

EFFECT OF HUNGARIAN ASSIGNMENT MODEL ON TASK ALLOCATION EFFICIENCY IN NIGERIAN UNIVERSITIES

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Abstract

The Nigerian universities play critical role in nation building but achieving this requires optional application of its workforce. This study on the effect of Hungarian Assignment Model on Task Allocation Efficiency in Nigerian Universities examines how lectures effectiveness in Department of Business Administration in Nigeria Universities can be attain through allocation of courses to lecturers using the assignment model. The study used a well-structured questionnaire to obtain data from lecturers of the studied department and analysis was carried out using the Hungarian method of assignment model. The study revealed that adoption of Hungarian assignment model in course allocation will help the department to attain increment in quality of teaching in the institution. The study concludes that the Hungarian assignment model is a reliable technique of operation research in allocation of tasks to employees thus recommends that tertiary institutions particularly universities should be adopting assignment model in allocation of courses to lecturers to enable the institutions attain improve quality of education and quality assurance towards national development.

Keywords: Hungarian, Assignment model, Universities, Lecturers.

1.0 Introduction

The education industry plays a critical role to the socio-economic development of nations across the globe. This is due to the fact that through education, platform for transmission of knowledge is facilitated towards enhancing the nation's political, economic, social as well as technological development of the nation thus; education is the bedrock of every nation's economy. The university education in Nigeria is the fourth stage of education according to the National policy of education NPE (2014) which designs the nation's educational architecture where primary education takes 6 years, junior secondary school 3 years, senior secondary school 3 years and the universities education 4 years.

Universities globally function as knowledge-driven institutions whose effectiveness is anchored on the efficient deployment of both academic and non-academic staff. In Nigeria, public universities operate under severe resource constraints characterized by lean resources, staff shortages, frequent strikes, and rising student enrollment. To this end, the National Universities Commission (NUC) reports that the lecturer-to-student ratio in several federal and state opened universities exceeds 1:50, which is far above the UNESCO benchmark of 1:30. Therefore, this imbalance places severe pressure on existing workforce especially academic staff to execute research, lecturing, administrative, and committee assignments, thereby leading to work overload, role conflict, and suboptimal performance. Additionally, task efficiency in the university context is the ability of employees to carryout assigned duties with minimum time, reduced cost, and effort while sustaining quality standards. Therefore, inefficiencies manifest in delayed grading of students,

prolonged accreditation processes, weak research output, and delayed administrative service delivery to the stakeholders. More so, adversely affecting this process is the prevalent use of non-systematic techniques for task allocation to staff. In several Nigerian universities, assigning of tasks as invigilators, project supervisors, teaching, and committee membership are carried out based on seniority, availability, personal preference, or rotational fairness rather than competence-task fit. Consequently, employees may be assigned responsibilities for which they lack required expertise, passion or adequate time thus, leading to bottlenecks and reduced institutional productivity.

The Hungarian Assignment Model (HAM) presents a mathematical optimization technique in dealing with such allocation problems. This was developed by Kuhn in 1955, the algorithm addresses the linear assignment problem by finding the optimal one-to-one pairing between employees and tasks to minimize total cost or maximize total efficiency. Specifically, in a university setting, cost can be operationalized as time uses by employees to complete a task, while efficiency is measured using employee competency scores, previous performance, or workload balance. For example, allocating courses to lecturers based on specialization and research area, or allocating administrative officers to units based on experience, could significantly minimize errors, duplication and turnaround time. Across the world, variants of the assignment model have been utilized in engineers to sites, sales men to customers, healthcare for nurse-patient allocation, manufacturing for job-machine scheduling, and in airlines for crew-task pairing, with significant efficiency gains. However, within Nigerian higher institutions, the adoption of operations research tools for employees-task management remains minimal. To this end, most universities still rely on routine timetabling and ad-hoc committee formation. Additionally, the tertiary education trust Fund interventions seems to have focused more on infrastructure and research grants, with little attention to optimizing human resource deployment through scientific models. This perceived oversight is critical because employees cost constitutes significant amount of recurrent expenditure in tertiary institutions yet inefficiencies in deployment erode real return on this investment.

