and Larke, 2001).

The belief that perceptions of agriculture were playing a key role in enrollment outcomes caused scholars to undertake a large amount of research that was intended to characterize the opinions about agriculture held by undergraduate students at COAs (Baker et al., 2013; Donnermeyer, and Kreps, 1994; Dyer et al., 1999; Dyer et al., 1996; George, 1978; Wildman and Torres, 2001). These authors used surveys to gain a better understanding of the factors that influenced COA undergraduates to apply to their programs. Student exposure to agriculture and related fields prior to enrollment in a COA has been widely studied as an important pathway to enrolling in a COA (Dyer et al., 1999; George, 1978; Smith et al., 2010; Wildman and Torres, 2001). This pathway has been considered to include various different experiential factors including prior coursework in AFNR, membership in FFA/4-H, having grown up on a farm or in a rural setting, having engaged in work on a farm or ranch, and having taken part in agriculture related hobbies (Dyer et al., 1999; George, 1978; Smith et al., 2010; Wildman and Torres, 2001). Dyer et al. (1999) found that the strongest predictors of retention in agricultural programs was previous experience with agriculture. Smith et al. (2010), meanwhile found inconclusive results with

regard to the predictive power of agricultural student group participation (FFA) and coursework at the high school level on student success in college.

The influence that parents, professionals and other associates have on students' decision to enroll in a COA has also been considered (Dyer et al., 1999; Dyer et al., 1996; George, 1978; Shrestha et al., 2011). In one early study, George (1978) collected survey data on 150 randomly selected agriculture students from Murray State University which he compared and contrasted with existing data from 1862 Land Grant institutions. He found that for both Murray State students and students of the 1862 Land Grant institutions, slightly more than 60% listed influence from their parents as a factor in their decision to enroll in an agricultural major. Subsequent work has corroborated the important role that parents play in encouraging undergraduates to enroll as a student in an AFNR major (Dyer et al., 1999; Dyer et al., 1996; Rayfield et al., 2013; Rocca and Washburn, 2005; Shrestha et al., 2011).

In a more recent study, Shrestha et al. (2011) explains that "the most influential individuals as information sources for students were parents and family members, other relatives, friends, alumni, high school agriculture teachers, and college faculty members" (p.34). Studies have shown mixed results of the importance of agricultural educators and other professionals in the decision-making process leading students to enroll in a COA (Donnermeyer and Kreps, 1994; Duncan, et al., 2015; Wildman and Torres, 2001). Donnermeyer and Kreps (1994) found that teachers and extension workers were ranked as the least influential factor impacting students' decision-making. Duncan et al. (2015) found that the importance of teachers versus parents or other family as influencers for agriculture undergraduates depended on previous experience with

agriculture related clubs. For students with experience in 4-H, family ranked highest, for those with prior FFA experience, agriculture teachers ranked as the most influential adult (Duncan, et al., 2015).

Authors have noted that there is a tension between the need to expand the recruitment pool for COAs and the shrinking number of students from the traditional profile that these institutions have previously recruited from. Dyer et al. (1999) bemoaned the fact that an increasing number of students were enrolling in COAs with an urban background and no previous involvement with agriculture. He claimed urban students with no agriculture exposure were less committed to AFNR fields than students with more agriculture exposure and were more likely to transfer out of the college to another program (Dyer et al., 1999). According to Peffer (2010) "an increasing number of animal sciences students are urban, female, and declare career interests that are dominated by the veterinary profession" (p.25). Many COAs are now majority female and serve a population with less direct exposure to agriculture than their peers from previous decades (Dyer et al. 1999; Lancaster and Robinson, 2011; McMillan et al., 2009; Peffer, 2010; Soberon et al., 2012).

There is significant evidence that suggests that COA's will need to continue to accommodate an increasingly diverse set of students in order to stay viable (Foreman, et al., 2018; Powell, 2017). The total number of graduates produced by high schools in the US has been projected to decline from 2014 until 2023 (Foreman, et al., 2018). This decline is fueled by a decrease in the number of White and Black graduating students, but partly offset by an increase in the number of Latinx and Asian and Pacific Islander graduates entering the university system (Foreman et al., 2018).

Many have predicted that to keep up with demographic trends, COAs will need to continue to broaden their recruitment efforts to attract students from many different backgrounds (Archibeque-Engle and Gloeckner, 2016; Foreman et al., 2018; Powell, 2017).

Theoretical Frame

This study is grounded in Chapman's (1981) Theory of College Choice. Chapman postulated that students choose to apply to and attend a university or college based on two types of factors which are 1) personal characteristics and 2) outside influences. Student personal characteristics that Chapman identified include socioeconomic status (SES), aptitude, and educational expectations. External influences include the influence of important people in the student's life including family, friends, teachers, and others; fixed college characteristics including cost, location, and programs; and efforts from the college to reach out to students directly including any type of recruitment or programing offered to student prospects (Chapman, 1981). The experiences and aspirations that we classify in this paper as AFNR pathways include a mix of all of the factors that Chapman identified.

Methods

This study compiled data from the transcripts and applications of all 491 students in the fall 2013 admitted CALS cohort who completed a personal statement and short answer questions as a part of their application. The total number of admitted students was 505 meaning that 14 students (2.8% of the cohort) did not submit written materials. This group was selected so that students could be tracked from entry through dropout, transfer, or graduation over a six-year timeline. The study merges qualitative data collected from the students' personal statements with

demographic and academic data collected by the university's Enrollment Management and Services Office. The data analysis was conducted with the approval of the university's Internal Review Board (IRB). This study follows an observational approach (Privitera, 2014). The findings cannot, and are not, intended to be interpreted through the lens of causation.

The qualitative data collection process consisted of the researchers reading each student's personal statement and short answer prompts, which were included in their application documents, and extracting information on their experiences with AFNR. We used an In Vivo coding scheme in the initial stage of data collection to deduce the AFNR pathways that students discussed (Creswell and Poth, 2018). This coding scheme was used to ensure that the pathway categories tracked in the study emerged directly from the students' own words, rather than being imposed from outside. The initial set of codes were then organized into a descriptive coding scheme, which was more concise (Privitera, 2014). Once the coding was complete, the codes were translated into variables and merged with the body of academic and demographic data, which was recorded in the main dataset. The agricultural background variables were analyzed using descriptive statistics.

Results

Students discussed a wide range of pathways to enrollment in CALS that were relevant to AFNR (see Table 6). The specific experiences that students described were diverse, but they all fit under the following categories: work and volunteer experience, career intention, clubs, coursework, personal history, and leisure.

Among the work and volunteer experiences that students described, the most common was work on a farm, which ranged from multigenerational enterprises engaged in intense production agriculture employing large numbers of non-family workers, to personal "hobby farms" generating limited or no income. Students were considered to have worked on a farm if they made reference to the place that they worked as a farm and described direct participation in completing chores and other tasks critical to keeping the farm functioning. Among the 491 students in the cohort whose personal statement and/or short response questions were available for study, 76 (15.5%) described participating in some form of paid or volunteer work on a farm.

The second most common form of work or volunteer experience, reported by 49 students, or 10.0% of the target cohort, was completed in a veterinarian's office, animal hospital, or pet shelter. The students in this group completed tasks that ranged from administrative functions to direct animal care. Many of them assisted in surgery, birth, and euthanization.

Participating in landscaping was listed by only 7 students, or 1.4% of the cohort, which was surprisingly low considering the fact that NC State has a well-regarded Horticultural Science Department. Additionally, 17 students or 3.5% of the cohort described participating in various types of work that were related to AFNR but did not fit into the other work and volunteer subcategories discussed above.

In regard to career intentions that led students to apply to CALS, 151 students or 30.8% of the cohort described a career intention of becoming a veterinarian. This number is particularly impressive in comparison the 32 students, or 6.5% of the cohort, who expressed similarly

specific career intentions in any other fields related to AFNR. Desire to join the veterinary profession clearly plays a huge role in driving students into CALS.

The next category of AFNR pathways that students described was participation in clubs with an agricultural and/or natural resource emphasis. FFA was the most commonly discussed club with 69 students claiming membership, accounting for 14.1% of the cohort. Students were counted as members of the FFA if they identified themselves as such in their personal statement or short response materials. Of the FFA members, 36 students, or 7.3% of the cohort, discussed being an FFA officer.

4-H participation was less commonly discussed. Only 26 students, or 5.3% of the cohort claimed 4-H membership. This may be attributable to the fact that 4-H often works with younger children so students may have been less likely to focus on events that were potentially further in their past. Of the students reporting 4-H participation, 12 students, or 2.4% of the cohort, discussed holding a leadership role in the organization.

