BABCOCK JOURNAL OF THE SOCIAL SCIENCES

VOL {17}, ISSUE {1}, {2026}

https://journal.babcock.edu.ng/j/BJSS

ISSN: P-ISSN2795-3378

ADMISSION CONSTRAINTS, COURSE ALLOCATION EFFICIENCY, AND GRADUATE LABOUR MARKET OUTCOMES IN FEDERAL UNIVERSITIES IN NORTH-CENTRAL NIGERIA

Oyemade M. OBAFEMI[1], Oyenike A. OYEBIYI[2] & Christiana O. ADEYANJU[3]

Department of Arts and Social Science Education
Lead City University, Ibadan, Nigeria,

Department of Educational Management
University of Ilorin, Ilorin, Nigeria
&
Department of Educational Technology
University of Ilorin, Ilorin, Nigeria

Abstract

This study examined the effect of admission constraints on course allocation efficiency and graduate labour market outcomes in six federal universities in North-Central Nigeria. Using an explanatory sequential mixed-methods design, informed by a review of Human Capital Theory (to model inefficiency costs of misallocated educational investment), Signalling Theory (to analyse credential distortions in information-asymmetric labour markets), and the Theory of Educational Mismatch (to link course allocation outcomes to earnings penalties and occupational misalignment), multi-stage stratified random sampling yielded a valid analytical sample of 837 respondents (416 final-year students; 421 graduates) from accessible populations of 33,940 students and 169,700 alumni. >Data were collected via the ACAGOS instrument (Cronbach's $\alpha = 0.87$). The study employed multiple regression technique. Findings revealed that 60.7% of respondents were enrolled in non-first-choice programmes. Admission constraints explained 42% of variance in course allocation efficiency, with carrying capacity constraints ($\beta = -.29$) and JAMB score thresholds ($\beta = -.28$) as strongest predictors. Course allocation efficiency significantly predicted academic performance ($R^2 = .34$), employment odds (OR = 2.27), occupational match ($R^2 = .38$), and earnings ($R^2 = .29$). Gender, socioeconomic background, and geographic origin moderated the constraint–outcome relationship. Data were analysed using multiple regression, binary logistic regression, and hierarchical regression. The study recommends reform of JAMB's cut-off architecture and carrying capacity ceilings.

Keywords*:* admission constraints, course allocation efficiency, graduate labour market outcomes, federal universities, North-Central Nigeria

BABCOCK JOURNAL OF THE SOCIAL SCIENCES

VOL {17}, ISSUE {1}, {2026}

https://journal.babcock.edu.ng/j/BJSS

ISSN: P-ISSN2795-3378

INTRODUCTION

Higher education systems worldwide navigate a persistent structural tension between expanding access and maintaining the quality alignment between graduate competencies and labour market demand. In Nigeria, the strain is particularly acute. Rapid growth in university enrolment has not been matched by commensurate expansion in institutional capacity, faculty quality, or programme-industry alignment, producing a system in which structural mismatches between students and their academic programmes have become a defining feature rather than an exception (Oketch et al., 2014; National Universities Commission [NUC], 2022). The North-Central geopolitical zone, which includes Benue, Kogi, Kwara, Nasarawa, Niger, Plateau states, and the Federal Capital Territory, offers an especially informative framework for studying these dynamics. The zone hosts numerous federal universities that serve as principal human capital development conduits for a socioeconomically diversified population, yet it has received significantly less empirical attention than the better-studied South-Western and South-Eastern zones.

The Joint Admissions and Matriculation Board (JAMB) administers the admission system for Nigerian federal universities, setting minimum Unified Tertiary Matriculation Examination (UTME) cut-off marks. Individual universities apply additional screening criteria, whilst the NUC establishes departmental carrying capacity ceilings and approves programme offerings. This multilayered regulatory apparatus, though designed to assure quality and promote equity, generates conditions in which a significant proportion of admitted students are placed in programmes that diverge substantially from their stated preferences, measured aptitudes, and career aspirations (Adeyemi, 2001; Nwagwu, 1997). The academic and economic effects of such structural misallocation extend across the entire educational lifecycle, reducing academic engagement, restricting human capital accumulation, and ultimately undermining graduates' labour market performance.

Course allocation efficiency, the extent to which students are placed in programmes that match their interests, abilities, and career goals is a theoretically and practically essential link in this causal chain. International research consistently demonstrates that student-programme fit predicts degree completion, professional competency development, and early career earnings (Allen & van der Velden, 2001; Capsada-Munsech, 2019). In Nigeria, Adeyemi (2001) documented that systematic mismatches between student preferences and programme placements are endemic in Nigerian universities, while Teichler (2007) documented considerably lower employability scores among graduates whose course assignments diverged significantly from their preferences. These effects

BABCOCK JOURNAL OF THE SOCIAL SCIENCES

VOL {17}, ISSUE {1}, {2026}

https://journal.babcock.edu.ng/j/BJSS

ISSN: P-ISSN2795-3378

represent a systemic loss of human capital that the Nigerian economy, already burdened by structural unemployment and underemployment, cannot afford.

Despite growing recognition of these difficulties, no previous study has addressed the entire admission-allocation-outcome causal chain using a single integrated analytical methodology tailored to the North-Central Nigerian context. Most existing research either evaluated admission policies in isolation (McCowan, 2016), concentrated on South-Western or South-Eastern Nigeria (Agboola et al., 2014; Darvas et al., 2017), or analysed labour market outcomes without tracing their educational antecedents (World Bank, 2019). This article fills that gap by presenting findings of a large-scale mixed-methods study designed to answer five interconnected research questions: What is the nature and scope of admission constraints in North-Central federal universities? How do these constraints affect course allocation efficiency? What is the relationship between course allocation efficiency and academic performance? How do course allocation outcomes influence graduate employment status, occupational match, and earnings? And what moderating roles do gender, socioeconomic background, and geographic origin play in this pathway? The article is structured as follows: Section 2 reviews theoretical and empirical literature; Section 3 details the methodology; Section 4 presents findings; Section 5 discusses implications; and Section 6 offers conclusions and recommendations.