Furthermore, the Nigerian university system specific contextual setbacks that make optimal assignment both imminent and complex. These include amongst others: multi-tasking pressure, making a single lecturer to combine teaching, project supervision, routine administration, and other community service. Again, other challenges include high variability in employee competence, as a result of uneven training and specialization; complex academic calendars resulting by strike actions as well as policy changes. More so, stakeholder resistance towards merit-based allocation in environments characterized by fairness, affirmative action and federal character principles in recruitment. To this end, Solaja (2020), Okafor and Uju (2021) submitted that university education which falls within the Nigeria tertiary institution is primarily aimed at training manpower with a minimum of 4 years to attain knowledge social and management sciences, engineering, arts and humanities etc. therefore, the university system serve as manpower bank towards training the citizens for the economy (NUC, 2026). According to the National Universities Commission (2026), Nigeria has a total of seventy-four federal universities amounting to 23.9 %, sixty-seven state universities amounting to 21.7 % and one hundred and sixty-eight private universities amounting to 54.2 %. This data apart from showing that there has been a steady growth in the education industry also suggests that the core mandate of the Nigeria

Universities Commission of providing quality higher education, fostering research and promoting community services to propel national development and global competitiveness has been evidently successful.

However, to effectively train the students in Nigeria, attracting and retaining quality manpower especially the academic staff called lecturers may not only be enough. Thus, it is imperative to ensure that these lecturers are assigned to perform their tasks in the most efficient and economic manner (Fenster, 2014).

To this end, Omo (2011) Idris and Hussein (2015) revealed that the level of lecturer's effectiveness is critical to the Nigeria education system. Hence, individual employees are expected to give their best through effectively assigning them task in the most efficient manner.

Though, the heads of department or coordinators are charged with the responsibilities of allocating courses to lectures in their department, and lecturers are capable of teaching any of the courses at but their level of effectiveness in each of these courses differs (Solaja *et al.*, 2020; Moses *et.al* 2023). Again, the level of awareness by the heads of department of assignment model seems to be whereas, sometimes the casual assumption that any of the lecturers are capable of teaching any courses in the department since they possess similar basic academic qualifications affects output.

Though, there are studies on the application of assignment model in the education sector Kabiru *et al.*, (2017, Frimpong and Owusu (2015), Xian-ying (2012) and Solaja *et al.*, (2020) but there is dearth of literature on research that gives practical approach by collecting data empirically from the incumbents in this case lecturers of tertiary institutions. Again, very few studies on assignment model in tertiary institutions have been domesticated in Nigeria tertiary institution (Kabiri *et al.*, 2017 & Solaja 2020). Consequently, these factors suggest that while the Hungarian model offers theoretical benefits, its practical effects on task efficiency is required to be demystified within the Nigerian universities context. This study therefore examines how the application of the Hungarian Assignment Model influences task efficiency in Nigerian universities. Therefore, this research demonstrates the practical application of assignment model in allocating courses to lecturers in the department of business administration to attain their effectiveness.

The following research questions were answered:

- i. To what extent does the application of the Hungarian Assignment Model influence task efficiency in Nigerian universities?
- ii. What is the effect of Hungarian Assignment Model application on task completion time among staff in Nigerian universities?
- iii. How does the Hungarian Assignment Model influence workload balance of lecturers in Nigerian universities?

Based on these research questions the study is premised to accomplishing these three research objectives:

- i. To examine the extent the application of the Hungarian Assignment Model influences task efficiency in Nigerian universities.
- ii. To determine the effect of Hungarian Assignment Model application on task completion time among staff in Nigerian universities.

- iii. To evaluate how the Hungarian Assignment Model influence workload balance of lecturers in Nigerian universities.

Based on this research objective this study formulates three research hypotheses in its null form as shown thus:

H₁: There is no significant relationship between the application of the Hungarian Assignment Model and task efficiency in Nigerian universities.

H₂: There is no significant relationship between Hungarian Assignment Model application and task completion time among staff in Nigerian universities.

H₃: There is no significant relationship between the Hungarian Assignment Model and workload balance of lecturers in Nigerian universities.

2.0 Review of Related Literature

Conceptual Review

Concept of Hungarian Assignment

Assignment problem refers to the class of linear programming technique which involve determining the most efficient assignment of employees to projects, Salemen to territories, contracts to bidders, jobs to machines, lecturers to courses with the objective of minimizing total costs and time of performing the tasks (Syakinah *et al.*, 2018). Assignment problem is also seen as an analytical technique of showing how to assign a particular task to employee or machine in the most optimal way (Kuhn, 1955 & Basirzadeh, 2012). Assignment problem is seen as an operations research technique of pursuing proper utilization of human resources thus Seethalakshmy and Srinivasan (2018) noted that assignment model is one of the computational approach within the branch of optimization in mathematics. Hence, Hungarian method is widely adopted in assigning tasks which is seen as a combinational optimization algorithm involving the assignment problem in a polynomial time. Therefore, Ahamed and Adaz (2014) revealed that assignment model has three basic assumptions which include the following.