Just 7 students discussed attending summer camps or academies with an agricultural or natural resource focus. These students accounted for only 1.4% of the cohort. Additionally, 15 students or 3% of the cohort made reference to membership in a number of other natural resource or agricultural clubs.

Past coursework in agriculture and related fields at the high school level was referenced by 30 students, or 6.1% of the cohort. Although participation in this type of curriculum can be inferred

for all high school students in FFA as a requirement for participation, the researchers only coded students as having participated in agricultural and natural resource focused curriculum if they made explicit reference to these experiences. There were also 14 students, or 2.9% of the cohort, who discussed having taken AFNR courses at a two or four-year institution before transferring to NC State.

The students in this study discussed many details that pertain to their personal history. The most common experience which fit into this subcategory was having grown up on or lived on a farm. A total of 89 students or 18.1% of the cohort reported this type of personal history. Students were considered to have lived on a farm if they resided in a place that they considered a farm and identified it as such in their writing. This included not only students who had lived on a farm for their entire life, but also students who may have lived on a farm for a particular period of time or who stayed with a relative during the growing season.

Having a parent or other influential adult, such as a teacher, who was involved in agriculture was reported by 56 students, or 11.4% of the cohort. Students were assigned this code if they identified a specific adult in their life (parent, teacher, etc.), described that person's connection with agriculture (through a job, personal history etc.) and explained how their connection with that adult had influenced the student in their life choices.

Another element of personal history that students described was the experience of having grown up in an agricultural community, which was reported by 22 students, or 4.5% of the cohort. In

order to be counted among this group, students had to describe agriculture as a constitutive element of the economy and/or the character of their community.

The final category of experience that students described was participation in leisure activities. Horseback riding was the most commonly reported activity; 49 students spoke about riding horses, accounting for 10% of the cohort. Gardening was reported by 9 students, or 1.8% of the cohort.

In order to get an overall impression of how many students viewed their experience with AFNR as an important element of their application to an undergraduate program in CALS, we created a composite indicator for AFNR pathways. For a student to be coded into this group it was necessary for them to have described at least one of the experiences discussed above. Our study found that 319 students or 65% of the admitted cohort discussed one of the AFNR pathways that we identified in our study as having played a role in the process that led them to apply to CALS.

Table 7. AFNR Pathway Categories.

	N	Cohort %
All Students in Cohort (for whom data was available)	491	-
At Least Some AFNR Experience	319	65.0
Volunteer or Work Experience		
On Farm	76	15.5
Veterinarian, Animal Hospital, or Pet Shelter	49	10.0
Landscaping	7	1.4
Other Work Related to AFNR	17	3.5
Career Intention		
Veterinarian	151	30.8
AFNR Related	32	6.5
Clubs		
FFA Participation	69	14.1
FFA Officer	36	7.3
4-H Participation	26	5.3
4-H Leadership	12	2.4
Attended AFNR Camp or Academy	7	1.4
Other AFNR Clubs and Societies	15	3.0
Coursework		
Secondary ANFR Coursework	30	6.1
Post-Secondary ANFR Coursework	14	2.9
Personal History		
Lived on Farm	89	18.1
Influenced by an Adult Involved in Agriculture	56	11.4
Member of an Agricultural Community	22	4.5
Leisure		
Horseback Riding	49	10.0
Gardening	9	1.8

Demographic Profiles by Pathway Category

We sought to demonstrate how race/ethnicity and gender impacted what AFNR pathways

students followed to a major in CALS (Table 2). Because the overall number of students who are

from minoritized racial/ethnic groups is small, we found it to be more informative to group them.

We therefore placed non-Hispanic Whites under the category of "White" and all other students

under the category of "minoritized groups." For the sake of comparison, the breakdown of the general population for the entire cohort is also included in this table.

Female students were represented at a rate that was higher than their representation in the general population of the cohort (65%) in pathway categories including: at least one AFNR pathway (67.8)%, volunteer or work experience with a veterinarian, animal hospital or pet shelter (89.8%), career intention to become a veterinarian (90.1%), 4-H participation (76.9%), 4-H leadership (66.7%), attending AFNR camp or academy (71.4%), attending other AFNR clubs and societies (66.7%), and horseback riding (93.9%).

Male students were represented at a rate that was higher than their representation in the general population in the cohort (35%) in pathway categories including: volunteer or work experience on a farm (57.9%), landscaping, other work related to AFNR (85.7%), career intention related to AFNR (47.1%), personal history of having lived on a farm (43.8%), having been influenced by an adult involved in agriculture (42.9%), having been a member of an agricultural community (36.4%), having taken secondary coursework in AFNR (53.3%), having taken post-secondary coursework in AFNR (50%), FFA participation (36.2%), FFA officer status (38.9%), and gardening (55.6%).

White students were represented at a rate that was higher than their representation in the general population of the cohort (86.9%) in pathway categories including: at least some AFNR experience (91.2%), volunteer work or experience on a farm (100%), volunteer or work experience with a veterinarian, animal hospital or pet shelter (91.8%), other volunteer or work experience related to AFNR (100%), career intention to become a veterinarian (90.1%), personal

history of having lived on a farm (94.4%), personal history of having been influenced by an adult involved in agriculture (96.4%), personal history of having been a member of an agricultural community (90.9%), having taken secondary level AFNR coursework (93.3%), having participated in 4-H (88.5%), having participated in FFA (95.7%), having been an officer in FFA (100%), having participated in other AFNR clubs or societies (93.3%), and having participated in the leisure activity of horseback riding (97.9%).

Minoritized group students were represented at a rate that was higher than their representation in the general population of the cohort (13.1%) in pathway categories including: work or volunteer experience with landscaping (14.3%), having taken post-secondary coursework related to AFNR (14.3%), having participated in 4-H in a leadership position (16.7%), having attended an AFNR camp or academy (28.6%), and having participated in the leisure activity of gardening (22.2%).

Table 8. Gender and Race Representation for AFNR Pathway Categories.

	N	Female%	Male%	White%	Minoritized%
All Students in Cohort	491	65.0	35.0	86.9	13.1
At Least One AFNR Pathway	319	67.8	32.2	91.2	8.8
Volunteer or Work Experience					
On Farm	76	42.1	57.9	100.0	0.0
Veterinarian, Animal Hospital, or Pet Shelter	49	89.8	10.2	91.8	8.2
Landscaping	7	14.3	85.7	85.7	14.3
Other Work Related to AFNR	17	52.9	47.1	100.0	0.0
Career Intention					
Veterinarian	151	90.1	9.9	90.1	9.9
AFNR Related	32	40.6	59.4	87.5	12.5
Clubs					
FFA Participation	69	63.8	36.2	95.7	4.3
FFA Officer	36	61.1	38.9	100.0	0.0
4-H Participation	26	76.9	23.1	88.5	11.5
4-H Leadership	12	66.7	33.3	83.3	16.7
Attended AFNR Camp or Academy	7	71.4	28.6	71.4	28.6
Other AFNR Clubs and Societies	15	66.7	33.3	93.3	6.7
Coursework					
Secondary AFNR Coursework	30	46.7	53.3	93.3	6.7
Post-Secondary AFNR Coursework	14	50.0	50.0	85.7	14.3
Personal History					
Lived on Farm	89	56.2	43.8	94.4	5.6
Influenced by an Adult Involved in Agriculture	56	57.1	42.9	96.4	3.6
Member of an Agricultural Community	22	63.6	36.4	90.9	9.1
Leisure					
Horseback Riding	49	93.9	6.1	97.9	2.1
Gardening	9	44.4	55.6	77.8	22.2

Academic Profiles by Pathway Category

We have assembled student academic profiles (See Table 8) which include indicators for the

AFNR pathway groups. The data is provided as a cross tabulation to provide easy comparison

between groups. It should be noted that these groups inevitably overlap and intersect with one

another. We do not intend to imply a causal link between membership in any one of these groups

and outcomes such as graduation. Rather, our intention is to give a basis for comparison between groups to give an insight on how students perform on average when they enter the college through their mean first academic term NC State GPA (FTGPA), and their prospects for graduation through six-year graduation rate.

The student groups with the highest mean FTGPA were those who attended an AFNR camp or academy (3.37), those who participated in 4-H (3.32), and those who participated in gardening (3.30). Additionally, the groups with the highest six-year graduation rate were those who attended an AFNR camp or academy (100%), those who participated in gardening (100%), and those who participated in FFA as an officer (94.3%). While these numbers appear promising, it should be noted that the students who participated in an AFNR camp or academy and those who participated in gardening were both small groups, consisting of just 7 and 9 students respectively. FFA officers and 4-H participants represented larger groups representing 36 and 24 students respectively.