LITERATURE REVIEW

Theoretical Framework

This study is informed by three complementary theoretical frameworks, each reviewed below. Human Capital Theory, first proposed by Schultz (1961) and systematically developed by Becker (1964), holds that investing in education increases individual productive potential and yields proportionate labour market returns. When admission constraints impair the matching of student characteristics with programme demands, educational investment is deployed inefficiently and returns are predictably lower. Goldin (2016) extended this framework to account for gender-differentiated returns, demonstrating that systematic differences in the conversion of educational investment into earnings partly originate in occupational sorting patterns that begin at the point of programme selection a dimension directly relevant to this study's examination of moderating effects. Signalling Theory, developed by Spence (1973) and complemented by Arrow's (1973) filter model, provides a second analytical lens. In information-asymmetric labour markets, educational credentials serve as indicators of worker quality for employers unable to directly observe productive ability prior to hiring. Admission constraints distort this signalling dynamic simultaneously in two

directions: capable students placed in non-preferred programmes earn credentials that understate their productive potential, while students placed in programmes for which they are inadequately prepared may acquire credentials that overstate domain-specific competency. Both distortions contribute to occupational mismatch and systematic underutilisation of graduate talent.

The Theory of Educational Mismatch, proposed by Freeman (1976) and developed by Verhaest and Omey (2006), provides a direct analytical link between course allocation and labour market outcomes. Leuven and Oosterbeek (2011) documented persistent earnings penalties of 10–30% associated with both vertical and horizontal mismatch forms across multiple national settings. The efficiency evaluation lens is further provided by Allocation Theory (Roy, 1951; Sattinger, 1993) and Gale and Shapley's (1962) formal matching framework: when individuals are assigned to activities in which they do not hold comparative advantages, aggregate welfare is reduced.

Admission Constraints in Nigeria and Sub-Saharan Africa

Admission constraints in Nigerian federal universities are multifaceted and institutionally entrenched. JAMB's UTME cut-off marks serve as the principal gatekeeping mechanism, supported by institutional cut-off marks, NUC-mandated carrying capacity ceilings, geographic catchment area quotas, and gender equity provisions (JAMB, 2023; NUC, 2023). Despite their stated quality-assurance rationale, the cumulative effect of these layered constraints has been documented to undermine rather than support efficient student-programme matching. Adeyemi (2001) demonstrated a consistent link between quota mechanisms and diminished access equity, yet critically did not model the downstream consequences for academic performance or graduate outcomes a gap the present study directly addresses. Similarly, Nwagwu (1997) established that the combination of quota systems and carrying capacity constraints structurally ensures involuntary course placement for a substantial proportion of candidates, but relied on institutional-level data that could not capture individual-level outcome variation. Taken together, these foundational studies identify the problem but stop short of quantifying its educational and economic costs. Comparative evidence from Sub-Saharan Africa deepens this picture: Darvas et al. (2017) documented a systemic mismatch between higher education outputs and labour market demands across the region, while the ILO (2020) highlighted the absence of post-admission support structures as a compounding factor. Crucially, neither study traced the pathway from admission policy to individual graduate outcomes, nor did either employ the integrated analytical framework adopted here. The present study thus builds on and advances this body of work by situating admission constraints within a testable causal model linking regulatory architecture to allocation quality and labour market performance.

BABCOCK JOURNAL OF THE SOCIAL SCIENCES

VOL {17}, ISSUE {1}, {2026}

https://journal.babcock.edu.ng/j/BJSS

ISSN: P-ISSN2795-3378

Course Allocation Efficiency and Academic Performance

The empirical evidence on programme-student fit and academic outcomes is broadly consistent across national contexts, though the mechanisms remain contested. Roksa et al. (2017) found that instructional quality significantly predicted cognitive gains and academic engagement, but their analysis focused on pedagogy rather than programme fit, leaving open the question of whether preference-satisfaction independently shapes student outcomes. Kebede et al. (2025) more directly addressed this, documenting that entry-point mismatches between student profiles and programme demands compound initial disadvantage a finding that aligns with the present study's analytical framework but was limited to a single-institution Ethiopian context and did not control for socioeconomic background. Ajufo (2013) demonstrated that structured career counselling mitigates the academic effects of mismatched placements, implying that institutional intervention can modulate but not eliminate misallocation harm. What these studies collectively underscore, and what none addresses within the Nigerian federal university system, is the need for an integrated, multi-institutional model that estimates not just whether mismatch affects performance, but by how much, for whom, and through what mechanisms. The present study fills this void.

Course Allocation Outcomes and Graduate Labour Market Performance

The labour market consequences of educational mismatch are well established internationally, though their magnitude and mechanisms vary by context in ways that have not been adequately examined within the Nigerian setting. Capsada-Munsech (2019) documented that overeducation and horizontal mismatch consistently generate earnings penalties and occupational misalignment across multiple national settings, though her analysis relied on European labour market structures that differ substantially from Nigeria's in terms of formal sector depth and occupational signalling norms. Allen and van der Velden (2001), drawing on European graduate data, similarly identified educational mismatch as a key predictor of earnings penalties and job dissatisfaction, but did not disaggregate effects by admission pathway or programme preference-satisfaction — the precise mechanism under investigation here. Teichler (2007) corroborated these patterns across fourteen countries, finding field-of-study match to be the single strongest predictor of early career earnings, yet his comparative framework did not include Sub-Saharan African systems characterised by different institutional constraints on student-programme matching. Taken together, this body of evidence establishes that mismatch matters economically, but it does not speak to the specific institutional pathways through

which it originates in regulated admission systems such as Nigeria's, a lacuna the present study addresses empirically among North-Central graduates operating within documented high graduate unemployment conditions (NBS, 2023).

METHODOLOGY

Research Design and Epistemological Orientation

This study employed a cross-sectional, explanatory sequential mixed-methods research design combining quantitative hypothesis testing with qualitative contextualisation of mechanisms. The design is rooted in a post-positivist paradigm that treats social reality as objectively structured and measurable, while acknowledging that observations are theory-laden and subject to measurement error (Creswell & Plano Clark, 2018). Quantitative data constituted the primary evidence base; qualitative open-ended responses from the survey instrument served to illuminate the processes through which admission constraints generate their documented effects and to contextualise quantitative patterns within respondents' lived experiences.

Study Area and University Selection

The study was conducted in the North-Central geopolitical zone of Nigeria. Six federal universities were purposively selected to ensure geographic spread across the zone's constituent states, institutional diversity in programme offerings and vintage, and sufficient variation in student population size: the University of Abuja (Federal Capital Territory), Joseph Sarwuan Tarka University Makurdi (Benue), University of Ilorin (Kwara), Federal University of Technology Minna (Niger), Federal University of Lafia (Nasarawa), and the University of Jos (Plateau). All six institutions are accredited by the NUC and subject to JAMB admission regulations, providing the regulatory homogeneity necessary for meaningful cross-institutional comparison.