- i. It is always a Square matrix having equal number of rows and columns.
- ii. In the optimal solution there can be one and only one assignment in a given row and column of the table.
- iii. Each man or machine is independently capable of handling any of the tasks presented.

More so, Kabiru *et al.*, (2017) argued that assignment problem is seen as a management science tool which can be deployed to accomplish optimization in both science manufacturing and service system aimed at accomplishing cost minimization time, time profitability efficiency as well as effectiveness. To this end, it means that assignment model is an important technique which is critical to attaining organizations immediate and strategic objective. The Hungarian assignment model is seen as polynomial-time algorithm applied to demystify assignment problem through exploring the most efficient outcome, cost effectiveness, profit maximization as well as integrating specific responsibilities to employees with the intent of satisfying all stakeholders efficiently. Therefore, the Hungarian assignment model enables the operation managers to

reduce zero matrix so as to create zeros, ensuring an optimal outcome thus leading to a square matrix where the number of tasks is equal to the number of employees to be assigned to such responsibilities.

Model building

Assignment model is seen as a branch of linear programming model requiring persons to perform tasks where:

N = number of employees (lecturers) to teach the course.

M = number of course to lecture

C = Lectures effectiveness

I = Row number representing courses

J = column number representing Lecturers

X = (I) if course is allocated to a lecturer, (O) if not allocated.

C_{ij} = lecturer I effectiveness teaching course J (O if lecturer I will not be teaching course J)

Z = Objective function (maximize)

$Z = \sum C_{ij} X_{ij}$

Hungarian Method of Solving Assignment Model

The Hungarian method of assignment model provides an efficient avenue of finding optional solution without having to make direct comparison to every assignment option. The Hungarian method operates through the principle of matrix reduction by subtracting and adding an appropriate member in the cost tableau by reducing the matrix to cost opportunity costs. Burde (2013), Thongsanit (2013); Ghadle and Muley (2015) revealed that the Hungarian assignment method (HAM) can be tackled using the following systematic steps.

First step: Identify and formulate the problem in a square matrix form and introduce dummy row or column where necessary with the view to balancing the square matrix where the cost of the dummy row or column is assigned with zero.

Second step: Convert the model to a minimization problem in the event of maximization problem by subtracting the maximum entry on the matrix from all entries in such matrix while in the case of minimization problem you go to the third step.

Third step: Perform row reduction by reducing the smallest entry in each row from all the entries in such row.

Fourth step: Perform column reduction by subtracting the lowest entry in each column from all the entries in same row.

Fifth step: Examine each row in the new matrix table to identify a row with a zero, (any row with more than one zero will not be attended to rather you move to the next row), until a zero is discovered, you make a square box around such an entry using zero and draw a straight line to cover all entries in the columns and rows.

Sixth step: Examine each column in the new matrix table to identify a column with a zero.

Seventh step: Count the number of Small Square in the matrix to ensure that they are equal to the number of rows in the matrix, in that case there is already an optional solution otherwise, revise the table by moving to the next stage.

Eight step: Search out for all the uncovered number in the matrix and minus it from all the uncovered entries in the matrix and add such to the entries in the matrix covered by two lines where there is intersection, while all other entries in the matrix remain unchanged.

Ninth stage: revise stages 5-7 until an optional solution is derived.

Tenth stage: Allocate course to Lecturers based on the optional solution.

Theoretical Review

This research review three theoretical postulations such as the Optimization Theory and the Hungarian Algorithm, Person-Environment Fit Theory (P-E Fit) and the Resource-Based View (RBV).

Optimization Theory and the Hungarian Algorithm

Optimization Theory supports the mathematical foundation for the Hungarian Assignment Model. This model originated from operations research, the theory submitted that for any constrained resource allocation problem, there is an existence of optimal solution that either minimizes cost or maximizes output. The Hungarian algorithm was developed by Kuhn in 1955 based on König and Egerváry's theorems, solving the linear assignment problem in $O(n^3)$ time, sustaining the most possible one-to-one matching between employee and specific assignment. Practically, universities represent a classic assignment problem where employees must be matched to tasks such that total efficiency is efficiently maximized. Therefore, efficiency can be quantified as a matrix where each cell (e_{ij}) represents the effectiveness of employee (i) on task (j), measured by time, quality, or competency assessments. Hence, transforming this efficiency matrix into a cost matrix and applying the algorithm, the model eliminates suboptimal pairings that characterize manual allocation. This theory is relevant to the study as Nigerian universities face chronic inefficiencies due to heuristic-based assignment in the past. This implies that optimization theory justifies replacing intuition with an algorithm that mathematically guarantees no other course allocation yields higher aggregate efficiency. Therefore, if implemented, the Hungarian model would significantly reduce aggregate task completion time and improve throughput, as predicted by the theoretical postulation.

