

**Exploring Factors Associated with Graduation Outcomes at Rural Community Colleges:
Implications for Agricultural Education**

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Introduction / Need for Research

Agricultural education has long played a critical role in preparing students for careers in food, fiber, and natural resources industries, particularly in rural communities (Roberts, Harder, & Brashears, 2016). These communities are often served by rural community colleges (RCCs), which provide essential access to postsecondary education and workforce development (Cohen, Brawer, & Kisker, 2014). Despite their importance, many RCCs face challenges related to student success and degree completion (Bailey, Jaggars, & Jenkins, 2015). Graduation rates at these institutions vary widely, and little is known about the institutional characteristics that influence these outcomes. This study was designed to explore institutional patterns that may be associated with higher graduation outcomes at RCCs, with a particular interest in implications for agricultural education. Many rural community colleges offer associate degrees in agriculture or related fields, which serve as a pipeline to four-year colleges and universities offering bachelor's degrees in agriculture, food, and natural resources. Understanding which institutional characteristics support student success can inform recruitment, retention, and curriculum strategies within school-based agricultural education (SBAE) programs. The purpose of this study was to identify institutional characteristics associated with stronger graduation outcomes at RCCs and determine whether those characteristics distinguish high-performing institutions. The research objectives were: (RO1) identify common features among RCCs with higher graduation rates; and, (RO2) determine if traits exist that reliably differentiate RCCs with high versus low student success.

Theoretical Framework

This study is grounded in Tinto's Theory of Student Departure (1975) and Human Capital Theory (Becker, 1993). Tinto's model suggests that student retention is influenced by both academic and social integration into the institution, while Human Capital Theory supports the idea that education, particularly when accessible and affordable, enhances individual and societal economic outcomes. These theories are useful in framing the role of rural community colleges as both community access points and engines for workforce and leadership development in agriculture and related sectors.

Methods

This quantitative study analyzed 2022–2023 data from the Integrated Postsecondary Education Data System (IPEDS) to examine institutional characteristics associated with graduation outcomes at rural community colleges (RCCs). Using NCES locale codes, the dataset was filtered to include 190 public, two-year institutions classified as rural. Variables included in-state and out-of-state tuition, open admission status, gender and race composition, and graduation rates by financial aid type (Pell Grant, loan-only, and no aid). Institutions with incomplete data were excluded. All continuous variables were standardized prior to model estimation to allow direct comparison of effect sizes across predictors and to improve model stability.

Results / Findings

To address Objective 1, ridge regression was used to examine how institutional characteristics predicted graduation outcomes at rural community colleges (RCCs). The model explained 94% of the variance in graduation rates ($R^2 = 0.939$) with a very low mean squared error ($MSE = 0.0013$), indicating high model accuracy. The most influential predictors were the standardized completion rates among students receiving no federal aid ($\beta = 0.066$) and Pell Grant recipients ($\beta = 0.058$). A one-standard deviation increase in either rate corresponded to roughly a 6% gain in overall graduation rate, underscoring the importance of supporting both economically disadvantaged students and those outside the aid system. Smaller effects were observed for percent male ($\beta = 0.006$) and percent nonwhite ($\beta = -0.009$). Remote locale ($\beta = -0.004$) and open-admission policy ($\beta = -0.004$) were negatively related to graduation rate, while tuition levels showed negligible influence ($|\beta| < 0.002$). Overall, financial-aid completion and institutional location emerged as the strongest predictors of student success at RCCs.

To address Objective 2, a logistic regression model classified RCCs as having above- or below-average graduation rates using the same institutional predictors. The model correctly identified institutional performance in nearly nine of ten cases (accuracy = 87.7%) and demonstrated balanced precision (89.7%) and recall (86.7%) with an F_1 score of 88.1%. The $AUC-ROC = 0.878$ confirmed strong discriminatory power. Consistent with the ridge regression, Pell Grant and no-aid completion rates exerted the greatest positive influence on the likelihood of an institution being high-performing ($\beta = 2.994$ and $\beta = 2.609$, respectively). Fringe campuses were more likely to be high performers than remote ones ($\beta = -0.307$), slightly higher in-state tuition was positively associated with success ($\beta = 0.143$), and open-admission policies showed a modest negative relationship ($\beta = -0.227$). Collectively, these findings suggest that institutional context, particularly financial-aid completion and geographic remoteness, are key factors distinguishing high- and low-performing RCCs.

Conclusions / Implications / Recommendations

The findings of this study demonstrate that institutional characteristics meaningfully influence graduation outcomes at rural community colleges, particularly through financial aid completion and geographic context. Grounded in Tinto's Theory of Student Departure (1975) and Human Capital Theory (Becker, 1993), these results suggest that environments supporting academic and social integration, along with accessible and affordable education, are most conducive to student persistence and success. Investing in institutional systems that strengthen financial aid completion, reduce economic barriers, and address challenges associated with geographic isolation may help improve outcomes for students in agriculture and other rural programs. The implications for school based agricultural education (SBAE) are clear. Postsecondary agriculture programs benefit from policies that assist low income and nontraditional students, while secondary agricultural educators and FFA advisors can use these findings to guide students pursuing associate degrees or transfer pathways in agriculture. Identifying and studying high performing rural community colleges can inform partnerships such as articulation agreements, dual credit opportunities, and collaborative supports for underrepresented students. The performance differences among rural institutions also suggest a need to strengthen connections between secondary and postsecondary agricultural programs in remote areas, where students may face structural barriers to success. Future research should include case studies of high performing rural community colleges offering agriculture degrees, explore faculty and advising structures, and assess how industry partnerships and experiential learning opportunities contribute to improved student outcomes.

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