Population of the Study

The target population comprised two distinct groups: (a) all final-year (400-level) undergraduate students enrolled at the six selected federal universities during the 2024/2025 academic session, and (b) all alumni who completed undergraduate degree programmes at the same institutions between 2019 and 2024. Final-year students were selected because they are the most recent recipients of the admission and course allocation process and can provide contemporaneous accounts of their admission experiences, perceived course fit, and current academic engagement. Graduates document downstream labour market consequences, enabling a reconstructed picture of the full admission-allocation-outcome pathway (Babbie, 2021).

BABCOCK JOURNAL OF THE SOCIAL SCIENCES

VOL {17}, ISSUE {1}, {2026}

https://journal.babcock.edu.ng/j/BJSS

ISSN: P-ISSN2795-3378

Population figures are presented in Table 1. Population figures for final-year students were derived from official convocation graduating class data published by each institution's registry and publicly reported at institutional press briefings in 2024, which constitute the most reliable proxy for registered final-year enrolment in the Nigerian federal university context (NUC, 2023). The five-year alumni pool for each institution was estimated by multiplying the annual graduating cohort by five, consistent with the study's 2019–2024 alumni coverage window. The total accessible population of final-year students across the six universities was 33,940, while the estimated five-year graduate alumni pool was 169,700.

Table 1

Population Distribution of Final-Year (400L) Students and Graduates Across Selected Federal Universities in North-Central Nigeria

University	**Final-Year 400L Students**	**Graduates (5-yr Alumni Pool)**	**Source**
University of Abuja	5,466	27,330	UNIABUJA Registry / 30th Convocation, 2024
Joseph Sarwuan Tarka Univ., Makurdi	3,671	18,355	JOSTUM Registry / Convocation avg, 2024
University of Ilorin	12,042	60,210	UNILORIN Registry / 39th Convocation, 2024
Fed. University of Technology, Minna	4,955	24,775	FUTMINNA Registry / 33rd Convocation, 2024
Federal University of Lafia	2,166	10,830	FULAFIA Registry / Combined Convocation avg, 2024
University of Jos	5,640	28,200	UNIJOS Registry / Combined Convocation avg, 2024
Total	**33,940**	**169,700**	

Note. Final-year (400L) population figures are derived from official institutional convocation graduating class data (2024) as reported at pre-convocation press briefings. These constitute the most reliable available proxy for registered final-year enrolment. Five-year alumni pool = annual graduating cohort × 5, covering the 2019–2024 window. Total accessible population: 400L students = 33,940; 5-year alumni = 169,700. Source: Institutional registry data (2024) and NUC (2023).

Sample Size Determination and Sampling Technique

BABCOCK JOURNAL OF THE SOCIAL SCIENCES

VOL {17}, ISSUE {1}, {2026}

https://journal.babcock.edu.ng/j/BJSS

ISSN: P-ISSN2795-3378

A multi-stage stratified random sampling procedure was employed to ensure representativeness across institution, respondent type, gender, and field of study. In the first stage, the six universities served as primary strata, with proportional allocation ensuring that each institution contributed respondents in direct proportion to its share of the total population. Within each institution, stratification was applied by respondent type (students vs. graduates) and broad faculty group (sciences and technology; social sciences and management; humanities and education; health sciences). Individual respondents were selected by simple random sampling from complete departmental student lists.

Institution-level sample allocations are presented in Table 2. Sample size was determined using the Yamane (1967) formula: $n = N / (1 + Ne^2)$, where N is the total population and e = 0.05 (margin of error). Applying this formula to the 400-level student population of 33,940 yielded a minimum sample of 395; applying it to the five-year alumni population of 169,700 yielded a minimum of 399. Both figures were adjusted upward by 15% to account for anticipated non-response, yielding desired samples of 454 students and 459 graduates (total desired: 913). Proportional stratified allocation — $n_i = (N_i / N) \times n$ — was then applied to distribute sample units across institutions, ensuring larger institutions contributed proportionately larger sub-samples.

Table 2

Sample Size Distribution Across Universities and Respondent Groups (N = 913)

University	400L Pop.	Student Sample	5-yr Alumni Pop.	Graduate Sample	Total
University of Abuja	5,466	73	27,330	74	147
Joseph Sarwuan Tarka Univ., Makurdi	3,671	49	18,355	50	99
University of Ilorin	12,042	161	60,210	163	324
Fed. University of Technology, Minna	4,955	66	24,775	67	133
Federal University of Lafia	2,166	29	10,830	29	58
University of Jos	5,640	75	28,200	76	151
Total	**33,940**	**454**	**169,700**	**459**	**913**

Note. Sample sizes determined by Yamane (1967) formula $n = N/(1+Ne^2)$ at e = 0.05, with a 15% non-response buffer, and proportionally allocated by $n_i = (N_i/N) \times n$. Student samples proportionate

BABCOCK JOURNAL OF THE SOCIAL SCIENCES

VOL {17}, ISSUE {1}, {2026}

https://journal.babcock.edu.ng/j/BJSS

ISSN: P-ISSN2795-3378

to institutional 400L graduating cohort; graduate samples proportionate to estimated five-year alumni pool. Figures rounded to the nearest whole number. Source: Authors' computation based on Yamane (1967).

For graduate respondents, alumni were identified through institutional alumni databases and departmental alumni associations; a hybrid approach combining random selection from available alumni rolls and purposive snowball sampling was employed to reach graduates not formally registered in alumni databases, consistent with established practice for hard-to-reach populations (Creswell, 2014). At the conclusion of data collection, 913 questionnaires were received. After removing questionnaires that were more than 20% incomplete or demonstrated systematic inattentive response patterns, and following univariate outlier screening (z-score threshold $|z| > 3.29$), the final valid analytical sample comprised 837 respondents, 416 final-year students and 421 graduates — representing an effective response rate of 91.7%. Chi-square tests confirmed no statistically significant demographic differences between the two sub-samples on any characteristic ($p > .05$ for all), establishing their comparability for analytical purposes.

Instrumentation and Psychometric Properties

The structure of the ACAGOS is presented in Table 3. Data were collected using the researcher-developed Admission Constraints, Course Allocation, and Graduate Outcomes Survey (ACAGOS), a 70-item structured questionnaire administered in two parallel versions: Version A for final-year undergraduate students and Version B for graduates. Both versions share common sections on demographic background, admission constraints, and course allocation efficiency, with version-specific sections capturing academic performance (students) and labour market outcome (graduates) data.