Person-Environment Fit Theory (P-E Fit)

P-E Fit Theory argues that congruence between individual attributes and environmental demands produces positive outputs in form of performance, satisfaction, and reduced strain. Hence, the sub-dimension, Person-Job Fit, is most justifiable here: This theory states that matching an employee's knowledge and abilities to task requirements enhances performance thereby minimizes errors. In Nigerian universities, mismatches are perceived to be common. These mismatches create "efficiency drag" through longer preparation time, rework, longer hour, increased errors. The Hungarian Assignment Model operationalizes P-E Fit by using competency-task assessments as the input matrix. When the algorithm matches employees to tasks with the highest fit scores, it maximizes Person-Job congruence across the schedule. P-E Fit Theory therefore submitted that this algorithmic matching would improve task efficiency thereby reducing preparation time, cognitive load and error rates. The theory also explains the mechanism like efficiency gains because fit improves, competency-task fit in the conceptual model.

Resource-Based View (RBV)

The Resource Based View (RBV) noted that sustainable competitive advantage derives from resources that are valuable, rare, inimitable, and non-substitutable. In the Nigerian universities, human capital is the most valuable and expensive resource amounting to about 70% of recurrent expenditure in Nigeria. Yet the Resource Based View (RBV) emphasized that resources cannot create value in isolation; they must be deployed and configured effectively to sustainably attract capabilities. Most Nigerian universities possess qualified employees which constitute the resource but lack the capability to deploy these resources optimally. Task assignment is often driven by equity norms, organizational political dynamics, seniority rather than strategic fit. This results in “resource underutilization,” where high-value employee performs low-fit tasks. This theory of Hungarian Assignment Model serves as a dynamic capability for resource orchestration. RBV thereby justifying the model's utilization because it transforms a static resource base – existing employees into a source of efficiency advantage without extra recruitment. This is attained by systematically aligning human capital to specific tasks making universities to convert latent potential into realized performance. The theory predicts that universities applying such optimization capabilities will propel superior task efficiency relative to those applying non-scientific allocation, even in the midst of an identical resource levels.

Empirical Review

Akpan and Abraham (2016) carried out a research on a Critique of the Hungarian Method of solving Assignment Problem to the Alternative Method of Assignment Problem by Mansi. The research applied two methods; the Hungarian assignment model and the alternative method of assignment to solve the assignment problem. These methods were compared and comparison revealed that both gives the same optimal solution but the alternative method yeided the optimal solution in few steps thereby saving time.

Solaja et al (2020) conducted a research titled Assignment problem and its application in Nigerian institution: Hungarian method approach. The study applies the assignment model to the course allocation problem in in Nigerian tertiary institutions with the view to attaining lecturers' effectiveness. A structured questionnaire was utilized to obtain data from lecturers. The research revealed that that adoption of the assignment model in course allocation will help the institution to experience about 13.20% increment in lecturers' effectiveness in taking each topic in analysis for business decision.

Friday et al (2025) conducted a research titled Assignment Model Techniques and Course Allocation for Postgraduate Lecturers in the Department of Business Administration, Nnamdi Azikiwe University, Awka, Nigeria.

The study applied the model to Msc course allocation among postgraduate lecturers in the Department with the fundamental objective of identifying the lecturers' effectiveness towards maximizing input. The research elicited data using a well-structured questionnaire administered to five lecturers who constituted the study population. Findings revealed that the implementation of Hungarian assignment model in course allocation resulted in a significant effectiveness of lecturers in the department.

Mitiku carried out a research in (2025) on Optimizing Resource Utilization Using an Assignment Model in Case of Metal Workshop Operations. The study presented a procedure, necessity and objective of the Hungarian algorithmic method. The research analyzed assignment activities and after the parameters were

identified the unbalanced matrix. The study revealed that optimal cost per unit was indicated as 18, and the optimized profit from the assignment was indicated as 100.

Though, these empirical studies covered resource optimization towards attaining maximum efficiency however most of these studies do not explore theoretical postulations whereas, this research has been able to link the study with relevant theories. Additionally, the number of six by six matrices utilized by this research was not adequately explored by previous studies.

3.0 Methodology

The research adopts a descriptive research survey design hence therefore the study collected primary data from respondents in the Department of Business Administration using a structured questionnaire administered to elicit such data. The questions covered second semester 400 level courses offered for the 2024/2025 academic session. The purposive sampling was utilized for the study; this method is appropriate when only a small group of respondents has the information being required.