Students with the lowest FTGPA included students who entered the college after having taken post-secondary coursework in AFNR (2.70), students who had an AFNR career intention (2.88), and students who had AFNR work experience in the "other" category (2.89). The student groups with the lowest graduation rate after six years were those who took post-secondary coursework in AFNR (64.3%), students who took secondary coursework in AFNR (73.3), and students who participated in AFNR clubs in the "other category" (73.3).
Interestingly, students who reported having work or volunteer experience with a veterinarian, animal hospital, or pet shelter or who had a career intention to become a veterinarian had

relatively high mean FTGPAs (3.11 and 3.10 respectively) but surprisingly low graduation rates (73.5% and 77.5% respectively). There is likely a considerable amount of overlap between these groups since many of the students reported pursuing volunteer and work experience in animal care settings in order to improve their chances of being admitted to veterinary school.

Table 9. Academic Profiles by AFNR Pathway.

	N	FTGPA		6-yr Grad
		Mean	SD.	%
All Students	491	2.99	0.80	81.8
At Least One AFNR Pathway	319	3.03	0.78	81.8
Volunteer or Work Experience				
On Farm	76	2.92	0.85	81.6
Veterinarian, Animal Hospital, or Shelter	49	3.11	0.83	73.5
Landscaping	7	3.14	0.51	85.7
Other Work Related to ANFR	17	2.89	0.78	82.4
Career Intention				
AFNR Related	151	2.88	1.01	84.4
Veterinarian	32	3.10	0.76	77.5
Clubs				
FFA Participation	69	3.07	0.63	89.9
FFA Officer	36	3.01	0.58	94.4
4-H Participation	26	3.32	0.49	92.3
4-H Leadership	12	3.16	0.61	83.3
Attended AFNR Camp or Academy	7	3.37	0.41	100.0
Other AFNR Clubs and Societies	15	2.84	0.71	73.3
Coursework				
Secondary ANFR Coursework	30	2.99	0.79	73.3
Post-Secondary ANFR Coursework	14	2.70	0.80	64.3
Personal History				
Lived on Farm	89	2.99	0.73	86.5
Influenced by an Adult Involved in Agriculture	56	3.06	0.56	89.3
Member of an Agricultural Community	22	2.93	0.88	90.9
Leisure				
Horseback Riding	49	3.23	0.80	93.9
Gardening	9	3.30	0.59	100.0

Discussion

Our analysis demonstrates that AFNR pathways continue to play an important role in attracting students to enroll in undergraduate programs at COAs. Of the students in our target cohort 65% described an AFNR pathway that was relevant to their decision to apply to CALS. We found that some of the traditional pathways to COA enrollment that other researchers (Donnermeyer, and

Kreps, 1994; Dyer et al., 1999; Dyer et al., 1996; George, 1978; Wildman and Torres, 2001) have identified, such as work experience on a farm, having lived on a farm, FFA participation, and having been influenced by an adult involved in agriculture, continue to be crucial in attracting students to CALS.

We found evidence to corroborate research that indicates that interest in animal science and career intention of becoming a veterinarian are major pathways attracting female students (Buchanan, 2008; Dyer et al. 1999; Geocker, 1982; Peffer, 2010). Our data highlights major disparities in the AFNR pathways that are followed by White students as compared with students from minoritized groups. Just 8.8% of the students who described at least one AFNR pathway in their personal statement were from minoritized groups. This was even lower than the overall rate of representation for minoritized student groups in the overall cohort population which was 13.1%. For pathway categories including having work or volunteer experience on a farm and FFA officer status, the number of minoritized students who described participating was zero.

However, we also found some AFNR pathways seemed to attract minoritized student groups at higher rates. Our results show that students who participated in agricultural academies or camps and those who participated in gardening were both more diverse than other pathway groups and had very high FTGPAs and six-year graduation rates. It should be noted that the number of students in these two groups was small and therefore random chance may have impacted the apparent makeup and performance of these groups.

Results pertaining to academic performance for students from the pathway groups were mixed and provide material for further study. While students who described being FFA participants and

officers had one of the highest six-year graduation of all of the AFNR groups, students who described having taken AFNR coursework in high school had a six-year graduation rate that was lower than the cohort average. This is surprising because students can only participate in FFA if they have taken high school coursework in AFNR.

Another question which the data presents is why students who accumulate animal care experience and/or have a career intention to become a veterinarian have relatively high FTGPAs but relatively low rates of graduation from CALS. More work should be done to investigate whether these students transfer or drop out of the college at elevated rates upon being confronted with the rigor and selectivity of the path to veterinary school.

Recommendations

While many of the traditional AFNR pathways continue to play an important role in recruitment and retention for COAs, it is crucial these institutions find ways to broaden their appeal as well. Interest in animal science and a career intention to become a veterinarian has attracted more female students to enroll in CALS, yet there is a continued need broaden the presence of female students into CALS programs other than veterinary science. In light of the evidence that we found which suggests that students with a career intention to become a veterinarian are high performing but have a relatively low six-year graduation rate, more effort could be taken to find another academic track for students who are ultimately not successful in their aspiration to become a veterinarian. Perhaps incentivizing transfer into another CALS program or a less competitive field in Animal Science would be appropriate for these students.

Additionally, our study shows that CALS has an urgent need to create more pathways for racially and ethnically diverse applicants and enrollees. Further research should be conducted to identify AFNR pathways which attract diverse students and spark interest in pursuing a degree at CALS or another COA. Faculty, staff, and alumni should also work to broaden access to traditional pathways which are disproportionately dominated by white students. Leadership of traditional AFNR clubs such as FFA and 4-H should continue to work to broaden their appeal outside of the traditional core of students that these programs serve. CALS should devote resources to support programing that allows minoritized students to gain direct volunteer or work experience in AFNR. Expanding access to these pathways for high school students of all backgrounds will help ensure a more secure future for CALS in regard to enrollment and retention.

Summary

Our study shows that AFNR pathways remain an important route for driving students to enroll in CALS. A total of 65% of the students for whom written application materials were available described an AFNR pathway that was an important factor in their decision to apply to the college. Overall, however, the students who identified themselves with at least one pathway were less diverse than the college overall. Only 8.8% these students were from a minoritized racial or ethnic group. Our comparison of academic outcomes for students in these groups was mixed and provided material for further study on the relevance of FFA participation and AFNR coursework to performance at the college level.

REFERENCES

Alston, A. J., R. Roberts and C. W. English. 2019. Building a sustainable agricultural career pipeline: effective recruitment and retention practices used by colleges of agriculture in the United States. Journal of Research in Technical Careers, 3(2):1-23

Baker, L. M., Q. Settle, C. Chiarelli and T. Irani. 2013. Recruiting strategically: Increasing enrollment in academic programs of agriculture. Journal of Agricultural Education, 54(3):54-66.

Chapman, D. 1981. A model of student college choice. The Journal of Higher Education, 52(5):490-505.

Donnermeyer, J. F., and G.M. Kreps. 1994. Assessing college of agriculture freshmen. NACTA Journal, 38(1):45-48.

Duncan, D. W., E. Carter, N. Fuhrman and J.K. Rucker. 2015. How does 4-H and FFA involvement impact freshmen enrollment in a college of agriculture. NACTA Journal, 59(4):326-330.

Dyer, J.E., L.M. Breja, and R.J. Andreasen. 1999. Attitudes of college of agriculture freshmen toward agriculture. Journal of Agricultural Education 40(2):1-10.

Dyer, J.E., L.M. Breja and P.S. Wittier. 2002. Predictors of student retention in colleges of agriculture. Retrieved from ERIC database (ED462290).

Dyer, J.E., R. Lacey, and E.W Osborne. 1996. Attitudes of University of Illinois College of Agriculture freshmen toward agriculture. Journal of Agricultural Education. 37(3):33-42.

Foreman, B., M. Retallick and S. Smalley. 2018. Changing demographics in college of agriculture and life sciences students. NACTA Journal, 62(2):161-167.

George, K. M. 1978. A profile of agriculture students at Murray State University. Retrieved from ERIC database (ED168794).

Goecker, A.D., E. Smith, P.G. Smith and R. Goetz. 2010. Employment opportunities for college graduates in food, energy, and the environment: United States, 2010-2015. https://securelb.imodules.com/s/1342/images/editor_documents/usda.pdf?sessionid=8b8f9c65-8f8b-4690-9f42-8fc853d5e1ff&cc=1

Jones, W. A., and A. Larke. 2001. Factors influencing career choice of African American and Hispanic graduates of a Land-Grant college of agriculture. Journal of Agricultural Education, 42(1):39-49.