Table 3

Structure and Content of the Admission Constraints, Course Allocation, and Graduate Outcomes Survey (ACAGOS)

S/N	Section	Constructs Measured	No. of Items	Scale
A	Demographic Profile	Gender, State of Origin, SES Proxy, Study Programme	8	Nominal/Ordinal

BABCOCK JOURNAL OF THE SOCIAL SCIENCES

VOL {17}, ISSUE {1}, {2026}

https://journal.babcock.edu.ng/j/BJSS

ISSN: P-ISSN2795-3378

S/N	Section	Constructs Measured	No. of Items	Scale
B	Admission Constraints	JAMB Score Threshold, Quota Experience, Carrying Capacity, Catchment Restriction	18	5-point Likert
C	Course Allocation Efficiency	Preference Satisfaction, Academic Fit, Career Alignment	20	5-point Likert
D	Academic Performance (Students only)	Self-reported CGPA, Engagement, Effort	10	5-point Likert / Ratio
E	Labour Market Outcomes (Graduates only)	Employment Status, Occupational Match, Monthly Earnings	14	Ordinal/Ratio

Note. Items in Sections B and C use a five-point Likert scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly Agree. Items in Section E employ mixed scales appropriate to each outcome variable. Source: Authors' design (2024).

Validity

The validity of the ACAGOS was established through three complementary procedures. Content validity was assessed by a panel of twelve experts comprising specialists in educational measurement, higher education policy, and labour economics, as well as practitioners from JAMB and the NUC using a Content Validity Index (CVI) framework. Items achieving a CVI of 0.78 or above were retained; items below this threshold were revised or replaced (Lynn, 1986), resulting in the removal of six items and revision of fourteen from the initial draft. Face validity was confirmed through review by twelve final-year students and recent graduates from universities outside the main sample, after which minor linguistic adjustments were made to three items. Construct validity was assessed through exploratory factor analysis (principal axis factoring, Promax rotation) on pilot data, confirming the hypothesised factor structure with all retained items loading above 0.40 (KMO = 0.83; Bartlett's test $p < .001$).

Reliability

Reliability was established through a pilot study involving 60 respondents (30 students; 30 graduates) from universities outside the main study sample. Internal consistency was assessed using

BABCOCK JOURNAL OF THE SOCIAL SCIENCES

VOL {17}, ISSUE {1}, {2026}

https://journal.babcock.edu.ng/j/BJSS

ISSN: P-ISSN2795-3378

Cronbach's alpha, with a minimum acceptable threshold of 0.70 (Pallant, 2020). As presented in Table 4, all subscale and overall coefficients exceeded this threshold.

Table 4

Cronbach's Alpha Reliability Coefficients for ACAGOS Subscales

Subscale / Construct	No. of Items	Cronbach's Alpha (α)	Interpretation
Admission Constraints (JAMB Threshold)	5	0.81	Good
Admission Constraints (Quota/Carrying Capacity)	7	0.78	Acceptable
Admission Constraints (Catchment/Geographic)	6	0.76	Acceptable
Admission Constraints (Gender/Equity Quota)	4	0.79	Acceptable
Course Allocation: Preference Satisfaction	7	0.84	Good
Course Allocation: Academic Fit	7	0.79	Acceptable
Course Allocation: Career Alignment	6	0.82	Good
Academic Performance Engagement (Students)	10	0.80	Good
Labour Market Outcomes (Graduates)	14	0.83	Good
Overall Instrument	70	0.87	Good

Note. Cronbach's alpha computed on pilot study data (n = 60). Interpretation thresholds: $\alpha \geq 0.90$ = Excellent; $0.80 \leq \alpha < 0.90$ = Good; $0.70 \leq \alpha < 0.80$ = Acceptable (Pallant, 2020). No subscale fell below the minimum threshold of 0.70. Source: Pilot study data (2024).

Data Collection and Analysis

A summary of research questions, hypotheses, and statistical techniques is presented in Table 5. Data were collected between October and December 2024 following receipt of institutional ethical clearance and written permissions from institutional gatekeepers. Trained research assistants administered questionnaires in person to student respondents during lecture-free periods; graduate respondents were reached via alumni offices, email distribution of an online questionnaire, and departmental alumni networks. All respondents provided written informed consent and were assured

BABCOCK JOURNAL OF THE SOCIAL SCIENCES

VOL {17}, ISSUE {1}, {2026}

https://journal.babcock.edu.ng/j/BJSS

ISSN: P-ISSN2795-3378

of anonymity and voluntary participation. Quantitative data were analysed using IBM SPSS Statistics Version 27. The primary estimation techniques employed were multiple regression (to test the predictive relationship between admission constraints and course allocation efficiency, and to model occupational match and earnings outcomes), binary logistic regression (to estimate graduate employment odds), and hierarchical multiple regression (to test moderating effects of gender, socioeconomic background, and geographic origin).

Table 5

Summary of Research Questions, Hypotheses, and Data Analysis Techniques

Research Question / Hypothesis	**Statistical Technique**	**Rationale**
RQ1: Nature and scope of admission constraints	Descriptive statistics (means, SD, frequencies, cross-tabulations)	Characterises extent and perceived severity of each constraint type across the sample
RQ2 / H01: Admission constraints → course allocation efficiency	Multiple Regression; Pearson Correlation	Tests predictive relationship; quantifies effect size (R^2)
RQ3 / H02: Course allocation efficiency → academic performance	Pearson Correlation; Simple Linear Regression; One-way ANOVA with Tukey post-hoc	Tests relationship between CAE Index and CGPA/AEI; compares means across preference groups
RQ4 / H03 & H04: Course allocation outcomes → labour market	Binary Logistic Regression (employment); OLS Multiple Regression (earnings, occupational match)	Appropriate to measurement level of each outcome variable
RQ5 / H05: Moderating roles of gender, SES, geographic origin	Hierarchical Multiple Regression with interaction terms; ANCOVA	Tests moderation through interaction terms; controls for admission constraint severity
General / Demographic profiling	Frequency tables, cross-tabulations, chi-square tests	Describes sample; verifies sub-sample comparability

Note. All quantitative analyses conducted at significance level α = .05 (two-tailed). Qualitative analyses conducted using NVivo Version 14. Source: Authors' design (2024).

BABCOCK JOURNAL OF THE SOCIAL SCIENCES

VOL {17}, ISSUE {1}, {2026}

https://journal.babcock.edu.ng/j/BJSS

ISSN: P-ISSN2795-3378

RESULTS

Demographic Profile of Respondents

The valid analytical sample of 837 respondents comprising 416 final-year students and 421 recent graduates was approximately balanced by gender (56.1% male; 43.9% female), closely mirroring the gender composition of undergraduate enrolment in North-Central federal universities. Field of study distribution reflected the stratified sampling design: sciences and technology (31.6%), social sciences and management (28.9%), humanities and education (25.1%), and health sciences (14.4%). Socioeconomic background was distributed across all five quintiles, with the majority (72.1%) falling within the lower-middle to middle-income range (ILO, 2020). Chi-square tests confirmed no statistically significant demographic differences between student and graduate sub-samples ($p > .05$ for all characteristics), establishing their comparability for analytical purposes.

Nature and Scope of Admission Constraints

Descriptive statistics for the four admission constraint subscales are presented in Table 6. Only 39.3% of all respondents (n = 329) reported admission to their first-choice programme. A further 33.1% (n = 277) were placed in their second-choice programme, while 27.6% (n = 231) more than one in four were admitted to a programme they had not applied for at all. In aggregate, 60.7% of the combined sample experienced some degree of involuntary or suboptimal course allocation, consistent with Adeyemi's (2001) documentation of systematic mismatches. This pattern was statistically indistinguishable between student and graduate sub-samples ($\chi^2 = 0.58$, $p = .45$), confirming it as a persistent structural feature of the admission system.

Table 6

Descriptive Statistics for Admission Constraint Subscales (N = 837)

Constraint Subscale	Students M (SD)	Graduates M (SD)	Total M (SD)	Rank
JAMB Score Threshold	3.82 (0.71)	3.79 (0.68)	3.81 (0.70)	1st
Quota & Carrying Capacity	3.64 (0.83)	3.61 (0.80)	3.63 (0.82)	2nd
Catchment Area & Geographic	3.31 (0.92)	3.28 (0.89)	3.30 (0.91)	3rd
Gender & Equity Quotas	2.94 (1.04)	2.91 (1.02)	2.93 (1.03)	4th
Overall Constraint Index	3.43 (0.65)	3.40 (0.62)	3.42 (0.64)	—

BABCOCK JOURNAL OF THE SOCIAL SCIENCES

VOL {17}, ISSUE {1}, {2026}

https://journal.babcock.edu.ng/j/BJSS

ISSN: P-ISSN2795-3378

Note. Constraint subscales measured on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Means are virtually identical across student and graduate sub-samples, indicating stable constraint severity over the five-year study window Source: Field survey data (2024).

4.3 Hypothesis 1: Admission Constraints and Course Allocation Efficiency

Multiple regression analysis with the four admission constraint subscales as predictors and the Course Allocation Efficiency (CAE) Index as the criterion variable yielded a statistically significant model: $F(4, 832) = 188.42$, $p < .001$, $R^2 = .42$, adjusted $R^2 = .42$. Full regression results are presented in Table 7. All four predictors contributed significantly and negatively. Carrying capacity constraints emerged as the strongest predictor ($\beta = -.29$, $t = -10.14$, $p < .001$), followed by JAMB score threshold constraints ($\beta = -.28$, $t = -9.87$, $p < .001$), catchment area restrictions ($\beta = -.21$, $t = -7.63$, $p < .001$), and gender equity quota constraints ($\beta = -.12$, $t = -4.22$, $p < .001$). Prior to interpreting these results, standard regression assumptions were verified. Residuals were approximately normally distributed as assessed by inspection of the normal P-P plot and a non-significant Kolmogorov-Smirnov test ($D = 0.031$, $p = .08$). Homoscedasticity was confirmed via Levene's test ($p = .21$) and visual inspection of residual-versus-fitted scatterplots, which revealed no systematic pattern. Multicollinearity was assessed using Variance Inflation Factors (VIF): all VIF values fell below 3.0 (range: 1.14–2.67), well within acceptable limits (Field, 2018). Independence of residuals was confirmed by a Durbin-Watson statistic of 1.97. The combined model explained 42% of the variance in course allocation efficiency, suggesting that admission policy characteristics are a substantive correlate of allocation quality in this context. Hypothesis 1 was rejected.

Table 7

Multiple Regression: Admission Constraints Predicting Course Allocation Efficiency

Note. $N = 837$. $R^2 = .42$, $F(4, 832) = 188.42$, $p < .001$. β = standardised regression coefficient. CI = confidence interval.

Predictor	B	SE B	β	t	P	95% CI
Constant	5.21	0.18	—	28.94	< .001	[4.86, 5.56]
JAMB Score Threshold	−0.39	0.04	−.28	−9.87	< .001	[−0.47, −0.31]
Quota & Carrying Capacity	−0.35	0.03	−.29	−10.14	< .001	[−0.42, −0.28]
Catchment Area & Geographic	−0.23	0.03	−.21	−7.63	< .001	[−0.29, −0.17]

BABCOCK JOURNAL OF THE SOCIAL SCIENCES

VOL {17}, ISSUE {1}, {2026}

https://journal.babcock.edu.ng/j/BJSS

ISSN: P-ISSN2795-3378

Predictor	B	SE B	β	t	P	95% CI
Gender & Equity Quotas	−0.11	0.03	−.12	−4.22	< .001	[−0.16, −0.06]

Hypothesis 2: Course Allocation Efficiency and Academic Performance

Pearson correlation analysis among final-year student respondents (n = 416) revealed strong positive associations between the CAE Index and CGPA ($r = .58$, $p < .001$) and between the CAE Index and the Academic Engagement Index (AEI) ($r = .62$, $p < .001$). Simple linear regression confirmed that CAE Index scores significantly predicted CGPA ($\beta = .58$, $R^2 = .34$, $F(1, 414) = 296.18$, $p < .001$) and AEI ($\beta = .62$, $R^2 = .38$, $F(1, 414) = 347.63$, $p < .001$), with course allocation efficiency alone accounting for 34% of the variance in undergraduate academic performance. Regression assumptions were verified: residuals were approximately normally distributed (Shapiro-Wilk $W = 0.99$, $p = .14$ for the CGPA model), homoscedasticity was confirmed by Breusch-Pagan test ($p = .18$), and no influential outliers were identified using Cook's distance (maximum $D = 0.04$, well below the conventional threshold of 1.0). Students admitted to first-choice programmes achieved a mean CGPA of 3.48 (SD = 0.51), compared to 3.19 (SD = 0.57) for those in second-choice programmes and 2.87 (SD = 0.62) for those in non-applied programmes. One-way ANOVA confirmed a statistically significant group difference: $F(2, 413) = 71.34$, $p < .001$, $\eta^2 = .20$, with Levene's test confirming homogeneity of variance ($p = .11$) and all pairwise Tukey HSD differences statistically significant (all $p < .001$). The 0.61-point CGPA gap between first-choice and non-applied students represents a substantial academic performance difference that compounds throughout the undergraduate career. Hypothesis 2 was rejected.