Lancaster, S. H., and J.S. Robinson. 2011. Factors associated with student success in an introductory plant science course. NACTA Journal, 55(2):26-31.

Peffer, P. A. L. (2010). Demographics of an undergraduate animal sciences course and the influence of gender and major on course performance. *NACTA Journal, 54*(3), 25-30.

Powell, L. A. 2017. Urban cowboys: Demographics confirm that agriculture and natural resources recruiting plans cannot be one-size-fits-all. NACTA Journal, 61(2):121-126.

Rayfield, J., T.P. Murphrey, C. Skaggs and J. Shafer. 2013. Factors that influence student decisions to enroll in a college of agriculture and life sciences. NACTA Journal, 57(1):88-93.

Rocca, S. J., and S.G. Washburn. 2005. Factors influencing college choice of high school and transfer matriculants into a college of agriculture. NACTA Journal, 49(1):32-38.

Setterbo, K., C. Akers, T. Tarpley, L. Kennedy, D. Doerfert and C. Gibson. 2017. Going against the grain: Recruiting atypical students into a college of agriculture. NACTA Journal, 61(1):46-51.

Shrestha, K. M., M. Suvedi and E.F. Foster. 2011. Who enrolls in agriculture and natural resources majors: A case from Michigan State University. NACTA Journal, 55(3):33-43.

Smith, A. R., B.L. Garton and T.J. Kitchel. 2010. Beyond mere enrollment: Level of youth organization participation as a predictor of collegiate academic success and retention. Journal of Agricultural Education, 51(2):24-35.

Turner, P., and E. Thompson. 2014. College retention initiatives meeting the needs of millennial freshmen students. College Student Journal, 48(1):94-104.

Tinto, V. 1975. Dropout from higher education: A theoretical synthesis of recent research. Review of Educational Research, 45(1), 89-125.

Tinto, V. 1993. Leaving college: rethinking the causes and cures of student attrition. Second Edition. The University of Chicago Press, Chicago, IL.

Wildman, M. and R.M. Torres. 2001. Factors identified when selecting a major in agriculture. Journal of Agricultural Education, 42(2):46-55.

CHAPTER 4

Untapped Reserves: A Narrative Analysis of Application Essays from Nontraditional Students at CALS

Shep Stearns[1], Katherine E. McKee[1], John M. Dole[2], and Jackie Bruce[1]

[1]Department of Agriculture and Human Sciences, North Carolina State University, Raleigh, NC 27695

[2]Academic Programs, College of Agriculture and Life Science, North Carolina State University, Raleigh, NC 27695

Keywords: College of Agriculture, Personal Statement, Nontraditional Student, Self-authorship

Abstract

This study analyzes the narratives embedded in the undergraduate personal statements of 40 nontraditional students - age 25 years and older - accepted to an undergraduate degree program at NC State's College of Agriculture and Life Sciences (CALS) in the fall of 2013. Although widely available to universities, personal statements have been overlooked in the literature of undergraduate student development. Through narrative analysis of these essays, we found evidence that about half of the students in the sample had undergone the developmental progression identified by Marcia Baxter Magolda as "self-authorship." Nontraditional students are widely known to be at very elevated risk for dropout. However, a high instance of self-authoring abilities among this group would represent a significant, yet overlooked, asset which could be leveraged by institutions in order to improve the rate of success that these students experience.

Introduction

Although personal statements are nearly universally used by universities and colleges as a criterion for admissions to undergraduate programs, the processes for evaluating their merit lacks depth. GlenMaye and Oakes (2002) attempted to create an instrument for assessing the quality of personal statements included in applications to a Master of Social Work program. The instrument was designed to assign value to the following characteristics "sound writing skills, evidence of sound communication skills, consistency between personal values and social work values, adherence to work ethics, and evidence of emotional/mental stability" (2002, p. 68). While these criteria may be valid for winnowing a field of candidates by eliminating those who do not have the requisite skills to be successful, or the perceived characteristics to form a "good fit", they do

not lead to a deeper institutional understanding of the developmental progression that applicants have undergone in the past and how they may be able to share their accumulated wisdom with other students if admitted.

A personal statement represents a rich data source that should have significance beyond admissions decision making. The narratives that students write themselves into have great instructive potential which, if fully utilized, could reshape an institution's understanding and approach to its students both as individuals and as a group.

Reflecting on the importance of narrative analysis as a qualitative method, Merriam (2009) notes "stories are how we make sense of our experiences, how we communicate with others, and through which we understand the world around us" (p. 32). Subjecting personal statements to a rigorous process of study that reveals the stages of personal development that students undergo before admission could have important ramifications for how they perform as admitted students.

This is especially true for the target group of this study, nontraditional undergraduates. By the most generally accepted definition, a nontraditional student is anyone who is 25 years of age or older at the time they enter a degree program (Linzmeier, 2014, p. 21). They represent a group that has been neglected in the literature and by the institutions of higher learning that they attend. They are defined in a de facto way in opposition to the students that universities and colleges expect to accommodate. As Linzmeier (2014) notes "most previous research on undergraduate students has been based on an understanding of a 'traditional' student as an individual 17-22 years of age, and the curriculum and institutional culture has been designed exclusively for this

age demographic" (p.21). Nontraditional students therefore are implicitly understood as a sort of "out-group" when it comes to most university and college systems. And yet, as the fastest growing group in national admissions, the need to understand and accommodate them better is of growing importance (Goings, 2016).

Nontraditional students form a large contingent of the undergraduate population in the US. In 2011, one third of all enrolled undergraduates in the US were considered nontraditional students (Markle, 2015). They are also a population at a very elevated risk of dropout. According to Gail Markle (2015), "64% of 18-year-old students enrolled in 2003-2004 graduated within 6 years compared to 20% of those aged 24 to 29 years, and 16% of those aged 30 and older" (p. 268). Forming a clearer picture of the challenges that face these students could have an enormous impact on graduation rates for institutions across the country.

This study will use the theory of self-authorship as clarified and expanded by Baxter Magolda to evaluate and characterize the experiences of a cohort of nontraditional students admitted to the College of Agriculture and Life Sciences (CALS) at NC State University in the fall of 2013. Baxter Magolda's version of this theory suggests that self-authorship is a higher-level phase of development in a person's decision-making process, worldview, and sense of self (Baxter Magolda 2001, 2004, 2008, 2009).

Baxter Magolda's work is situated in the constructivist tradition where individuals are understood to make their own meaning as they interact with the world. Her use of the term "self-authorship" is borrowed from the work of Kegan (1982, 1994). Kegan argued that people

develop through increasingly complex stages of meaning making. In Kegan's "five orders of mind" self-authorship is the second highest (1994). Some (though not all) individuals ascend to this level in adulthood. Those who do are well-equipped for leadership because they have a well-developed sense of self and a system for making their own meaning of the world (Kegan, 1982, 1994). They are able to see more elements of their world as changeable and under their own control (Kegan, 1982, 1994).

In her own conceptualization of self-authorship, Baxter Magolda also places emphasis on one's ability to make meaning in a self-directed manner. As Boes, Baxter Magolda, and Buckley (2010) put it "self-authorship is characterized by internally generating and coordinating one's beliefs, values, and internal loyalties, rather than depending on external values, beliefs, and interpersonal loyalties" (p. 4). For Baxter Magolda, this process depends on navigating and interweaving information gathered through three areas of development which include epistemological, interpersonal, and intrapersonal (2010).

According to Baxter Magolda the successful integration of these areas is the culmination of a multistage developmental progression. She defines the initial stage as "following formulas" whereby an individual merely receives information from outside authorities and leads their life according to a social script (2010). In the second stage, termed the "cross-roads", an individual begins to develop the "internal voice" that they need in order to vet information and create their own meaning (2010). Self-authorship is the final stage in the progression. It begins when the individual learns to trust their internal voice. At the same time, the individual also builds an "internal foundation" that consists of "embracing one's personal characteristics and sense of self

as a corner stone for developing a philosophy of life" (Baxter Magolda et al., 2010, p. 17). A third element of self-authorship is securing "internal commitments" which entails identifying and "living one's convictions" (Baxter Magolda et al., 2010, p. 17).