Hypotheses 3 and 4: Course Allocation Outcomes and Graduate Labour Market Outcomes

Among the graduate sub-sample (n = 421), binary logistic regression predicting employment status yielded a significant model: $\chi^2(5) = 118.34$, $p < .001$, Nagelkerke $R^2 = .28$. Labour market outcomes by programme preference group are summarised in Table 8. Model fit was confirmed by a non-significant Hosmer-Lemeshow test ($\chi^2(8) = 7.43$, $p = .49$), indicating adequate calibration. Classification accuracy was 74.1% overall (sensitivity = 76.3%; specificity = 71.8%). No evidence of influential cases was found using dfBeta diagnostics. Each one-unit increase in the CAE Index was associated with 2.27 times higher odds of employment (OR = 2.27, 95% CI [1.84, 2.79], $p < .001$), controlling for gender, field of study, institutional affiliation, and socioeconomic background. Graduates from non-applied programmes were 29.1 percentage points less likely to be

BABCOCK JOURNAL OF THE SOCIAL SCIENCES

VOL {17}, ISSUE {1}, {2026}

https://journal.babcock.edu.ng/j/BJSS

ISSN: P-ISSN2795-3378

employed than those admitted to first-choice programmes (55.2% vs. 84.3%), while underemployment rates were markedly higher among non-applied graduates (38.7%) than first-choice graduates (12.4%). For the OLS earnings and occupational match models, the assumptions of normality of residuals, homoscedasticity, and absence of multicollinearity (all VIFs < 2.5) were verified prior to interpretation. Multiple regression predicting the Occupational Match Index identified the CAE Index as the strongest predictor ($\beta = .54$, $t = 12.88$, $p < .001$), with the full model explaining 38% of variance: $F(5, 415) = 44.91$, $p < .001$. For monthly earnings, hierarchical regression showed the CAE Index was associated with an additional 8% of earnings variance beyond demographic controls ($\Delta R^2 = .08$, $\Delta F = 34.12$, $p < .001$), with the full model accounting for 29% of variance: $F(6, 414) = 24.67$, $p < .001$. Graduates from non-applied programmes reported monthly earnings approximately 30.4% lower than first-choice counterparts within the same field, a difference consistent with — though not necessarily directly caused by — the programme preference-satisfaction differences between groups given the cross-sectional study design. Hypotheses 3 and 4 were both rejected.

Table 8

Graduate Labour Market Outcomes by Programme Preference Group (n = 421)

Outcome Measure	First Choice %/M	Second Choice %/M	Non-Applied %/M	Effect Size
Employment Rate (%)	84.3	71.6	55.2	$\chi^2(2) = 47.21$***
Occupational Match Rate (%)	83.0	64.2	48.1	$\chi^2(2) = 52.64$***
Mean Monthly Earnings (₦)	142,300	118,500	99,100	$F(2) = 38.47$***
Underemployment Rate (%)	12.4	24.8	38.7	$\chi^2(2) = 44.83$***

*Note. *** p < .001. Employment rate = proportion employed full-time or part-time. Occupational match = proportion working in a field related to their degree. Earnings = self-reported monthly income among employed graduates (₦). Field survey data (2024).*

BABCOCK JOURNAL OF THE SOCIAL SCIENCES

VOL {17}, ISSUE {1}, {2026}

https://journal.babcock.edu.ng/j/BJSS

ISSN: P-ISSN2795-3378

4.6 Hypothesis 5: Moderating Roles of Gender, Socioeconomic Background, and Geographic Origin

Hierarchical multiple regression tested moderating effects of gender, socioeconomic background (SES quintile), and geographic origin (urban vs. rural) on the relationship between the Admission Constraint Index and graduate labour market outcomes. The three interaction terms collectively added 4% of explained variance: $\Delta R^2 = .04$, $\Delta F(3, 411) = 8.72$, $p < .001$. Female graduates experienced a significantly stronger negative effect of admission constraints on monthly earnings ($\beta = -.14$, $p = .003$) than male graduates. Graduates from the lowest socioeconomic quintile faced a 37% greater admission constraint penalty on employment odds than those from the highest quintile (OR = 0.63, 95% CI [0.48, 0.82], $p < .001$). Rural-origin graduates exhibited significantly higher occupational mismatch under elevated constraint severity than urban counterparts ($\beta = .16$, $p = .007$). These interaction effects confirm that admission constraints systematically compound pre-existing structural disadvantage. Hypothesis 5 was rejected.

4.7 Qualitative Findings: Mechanisms and Experiences

Thematic content analysis of open-ended survey responses (inter-rater $\kappa = 0.81$) identified four dominant themes. The first, structural inevitability of misplacement captured respondents' widespread perception that non-preferred programme placement was an expected systemic outcome, reducing their sense of agency at entry and contributing to passive academic engagement. The second theme, motivational erosion, described progressive academic disengagement from initial disappointment through gradual decline to instrumental compliance — attending and completing assessments without genuine intellectual investment. The third theme, counselling deficit, identified the near-total absence of structured pre- or post-admission career guidance as a critical amplifier of misallocation harm, consistent with Ajufo's (2013) findings. The fourth theme, compounded disadvantage by gender and geography, captured additional barriers faced by female graduates in converting qualifications into employment in the North-Central labour market, and the geographic segmentation that prevents rural-origin graduates from accessing field-relevant employment concentrated in urban centres.