Much of the initial work on self-authorship theory that Baxter Magolda produced is based on a multi-decade longitudinal study which became less diverse over time. The author notes that by year 20 "gradual attrition resulted in 30 [remaining] participants, all of whom are Caucasian" (Baxter Magolda et al., 2010, p. 26). The participants were also quite privileged as evidenced by the high rate of advanced degree attainment present in the sample (Baxter Magolda et al., 2010). After the theory was established however, the author worked with other scholars to apply the theory to nondominant groups as well (Torres & Baxter Magolda, 2004; Baxter Magolda et al., 2010).

Baxter Magolda and Torres (2004) replicated the original longitudinal study with Latinx college students and found that unlearning internalized stereotypes played a central role in attaining self-authorship. In general, Baxter Magolda's work suggests that participants from both White and non-dominant groups began to attain self-authorship throughout their mid and late twenties (Baxter Magolda et al., 2010, p. 27). Other researchers, however, suggest that the process of attaining self-authorship tends to occur earlier minoritized group students because the experience of facing discrimination forces them to wrestle with identity starting from a younger age (Abes and Jones, 2004; Pizzolato, 2003, 2004; Torres 2003; Torres & Hernandez, 2007).

King et al. (2009) found that interacting with diverse peers helped White students to develop more advanced meaning making capacity. White students encountering a diverse learning environment for the first time "focused on processing their discomfort with diverse perspectives and benefited from sustained interaction with diverse peers" (King et al., 2009, p. 112). They explain that these interactions belong to a larger group of experiences that catalyze development in the direction of self-authorship, which they refer to as "Developmentally Effective Events" (DEEs) (King et al., 2009). DEEs can include instances such as a compelling classroom discussion or debate, but they also often include "conflicts and difficult decisions" (King et al., 2009 p. 113). Based on this vein of self-authorship literature, it seems apparent that students often learn through difficult events or experiences, sometimes those that they live themselves and sometimes those that are conveyed to them by peers from different backgrounds.

In our study we explore whether the meaning-making and decision-making abilities of the students in our sample are consistent with the theory of self-authorship advanced by Baxter Magolda and others. Self-authoring abilities are believed to be a valuable asset in an atmosphere that prioritizes critical thinking and self-directed learning (Baxter Magolda, 2010). Therefore, demonstrating that the quality of self-authorship is common among nontraditional students applying to college would demonstrate the presence of an untapped surplus resource that could serve an instrumental role in addressing the challenges facing this high-risk group (Goings, 2016).

Methods

We used a narrative analysis design in this study because it has been acknowledged by many qualitative researchers as a highly effective way of uncovering how participants develop, articulate, and understand their own identity. As Essers (2009) notes, "life-story narratives can be regarded as 'personal myths', accounting for the fact that identity is created by organizing stories about multiple identifications into continually revised biographical narratives that provide answers to the question: 'Who am I?'" (p. 164). In this study we uncover the identity and developmental progression that students undergo as they learn to answer this question for themselves through the development of self-authoring abilities.

In the personal statement portion of the undergraduate application, students were given an open-ended opportunity to tell their story in the way they saw fit. Though it was not explicitly required of the students, most of them used this space to tell their life story or to describe a significant occurrence in their lives. As Syed and Azmitia (2008) state, "the life story can be viewed as consisting of a multitude of smaller narratives. Narratives typically have three primary components: a beginning or starting point, an occasion of trouble or conflict, and some sort of future direction or destination" (p. 1015). These stages fit in neatly with the theoretical frame of self-authorship that has been chosen for this study. The progression described in Baxter Magolda's "self-authorship" model as reflected in the testimonies of the students in the sample, mimics the universal structure of narrative itself. Embedded in each narrative is what Syed and Azmitia termed the participant's "developmental history" (2008, p. 1015).

The students' narratives were given additional context and detail through a series of short answer questions. These questions ask students about their view on leadership, their family obligations, personal hardships, and how they will contribute to or benefit from campus diversity. This slightly more structured portion of the application shed additional light on some of the specific experiences that students alluded to in their personal statements.

Sample Description

This analysis is a part of a larger study dealing with undergraduate student success at NC State CALS. Of the 505 students in the broader study, 40 of them were determined to be nontraditional according to the criterion that they were 25 years of age or older in the year they entered the college. Application documents including personal statements and short answer questions were gathered for all 40 of these students from the advising and enrollment management system. This data collection was conducted with approval from the university's IRB.

The sample was mostly non-Hispanic White, though by a narrower margin than is present in the general CALS population. A total of 26 participants selected only the "White" label. Two students claimed a mixed racial/ethnic identity including one student who selected "White and Hispanic or Latino" and another who selected "White and Asian". Additionally, four students selected "Hispanic or Latino", three selected "Black or African American", and one selected "Asian" as their racial or ethnic identities. Of the remaining students, one was a foreign national from Turkey and three chose not to declare any information about their racial or ethnic background.

In contrast to the broader population of CALS which is majority female, the gender makeup of the group was slightly skewed toward males, with 22 students identifying as male and 18 identifying as female. This demographic information was drawn from objective portions of the application and not from either the short answer or personal statement data. Students were only given a binary choice of gender identities on the application. Given a nonbinary choice, it is possible that some students would have chosen not to identify with either the male or female gender categories.

Document Analysis

We conducted the document analysis in an inductive manner. In the first round of coding of the personal statement and short answer sections of the applications we used an In Vivo coding scheme (Creswell & Poth 2018). In Vivo coding uses participants' own words to form a set of codes that represent the themes that are present in a text. Coding documents in this way helped us to ensure that our work will "prioritize and honor the participant's voice" (Saldaña 2015, p.67). This helped us ensure that the insights that emerged from the data were true to what the participants actually meant to convey. This initial stage revealed an identity and developmental progression that was clearly present in the data. As this trend became apparent, we felt that it was necessary to return to the literature and appropriate a theoretical frame which could describe the complex evolutionary process that was unveiled through the initial phase of coding.

Baxter Magolda's theory of self-authorship provided a framework that proved appropriate for capturing the themes that emerged in the initial round of coding (2001, 2004, 2008, 2009). We then developed a descriptive coding scheme in line with the elements of this developmental

theory as described by Baxter Magolda (2001, 2004, 2008, 2009). According to Saldaña (2015), a descriptive coding scheme "assigns labels to data to summarize in a word or short phrase - most often as a noun - the basic topic of a passage of qualitative data" and "provides an inventory of topics for indexing and categorizing" (p. 67). Our inventory started with the specific individual experiences that reoccurred throughout the narratives and emerged as important in the first stage of In Vivo coding (Saldaña, 2015). We then arranged these codes into the slightly broader categories which consisted of the numerous concepts related to self-authorship that have been defined by Kegan (1982, 1994), Baxter Magolda (2001, 2004, 2008, 2009), and other authors who contributed to the literature related to the theory (Abes and Jones, 2004; King et al., 2009; Pizzolato, 2003, 2004; Torres, 2003; Torres and Hernandez, 2007). Finally, we sorted and grouped the categories to reflect their association with the basic stages of identity development which Baxter Magolda has said are "following formulas", "the cross-roads", and "self-authorship" (2010). These key stages formed the broad, basic themes that tended to structure the narratives (Saldaña, 2015).

Internal Validity

Guba's (1981) widely respected criteria formed the paradigm we used to gauge the internal validity of our study. Guba listed truth value, applicability, consistency, and neutrality as the four relevant factors in assessing the trustworthiness or internal validity of a study (Guba, 1981).
In qualitative methodology "truth value" is concerned with rendering the complex and multiple lived realities of the participants as accurately as possible (Guba, 1981). According to Krefting (1991), researchers who wish to achieve a high level of truth value "need to focus on testing their findings against various groups from which the data were drawn" (p. 215). The 40 participants in

this study represented all of the nontraditional students in the selected cohort and therefore represented the largest number of perspectives possible from within the target cohort being studied. To test the truth value of the study, we drew ten students at random from the group and conducted data analysis on this initial sub-group (Krefting, 1991). The same analytical process was then repeated on the rest of the group with a conscious effort not to use the insights or coding scheme that was gleaned from the first round of analysis (Krefting, 1991). The narrative arc and overlap with the theoretical frame were found to be consistent between the two groups suggesting that the truth value of the study was strong.

Krefting notes that "applicability refers to the degree to which the findings can be applied to other contexts and settings or with other groups" (Krefting, 1991, p. 216). This element of trustworthiness relies on the inclusion of sufficient descriptive data to allow the findings of a study to be transferred to another similar situation (Krefting, 1991, p. 216). To accomplish this, we analyzed all of the available data on students that met the sampling criteria of being accepted to CALS in the fall of 2013 and turning 25 or older in that year (Krefting, 1991). While the data began to show saturation, or redundancy with the analysis of the initial sub-group, data analysis was continued in order to ensure the maximum amount of data was available for analysis (Krefting, 1991).

Once the data was analyzed and coded, the recurring elements of the narratives were identified. The passages were compared across texts for those that contained the most detailed and instructive examples of self-authorship and its associated concepts (Merriam, 2009). These passages are quoted at length and knitted together in the results section to provide an overview of

the common identity progression that emerged in the data (Merriam, 2009). These passages are then reinforced with briefer quotations and summaries that appeared in other narratives to support the claim that the observed developmental progression was widely present in the narratives of the participants (Merriam, 2009). This purposeful process of identifying and selecting the richest passages from the data was undertaken to ensure that sufficiently "thick description" would be available to allow other researchers to be confident in the transferability of the results from this study to future studies on other comparable groups (Merriam, 2009).

The institutional similarities between universities and their application process lends this study "consistency" as well (GlenMaye and Oakes, 2002). Consistency means that a study's conditions can be repeated and that the study itself can be replicated with a different group of participants (Guba, 1981). The near universality of the inclusion of a personal statement or essay of some kind as part of universities' application processes ensures that this study would be easy to replicate at other schools with other groups of nontraditional students.

Finally, Guba lists "neutrality" as an important element in evaluating a study (1981). Neutrality is the degree to which a study's findings emanate from the participants' responses within the conditions of the study rather than from the bias that researchers impose on the data (Guba, 1981). In order to prevent preconceived notions from influencing the data analysis, the member of our team who was responsible for coding kept a detailed reflexivity journal throughout the entire research process (Merriam, 2009). This helped him to document, confront, and mitigate his bias and reduce its impact on the neutrality of the study itself as recommended by Merriam (2009).

Limitations

This study is limited by the fact that there is no way to reach out to the participants and follow up on the experiences that they describe in their essays. There is no way of gaining more detail than is already contained in the documents themselves. These documents vary somewhat in length and structure and therefore in the amount of detail given as well. The students' writing also has an obvious agenda that may limit what they share and how they present their stories. The personal statements were most likely written in a way that participants felt would cast them in the best possible light as candidates for admission to NC State CALS. Another limiting factor is that the data of nonadmitted applicants was not available. We therefore have no way of knowing if the stories that admitted applicants tell are more or less in line with the chosen theoretical frame than those who were not selected for entrance into CALS.

Results and Discussion

While the experiences and backgrounds of the students in this study are extremely varied, there is a clearly discernable narrative arc that characterizes and structures the stories that they tell about themselves. In general, they begin with an initial external formula that the participant had sought to follow, this is met with some form of disruptive or troublesome event that prevents them from following this formula or highlights its unsuitability. Finally, the student arrives at an endpoint of a new chosen lifepath that will be fulfilled by pursuing a degree in CALS. These experiences show a strong overlap with the developmental progression that Baxter Magolda and other authors have identified as culminating in the advanced form of meaning-making and decision-making ability known as self-authorship.

Following Formulas

The stage of development that Baxter Magolda has referred to as "following formulas" is evident in the developmental progression that the students in the sample describe. In general, the students describe a particular life plan that they intended to follow based on external sources of information.

In some cases, this formula did not initially include post-secondary schooling. Mark, a White male born in 1983 had a difficult time in high school. He explains that "when I was in high school a little over a decade ago, I was a poor student because I had a narrow vision of what my future would be and reality had not yet kicked in." Having found school difficult, Mark sought a formula which would excuse him from the challenges he was facing in school. He continues "I didn't think that it was important to do my homework or study for exams because I was planning on making a career out of the military." Unfortunately, this life path was cut short for Mark due to a chronic condition where blood clots formed in his legs and he was forced to accept a medical discharge soon after enlisting. With his hopes of pursuing a life path based around a structured life in the military derailed, Mark sought another formula that would allow him success. He explains that he felt a great deal of external pressure to find a path to success because "given my poor performance in high school I felt discouraged and I was afraid of failing and disappointing my family again." The next formula he therefore arrived at was "to find a company that I could work my way up the company latter [sic] and maybe make a decent living." As will be seen later, successive stages of personal development and life events eventually culminated in Mark taking a different course.

For others, college was a part of the formula from the beginning, but an underdeveloped sense of purpose and direction left them ill-equipped to succeed on their first attempt. John, a male applicant born in 1987 with undeclared racial or ethnic identity went directly to community college after graduating high school and even matriculated to a four-year school. He describes his initial attempt at attaining a four-year degree as follows:

> I have had quite an elongated education at this point. I started out of high school at Wake Technical Community College. I spent a few years there trying to decide what I wanted to do when I grew up. Then I finally decided I wanted to study in the medical field, being specifically interested in physical therapy. Luckily, I had good enough grades to be accepted into East Carolina University and there [I thought] I would graduate. I used to refer to my education as taking the long path, the six year plan. But ultimately that plan failed. That plan failed in Greenville because I was not dedicated enough to myself, my studies, and my future.

Like Mark, John's initial attempt at following a formula faced limited success because it was based upon a weak understanding of himself, his capabilities, and what his future would entail. While he entered community college, chose an area of study, and even gained entry to a university, his commitment to this life path was initially weak. He therefore held a complacent view toward his timeline for graduation (e.g., "the six-year plan") and earned such poor grades that he ultimately withdrew from the university without graduating and with a GPA that he describes as "laughable."

For others, a high degree of success may have been attained in college and even in the pursuit of a post-graduate degree. Yet for these students, outside influence prescribed a formula that was ultimately unsuitable. For Annie, a woman of mixed White and Asian background born in 1969, the influence of her family steered her away from the career she otherwise would have aspired to in nursing. She describes this experience as follows:

> In college I studied Computer Science and Psychology at my fathers' request, even though I continued to talk about a career in nursing. My dad insisted that my current major's [sic] were best for me. I found out quickly that I really did not have the aptitude required for a major in Computer Science, and I really missed taking science classes like Biology and Chemistry. In my second year at college I failed all my CS related classes, the Dean of Academics decided this was related to the death of my mother and I was allowed to

> continue my studies as long as I was able to maintain a certain academic standard. After graduation, I found my first job in a hospital, putting my psychology skills to use by counseling drug treatment patients, I loved the hospital so much, I applied to Nursing School. I was accepted, but once again, advised to continue my education in the field of Psychology. I completed a Master's Degree in Experimental Psychology while doing research with drug study patients.

Although she encountered some difficulty in her studies in computer science due to lack of "aptitude" in the field, Annie thrived in psychology apparently because it was more closely related to her preferred field of nursing. After earning her bachelor's and master's degrees, Annie even gained entrance into a PhD. program in psychology (though she did not complete it). Her academic success was accompanied, however, by a growing feeling that she was not following the lifepath and formula that she would have chosen were it not for the strong outside influence of her father and other family members.

Cross-Roads

The students in the sample then face a readjustment period after the formula they have followed fails them in some way. Baxter Magolda (2001, 2004, 2008, 2009) refers to this period as the "cross-roads" where a student's internal voice begins to emerge, and the student slowly builds trust in this voice. Sometimes the cross-roads stage is spurred on by a discrete event referred to by King et al. as a Developmentally Effective Experience (DEE). For Shannon, a White female applicant born in 1983 the DEE comes during a stint in prison. As she says:

> As a 19-year-old sitting in prison, I often asked myself: "How did this happen?" Eventually I matured and realized that the answer to that question is that it happened because of choices I made. It had nothing to do with how I was raised. It had nothing to do with my socio-economic background. It had nothing to do with my family. It had everything to do with me and making poor choices. I vowed that I would never again do anything to cause me to see the inside of prison walls and that I would do everything I could to better my life. After being released from prison at the age of 22, I wasn't sure what I wanted to do. I started attending community college classes the semester after I was released. I was trying to find the career path that would suit me.

While the traumatic experience of being in prison prompted the emergence of an internal voice for Shannon, and she felt strongly that she needed to do "everything I could to better my life" she

also felt an equally strong sense of uncertainty about "what I wanted to do." The cross-roads is often a very prolonged and equivocal stage. For Shannon the cross-roads experience accompanied with this sense of uncertainty continues through many other life events before she reaches a firm resolution about what she wants out of life.