DISCUSSION

Admission Constraints as Structural Determinants of Allocation Inefficiency

The finding that admission constraints collectively account for 42% of the variance in course allocation efficiency is striking in both its magnitude and its policy implications. That the instruments most explicitly designed to maintain academic standards; JAMB score thresholds and

BABCOCK JOURNAL OF THE SOCIAL SCIENCES

VOL {17}, ISSUE {1}, {2026}

https://journal.babcock.edu.ng/j/BJSS

ISSN: P-ISSN2795-3378

carrying capacity ceilings simultaneously emerge as the strongest predictors of allocation inefficiency reveals a fundamental tension at the heart of Nigeria's admission regulatory architecture. Carrying capacity ceilings function as blunt instruments that are associated with allocation inefficiency at scale without commensurate quality assurance benefits: by preventing qualified and interested students from accessing preferred programmes, they are linked with both wasted student potential and the erosion of the educational engagement that quality assurance is intended to protect. This substantially extends the descriptive evidence of Adeyemi (2001) and Nwagwu (1997) by quantifying the contribution of each constraint type within an integrated multivariate model and situating these estimates within a theoretically specified framework something neither earlier study attempted. The consistency of these associations across six geographically dispersed institutions under identical regulatory frameworks suggests systemic-level attribution is more plausible than institution-specific explanations, a pattern that aligns with Gale and Shapley's (1962) formal matching theory prediction that, in the absence of a preference-revealing mechanism, stable and efficient student-programme matches are structurally difficult to achieve. Caution is warranted in interpreting these associations as causal, however, given the cross-sectional design; unmeasured institutional or student-level factors correlated with both constraint exposure and allocation outcomes cannot be fully ruled out.

The Human Capital Cost of Misallocation: Academic and Labour Market Dimensions

The 34% of CGPA variance associated with course allocation efficiency provides empirical grounding consistent with Human Capital Theory's prediction that misalignment between human capital investment and productive deployment generates welfare losses, though the cross-sectional design means that unmeasured pre-existing differences between students in different preference-satisfaction groups cannot be entirely excluded as partial explanations. The 0.61-point CGPA gap between first-choice and non-applied students is educationally substantial, and the pattern across the three groups is consistent with a progressive academic penalty linked to increasing degrees of preference-satisfaction deprivation: students in non-preferred programmes appear to accumulate not only lower credentials but potentially weaker field-specific competencies, shallower professional networks, and diminished disciplinary identity. The 2.27-fold difference in graduate employment odds associated with a one-unit CAE Index difference, and the 30.4% earnings gap for graduates from non-applied programmes, translate these performance differences into concrete economic

magnitudes. The 51.9% occupational mismatch rate among graduates from non-applied programmes compared to 17.0% among first-choice graduates is consistent with both the Theory of Educational Mismatch and Signalling Theory: students placed in non-preferred programmes may acquire credentials that signal suboptimal productive fit, contributing to occupational misallocation and wage differentials consistent with international estimates (Capsada-Munsech, 2019; Leuven & Oosterbeek, 2011). These associations, while robust across multiple models and outcomes, should be interpreted as consistent with the hypothesised pathway rather than as definitive proof of it, pending longitudinal replication.

Compounded Inequality and the Equity Imperative

The moderation findings represent perhaps the most policy-urgent contribution of this study. The evidence that gender, socioeconomic background, and geographic origin each significantly amplify the association between admission constraints and labour market outcomes suggests that these variables interact with constraints to compound disadvantage for already-marginalised groups — a pattern that, while cross-sectional and therefore not definitively causal, is theoretically coherent and consistent across multiple outcome measures. The 37% greater employment odds disadvantage experienced by the lowest socioeconomic quintile, and the additional earnings differential borne by female graduates in constrained placements, challenge approaches to admission policy reform that treat it as a purely technical exercise. The qualitative evidence reinforces this picture, identifying gender-based hiring discrimination and geographic labour market segmentation as plausible mechanisms through which compounded disadvantage may operate extending the equity-focused analyses of Bathmaker et al. (2016) and Unterhalter (2019) by tracing the moderation pathway through to quantified labour market outcomes within the North-Central Nigerian context.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This study provides the first integrated empirical analysis of the admission-allocation-outcome pathway in federal universities in North-Central Nigeria, drawing on a valid sample of 837 respondents (416 final-year students and 421 graduates) from a population of 33,940 final-year students and 169,700 five-year alumni across six institutions. Five principal conclusions emerge. First, admission constraints are pervasive: nearly two in three respondents experienced some degree of involuntary course allocation, with JAMB score thresholds and carrying capacity ceilings as the dominant mechanisms. Second, these constraints are substantially associated with reduced course allocation efficiency, collectively accounting for 42% of its variance, a finding that positions

admission policy characteristics as a primary correlate of allocation quality, though longitudinal evidence is needed to fully establish directionality. Third, reduced course allocation efficiency is associated with measurable academic differences, including a 0.61-point CGPA gap between first-choice and non-applied students that is consistent with a compounding disadvantage across the undergraduate career. Fourth, course allocation outcomes are significantly associated with graduate labour market differences: graduates from non-applied programmes are substantially less likely to be employed, more likely to experience occupational mismatch, and report earnings approximately 30% lower than first-choice counterparts associations that persist after controlling for gender, field, institution, and socioeconomic background. Fifth, these associations are systematically amplified for female graduates, those from lower socioeconomic backgrounds, and those from rural areas, producing compounded disadvantage for already-constrained groups.

Recommendations

For JAMB, the study recommends development and piloting of a ranked preference submission mechanism that enables applicants to specify multiple programme-institution preferences in order, allowing approximation of a stable matching algorithm that minimises involuntary placements while respecting carrying capacities. The existing CAPS digital infrastructure provides a viable technical foundation. Differentiated cut-off marks by discipline and institution calibrated to actual programme demands would substantially reduce distortions generated by the current uniform national threshold. For the NUC, an evidence-based review and rationalisation of carrying capacity ceilings is urgently warranted, particularly in high-demand disciplines. Mandatory adequately resourced academic counselling should be established as a minimum accreditation condition. For university administrations, structured departmental induction and peer mentoring targeting students in non-preferred programmes represent low-cost interventions with documented effectiveness, alongside formally established merit-based programme transfer pathways.

Limitations and Directions for Future Research

Several limitations constrain these findings and should inform interpretation. The cross-sectional design precludes causal inference from time-series variation; a longitudinal study tracking cohorts from admission through multiple career stages would strengthen the evidence for the hypothesised admission-allocation-outcome pathway. Graduate outcome data rely on self-report, which introduces multiple sources of potential bias that warrant explicit acknowledgement. Recall bias is a particular concern for employment and earnings data: graduates reporting on work histories spanning up to five years may misremember entry-level earnings, the timing of employment

transitions, or the degree to which their occupation matches their qualification. Social desirability bias may further inflate reported earnings and employment rates, as respondents may be reluctant to report unemployment or occupational mismatch to an institutional researcher. Additionally, since the ACAGOS instrument measured both admission constraints and outcome variables in the same survey administration, common method variance (CMV) the artificial covariance attributable to shared measurement context rather than true construct relationships is a potential confound in the quantitative findings. Although procedural remedies were employed, including scale format variation between predictor and outcome sections and explicit instructions directing respondents to think independently about each construct, the absence of temporal or source separation between predictor and criterion variables means that some degree of CMV inflation in the observed associations cannot be ruled out. Readers should therefore interpret the reported effect sizes as upper-bound estimates of the true relationships, and future studies should where possible collect constraint exposure and outcome data from administratively independent sources. The study is also geographically confined to the North-Central zone, and direct empirical generalisation to other geopolitical zones requires replication. Future research should investigate the mechanisms through which post-admission counselling and peer mentoring buffer the negative effects of constrained placement, and should conduct comparative analysis across geopolitical zones and between federal and state universities to enrich the evidence base.

REFERENCES

Adeyemi, K. (2001). Equality of access and catchment area factor in university admissions in Nigeria. *Higher Education, 42,* 307–332. https://doi.org/10.1023/A:1017965905830

Agboola, B. M., Adeyemi, J. K., & Ogbodo, C. M. (2014). Academic achievement and admission policy as correlates of student retention in Nigerian federal universities. *International Journal of Business and Social Science, 5*(2), 101–108.

Ajufo, B. I. (2013). Challenges of youth unemployment in Nigeria: Effective career guidance as a panacea. *African Research Review, 7*(1), 307–321.

Allen, J., & van der Velden, R. (2001). Educational mismatches versus skill mismatches: Effects on wages, job satisfaction, and on-the-job search. *Oxford Economic Papers, 53*(3), 434–452.

Arrow, K. J. (1973). Higher education as a filter. *Journal of Public Economics, 2*(3), 193–216.

Babbie, E. (2021). *The practice of social research* (15th ed.). Cengage Learning.

Bathmaker, A.-M., Ingram, N., Abrahams, J., Hoare, A., Waller, R., & Bradley, H. (2016). *Higher education, social class and social mobility: The degree generation.* Palgrave Macmillan.

Becker, G. S. (1964). *Human capital: A theoretical and empirical analysis, with special reference to education.* University of Chicago Press.

Capsada-Munsech, Q. (2019). Measuring overeducation: Incidence, correlation and overlaps across indicators and countries. *Social Indicators Research, 145*(1), 279–301. https://doi.org/10.1007/s11205-019-02112-0

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). SAGE.

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE.

Darvas, P., Gao, S., Shen, Y., & Bawany, B. (2017). *Sharing higher education's promise beyond the few in Sub-Saharan Africa.* World Bank. https://doi.org/10.1596/978-1-4648-1050-3

Field, A. (2018). *Discovering statistics using IBM SPSS Statistics* (5th ed.). SAGE.

Freeman, R. B. (1976). *The overeducated American.* Academic Press.

Gale, D., & Shapley, L. S. (1962). College admissions and the stability of marriage. *American Mathematical Monthly, 69*(1), 9–15.

Goldin, C. (2016). Human capital. In C. Diebolt & M. Haupert (Eds.), *Handbook of cliometrics* (pp. 55–86). Springer.

International Labour Organization. (2020). *World employment and social outlook: Trends 2020.* https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@dgreports/@dcomm/@publ/documents/publication/wcms_734455.pdf

Joint Admissions and Matriculation Board. (2023). *JAMB 2023 unified tertiary matriculation examination brochure.* https://www.jamb.gov.ng

Kebede, E., Tezera, R., Gedamu, S., Agago, T., & Hailu, T. (2025). *The effect of academic preference-placement mismatches on motivation and academic performance of university students: A prospective cohort study* [Preprint]. Research Square. https://doi.org/10.21203/rs.3.rs-6751390/v1

Leuven, E., & Oosterbeek, H. (2011). Overeducation and mismatch in the labour market. In E. A. Hanushek, S. Machin, & L. Woessmann (Eds.), *Handbook of the economics of education* (Vol. 4, pp. 283–326). Elsevier.

Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing Research, 35*(6), 382–385.

McCowan, T. (2016). Universities and the post-2015 development agenda: An analytical framework. *Higher Education, 72*(4), 505–523.

National Bureau of Statistics. (2023). *Labour force statistics: Unemployment and underemployment report (Q3 2022).* National Bureau of Statistics. https://nigerianstat.gov.ng/elibrary/read/1241365

National Universities Commission. (2022). *NUC annual statistical digest 2022.* https://www.nuc.edu.ng/tag/statistical-digest/

National Universities Commission. (2023). *NUC minimum academic standards and carrying capacity guidelines.* https://www.nuc.edu.ng

Nwagwu, C. (1997). The environment of crises in the Nigerian education system. *Comparative Education, 33,* 87–96. https://doi.org/10.1080/03050069728659

Oketch, M., McCowan, T., & Schendel, R. (2014). *The impact of tertiary education on development: A rigorous literature review.* Department for International Development.

Pallant, J. (2020). *SPSS survival manual* (7th ed.). Open University Press.

Roksa, J., Trolian, T., Blaich, C., & Wise, K. (2017). Facilitating academic performance in college: Understanding the role of clear and organized instruction. *Higher Education, 74*(2), 283–300.

Roy, A. D. (1951). Some thoughts on the distribution of earnings. *Oxford Economic Papers, 3*(2), 135–146.

Sattinger, M. (1993). Assignment models of the distribution of earnings. *Journal of Economic Literature, 31*(2), 831–880.

Schultz, T. W. (1961). Investment in human capital. *American Economic Review, 51*(1), 1–17.

Spence, M. (1973). Job market signaling. *Quarterly Journal of Economics, 87*(3), 355–374.

Teichler, U. (2007). Does higher education matter? Lessons from a comparative graduate survey. *European Journal of Education, 42*(1), 141–158.

Unterhalter, E. (2019). The many meanings of quality education: Politics of targets and indicators in SDG 4. *Global Policy, 10*(S1), 39–51.

ISSN: P-ISSN2795-3378

Verhaest, D., & Omey, E. (2006). The impact of overeducation and its measurement. *Social Indicators Research, 77*(3), 419–448.

World Bank. (2019). *The changing wealth of nations 2018: Building a sustainable future.* World Bank.

Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper & Row