This extended period of uncertainty and difficulty in trusting an emerging internal voice is paralleled in Annie's story. Annie's internal voice first began steering her in the direction of the nursing profession at the age of 13. She says that she remembers "waking up one morning long ago, when I was just 13 years old, and announcing to my family that I was going to be a nurse when I grew up. Everyone laughed at me." Discouraged from a career in medicine by family members throughout her life, it would take many years for Annie to fully trust her internal voice and absorb the impact of a DEE in the form of her mother's terminal illness:

> The reason I chose the field of medicine, so long ago, was because I wanted to make people feel better. My mother was sick while I was growing up, and I wanted to make her better. When I have worked with patients, I have been told that I was both caring and compassionate. An education in psychology has allowed me to learn a lot about counseling and I like to use these skills when working with patients and staff.

Annie's choice of psychology was a compromise between the field that she desired internally, nursing, and her father's externally imposed demands that she not pursue a career that he felt was not a wise choice. Getting multiple degrees in psychology allowed Annie to work in a hospital setting and to care for people, though not in the way that she had felt drawn to from early on. This left her with a lingering feeling of dissonance and unfulfillment at "having always wanted to work in the medical field" because of "the patients, the hard work, the challenging situations you are placed in, the new experiences and amount of learning you do" which were "all reasons I would love to be a nurse." The journey through the cross-roads and into self-authorship can therefore be a long one spanning an entire productive career.

Annie's experiences in the cross-roads is echoed in the personal statement from Oscar, a White and Hispanic male born in 1984. After completing high school and serving in the military through multiple tours of duty in a war zone and returning to civilian life where he attained economic security, Oscar began to feel unfulfilled in his job. This feeling of dissonance became particularly intense after an invigorating experience during a shift as a volunteer fire-fighter. Oscar explains:

> One particular example I'll briefly describe, was watching my friends and EMT's bring a man back to life after his body was cold to the touch. Any logical person would of [sic] given up. Every drug cocktail had been tried, with the family weeping, pleading us to bring him back. Damned if we didn't. The combination of determination, medical science, and time brought a pulse back to a cold body. It was the most powerful thing I've ever seen. Two deployments to Iraq, thousands of situations come and gone, and that moment the ambulance rushed off to the hospital left me with a feeling of fulfillment I've never experienced before. My daily job does not possess the reward a job like that provides. My new car, home, and vacations may indicate a successful life to many. I've worked hard to be where I am. But I believe it's thanks to this that I've realized that this isn't all that I'm capable of. I've learned that mere income isn't rewarding personally. The hobbies I've had, don't need to be hobbies at all.

The drama of the experience of helping his EMT colleagues employ the knowledge and skills needed to "bring a man back to life" was enough to persuade Oscar that he should apply for an undergraduate degree in order to begin the long process of becoming a doctor. Oscar's strong commitment to this goal and his willingness to act upon and trust the insights he gains from his "internal voice" demonstrate his move from the cross-roads stage to self-authorship.

Self-Authorship

The narratives that students advanced in their personal statements are heavily structured around the emergence of the internal voice which Baxter Magolda views as so central to self-authoring ability. As has been seen in the sections above, the early stages of these testimonials are characterized by the students' personal submission to externally imposed formulas that guide them onto a lifepath that they are often not strongly committed to. DEEs in the form of major life events tend to disrupt these formulas and sew dissonance in the minds of the participants. With

the onset of this dissonance students enter a phase where the internal voice begins to emerge but struggles to gain primacy over the lingering influence of external forces. Around the mid-point of the personal statements' narrative arcs however, the tide begins to turn. The participants' self-authoring abilities emerge, first with the growing potency of their internal voice.

In its most basic form, this voice emerges again and again in the personal statements as an often-repeated phrase "I want more." Many of the participants feel that the trajectory that following external formulas has placed them on is not sufficient. Andrew a White male born in 1974, who earned a computer science bachelor's degree, but graduated into the 2008 financial crisis and could not find a job out of college, puts it this way "I have made the choice that I want more out of life than hiding in the country on a friend's farm." Similarly, John says "I am not happy with just two associate degrees. I still want more. I want a bachelor's degree and more." This inner voice which inspires the participant to believe they are capable and deserving of getting "more out of life" is translated into action through the intrapersonal, interpersonal, and epistemological developmental areas discussed by Kegan (1982, 1994) and Baxter Magolda (2001, 2004, 2008, 2009). This statement itself depends on an assessment of one's self as worthy, it is a claim to an identity that is valid and deserving of consideration. For Andrew, this thought pattern is bolstered by an epistemological consideration of how he hopes knowledge will change the way he interacts with the world. As he considers what field to move into, he reflects on which area of study is likely to enrich his life the most:

> When I decided to change careers, I looked at my hobbies to determine which would be the best financially viable to help me achieve my long term goals. Gardening was the one I knew the least about yet most viable. Getting an education in agriculture will not only give me the chance for independence, but also enrich my enjoyment of gardening.

Andrew's internal voice helps him arrive at the conclusion that he not only has self-worth but that he can proactively change his life and circumstances by increasing his understanding of agriculture and gardening. Andrew's higher-level functions in decision making and meaning making seem to be primarily located in the epistemological and intrapersonal areas. Though he references living on a friend's farm, he does not discuss interacting with this friend as a way of strengthening his inner voice through insights gained or expressed through outside relationships.

Mark, who was discharged from the military for medical reasons was forced out of one life formula and immediately sought another. In spite of his father's "feverish attempts" to get him to consider college after the discharge, Mark chose a course that he felt would spare him the inadequate feelings he associated with school. He says he spent:

> About 4 years working in a grocery store as a Meat Cutter and Assistant Meat Market Manager, while also spending that time maturing and reevaluating my objectives and lifestyle. I began to come to the conclusion that this was not the life I wanted to live and I was too smart to limit my life to a grocery company.

Thus, Mark's father's advice worked its way into his own internal voice. Mark grew in maturity and was able to vet insights gained through an interpersonal relationship and come to his own decision about whether to follow them. For Mark this spurred a gradual intrapersonal reassessment of what he was capable of. This led him to secure an associate's degree in turf grass management and apply to NC State to complete a 4-year degree.

Some of the participants were able to pinpoint the moment that the internal voice emerged decisively. Shannon's experience was particularly dramatic.

> After a period of what I deem success in not making poor choices. I made one. Unfortunately, I ended up in a domestic violence situation as a result. However, good did come of this situation. It was during this period of my life that I realized what I was meant to do. During this two-year period, the only happiness and comfort I had were my two dogs. They knew how to help me and never had to say a word. When I removed myself from the situation, I took with me a newborn baby girl and two Boxers. I promised all three that we would never live like that again and that no matter what I would find a way. Throughout all of

this, I realized that animals, especially dogs, are my passion. Not only do I hope to one day become a veterinarian and be able to help dogs in a physical manner, but I also hope to be a voice for them as well.

In Shannon's recounting of this harrowing experience, she demonstrates a number of additional elements of self-authorship. According to Baxter Magolda, self-authorship emerges when one begins trusting the internal voice, building an internal foundation, and securing internal commitments (2001, 2004, 2008, 2009). Shannon's trust of her internal voice grew from the relationship that she formed between herself, her two dogs, and her infant daughter. The unspoken comfort and encouragement that Shannon felt she received from her dogs helped her to process her emotions and thoughts in relation to her abuse. Being non-verbal, the dogs may have acted as a medium for Shannon as she channeled and clarified her internal voice. With the support of her dogs as a proxy for her own growing strength, she builds the internal foundation necessary to take the step to remove herself from an abusive relationship. The commitment that she makes to the dogs and her baby, is both external and internal, as she says she will "never live like that again". Furthermore, she makes the commitment to actually "become a voice" for dogs and other animals beginning with her pursuit of a degree in animal science at NC State CALS.

Annie's aspiration to attain a degree from CALS represents not only a culmination of self-authorship, but also a continuation of it. Having returned to school for a nursing degree in another institution, she discovers an affinity for nutrition as a discipline and finds a way to incorporate this into her other competencies:

> I have been going to school to become a nurse for the past 3 years, I had completed several science and clinical courses when I took a course in Nutrition; it changed my life. Suddenly I found this wonderful way for me to combine all my former education with my current education, use it to benefit my family and have a career. I hope to study nutrition at NCSTATE and go on to become a clinical nutritionist, I will use my current clinical skills and my previous psychology skills to work in patient care with numerous people in the future. I also plan to complete my clinical rotations so that I can become a Registered Nurse.

By returning to school to fulfill her lifelong dream of becoming a nurse, Annie demonstrates that she has overcome outside influences and ascended to the stage of self-authorship. But she also displays the ability to continue to exercise this ability and act to change her world. She does not become tethered to her lifelong aspiration for its own sake but continues to modify and reconceptualize what she wants from life based on the new information she receives from the course she took in nutrition which "changed her life". She merges her passion for nursing and nutrition into the new goal of becoming a clinical nutritionist. For the students in the sample, applying to CALS and attaining a degree from the college is often either the pinnacle of their aspirations toward self-authorship or a continuation of this ability.

There is no doubt that these higher-level capabilities play an important role in shaping the performance of nontraditional students as they return to school. Institutions must find ways to leverage this quality which this study shows is demonstrated by many nontraditional students to help ensure that they attain the goals that they are strongly committed to but face greater adversity in attaining.

Recommendations

There is a paradox at the heart of this study. That is, while it is apparent this group of nontraditional students tended to possess advanced self-authoring abilities that are generally understood to be beneficial for undergraduate student success, they also belong to a group that is at elevated risk of dropping out (Goings, 2016). Markle (2015) has highlighted the difficulties that nontraditional students face as they attempt to carry on their responsibilities in multifaceted lives. The nontraditional students in this study give a detailed accounting of challenges that they

have faced in life prior to returning to school including physical and mental trauma, abuse, illness, injury, justice system involvement, and more. The students in this study demonstrate growth from these experiences, yet they are also likely left with ongoing challenges as a result (Markel, 2015). Targeted efforts to connect nontraditional students with physical and mental health services could be helpful to ensuring that members of this group continue on a growth trajectory.

Finding ways of allowing nontraditional students to share their life experiences with younger undergraduates should also be explored as a possible intervention. Pairing older and younger students for casual meetings in-person or virtually could facilitate a kind of two-way mentoring. Nontraditional students might gain some of the skillsets that are specific to the fast-changing world of undergraduate education while traditional students could learn about aspects of the work world which will allow them to be successful post-graduation.

The students in our study also alluded to family and work responsibilities which other authors have shown take a larger share of nontraditional students' time as compared to other undergraduates (Goings, 2016; Markel, 2015). Institutional investment in and facilitation of childcare could play an integral part in releasing nontraditional parents, especially mothers, from some of their family duties and allowing them to focus their attention on their studies.

Finally, we believe that nontraditional students may benefit from a more specialized approach to the curriculum and instruction that they are exposed to. More research should be done to identify

what conditions allow nontraditional students to bring their prior experience with time management and self-directed learning to bear in a university environment.

Summary

Many of the nontraditional students in this narrative analysis demonstrated a recognition of the value of their own life experiences. They articulated a logical, and generally consistent progression through the stages of development which have been identified by Baxter Magolda as "following formulas", "the cross-roads", and finally "self-authorship." They recounted challenges and traumas which, though often painful, they interpreted as instructive and a catalyst for growth. These students recounted a diverse set of experiences that led them to make the choice to return to school and chart a new course in life that was important to their expression of agency and self.

This study contributes insights on how universities and colleges can utilize personal statements in a way that goes beyond facilitating enrollment decisions. Assessing students' developmental history at the point of applying to a program could help lead to deeper insights into the abilities and challenges that students possess at the outset of their undergraduate career. More research should be done on how self-authoring abilities can be leveraged among nontraditional students to help them overcome the unique set of obstacles that limit their success as a group. Nontraditional students, their experiences, and abilities represent a resource that is too valuable to be squandered. Universities must investigate creative ways to support them and allow them to integrate more fully into the undergraduate learning environment. Accomplishing this could enhance the richness of education for all students.

REFERENCES

Abes, E. S., and S.R. Jones. 2004. Meaning-making capacity and the dynamics of lesbian college students' multiple dimensions of identity. Journal of College Student Development, 45(6):612-632.

Baxter Magolda, M. B. 2001. Making their own way: Narratives for transforming higher education to promote self-development. 1st ed. Sterling, VA: Stylus.

Baxter Magolda, M. B. 2004. Self-authorship as the common goal of 21st century education. In M. B. Baxter Magolda and P. M. King (Eds.), Learning partnerships: Theory and models of practice to educate for self-authorship. Sterling, VA: Stylus.

Baxter Magolda, M. B. 2008. Three elements of self-authorship. Journal of College Student Development, 49(4):269-284.

Baxter Magolda, M. B. 2009. Authoring your life: Developing an internal voice to navigate life's challenges.1st ed. Sterling, VA: Stylus.

Baxter Magolda, M. B., P.S. Meszaros and E.G. Creamer. (eds.). 2010. Development and assessment of self-authorship: Exploring the concept across cultures. Sterling, VA: Stylus.

Boes, L. M., M.B. Baxter Magolda and J.A. Buckley. 2010. Foundational assumptions and constructive-developmental theory. In M. B. Baxter Magolda, E. G. Creamer, and P. S. Meszaros (Eds.), Development and assessment of selfauthorship exploring the concept across cultures. Sterling, VA: Stylus.

Creswell, J. W., and C.N. 2017. Qualitative inquiry and research design: Choosing among five approaches. 4th ed. Thousand Oaks, CA: Sage Publications.

Denzin, N. K., and Y.S. Lincoln. 2000. The discipline and practice of qualitative research. In N. K. Denzin and Y. S. Lincoln (Eds.), Handbook of qualitative research. Thousand Oaks, CA: Sage Publications.

Essers, C. 2009. Reflections on the narrative approach: Dilemmas of power, emotions and social location while constructing life-stories. Organization, 16(2):163-181.

GlenMaye, L., and M. Oakes. 2002. Assessing suitability of MSW applicants through objective scoring of personal statements. Journal of Social Work Education, 38(1):67-82.

Goings, R. B. 2016. (Re)defining the Narrative. Adult Education Quarterly, 66(3):237-253.

Guba, E. G. 1981. Criteria for assessing the trustworthiness of naturalistic inquiries. Educational Communication Technology, 29(2):75-91

Kegan, R. 1982. The evolving self: Problem and process in human development. Cambridge, MA: Harvard University Press.

Kegan, R. (1994). In over our heads: The mental demands of modern life. Cambridge, MA: Harvard University Press

King, P. M., M.B. Baxter Magolda, J.P. Barber, M.K. Brown and N.K. Lindsay. 2009. Developmentally effective experiences for promoting self-authorship. Mind, Brain, and Education, 3(2):108-118.

Krefting, L. 1991. Rigor in qualitative research: The assessment of trustworthiness. American Journal of Occupational Therapy, 45(3):214-222.

Lieblich, A., R. Tuval-Mashiach, and T. Zilber. 1998. Narrative research: Readings, analysis, interpretation. Thousand Oaks, CA: Sage Publications.

Linzmeier, K. 2014. Deconstructing "non-traditional": What it means to be a "non-traditional" undergraduate student. PhD Diss., Dept. of Education, Univ. of Wisconsin Madison, 125 S Webster St, Madison, WI 53703

Markle, G. 2015. Factors influencing persistence among nontraditional university students. Adult Education Quarterly, 65(3):267-285.

Merriam, S. 2009. Qualitative Research and Implementation. 1st ed. San Francisco, CA: Jossey -Bass.

Mishler, E. G. 1995. Models of narrative analysis: A typology. Journal of Narrative and Life History, 5(2):87-123.

Perry, W. G. 1970. Forms of intellectual and ethical development in the college years: A scheme. Troy, MO: Holt, Rinehart, and Winston.

Pizzolato, J. E. 2003. Developing self-authorship: Exploring the experiences of high-risk college students. Journal of College Student Development, 44(6):797-812.

Pizzolato, J. E. 2004. Coping with conflict: Self-authorship, coping, and adaptation to college in first-year, high-risk students. Journal of College Student Development, 45(4):425-442.

Saldaña, J. 2015. The coding manual for qualitative researchers. 4th ed. Thousand Oaks, CA: Sage Publications.

Stets, J., and P. Burke. 2000. Identity Theory and Social Identity Theory. Social Psychology Quarterly, 63(3):224-237.

Syed, M., and M Azmitia. 2008. A narrative approach to ethnic identity in emerging adulthood: Bringing life to the identity status model. Developmental psychology, 44(4):1012.

Torres, V. 2003. Student diversity and academic services: Balancing the needs of all students. In G. L. Kramer (Ed.), Student academic services: An integrated approach. San Francisco, CA: Jossey-Bass.

Torres, V., and M.B. Baxter Magolda. 2004. Reconstructing Latino identity: The Influence of cognitive development on the ethnic identity process of Latino students. Journal of College Student Development 45(3):333-347.

Torres, V., and E. Hernandez. 2007. The influence of ethnic identity development on self -authorship: A longitudinal study of Latino/a college students. Journal of College Student Development, 48(5):558-573.