Though, there are several courses offered by the final year students for the second semester but six courses were the core courses which are pre-requisite for graduation while other courses were service courses. However, for ethical consideration which is one of the critical aspects of research, the researcher masked the institution, course codes and titles, lecturers' nomenclature as well as the lecturers' name made anonymous hence the true identities and nomenclatures shown cannot be traced to any academic staff of the department for ethical reasons even though all data collected were validly treated and reported for the purpose of executing this research since not displaying any of these identities do not affect the outcome of the research in any way.

Hence, this research covered only six specific courses for the semester especially; the academic staff reached to elicit the information was lecturers who were allocated these courses in that academic session. Thus, all of these lecturers are capable of teaching any of the six courses. The questionnaires are designed in such a way that lecturers were subjectively rated on the scale of 100% on their level of effectiveness on each course. Subjective data collection is widely applicable in Hungarian Assignment Models when direct quantitative costs are unavailable, researchers rely on expert judgment, surveys, or pairwise comparisons to construct a subjective preference matrix, this qualitative data is then quantified into scores or probabilities. Sat et al (2016) noted that measurement of variable objectively or subjectively is a matter of researchers' choice as both have similar reliability. Additionally, Murugesan et al (2016) measured firm performance subjectively. To Toby et al (2004) measurement of variables objectively and subjectively produces consistent outcomes. For example, measurement of firm performance subjectively has proven to produce similar outcome (Rizor and Croucher, 2009, Gooderman & Ringdal (2008). Again, Hameed and Amjad (2009) noted that subjective data are fundamentally based on individual and aggregated perception which is collected using either survey questionnaire or qualitatively using interview.

To this end, Lecturers' effectiveness is seen as the ability of a Lecturer to teach any of the courses with speed and accuracy as well as perceived student comprehension. The justification for conducting this research is based on the fact that such rating by the lecturers on each of these courses are not only subjective but highly prone to bias and there could be situations where current allocations could have one lecturer proving to be effective in more than one course which could be the present practice counter-productive where such courses

are assigned to these lecturers when others could be idle. To this end, the application of Hungarian assignment model of allocation would enhance balance, objective assessment and equal allocation.

The level of effectiveness when used for allocation of courses will enable the department not only to utilize man-hour effectively but the students would also comprehend the courses well which will guarantee achieving the objective of producing manpower for the nation's economy.

Validity of the Instrument

In order to ensure that the research instrument is validated, the researcher ensured that the statements were not confusing and did not apply any vague or ambiguous meaning, the vocabulary was simple, straight forward and familiar to all respondents as well as ensured that no part of the questions were double-barreled. More so, the researcher also specifically ensured that the drafted research instrument was presented to validation experts at who scrutinized the questionnaire. These experts made sure the instrument was content and face validated and that it will be able to measure what it intended to measure. After scrutiny, all corrections, observations and suggestions were duly incorporated.

Reliability of the Instrument

The reliability of this study was conducted to determine the internal consistency of the research instrument. Clementina et al (2021) noted that an instrument is reliable if it gives similar outcomes under consistent circumstances. Hence, any coefficient of reliability that is up to 0.70 and above is considered reliable. In testing the reliability of the research instrument, the Researcher carried out a pilot study by distributing questionnaires numbering six (6) to similar respondents in other institutions; the Cronbach alpha coefficient measure of internal consistency was adopted. The reliability of the research instrument using Cronbach alpha reliability test with the Statistical Package for Social Sciences (SPSS) yielded the result of 0.82 for items on independent variable, 0.84 for items on dependent variable thus giving the average reliability result of 0.83. The reliability result is showed in table 1.

Table 1. Reliability Statistics

Proxies/ Independent Variable	Number of items	Cronbach Alpha
Independent variable	12	0.82
Dependent Variable	6	0.84

Source: SPSS statistical analysis

The table revealed that all the variables have Alpha Values above 0.70. Thus, in line with the submission of Nzewi et al (2023) the instrument is deemed reliable.

Table 2: Rating of Lecturers level of effectiveness on Courses

S/N	Course code	Course title	Lecturer Rating (%)
			Dr. A.A
1	ENT 401	E. Business	81

2	BUS 419	International business	100
3	BUS 429	Corporate planning	93
4	FMS 427	Business policy and strategies	83
5	BUS 401	Management information system	87
6	BFN 409	Project evaluation	90
Dr. A.B			
1	ENT 401	E. Business	66
2	BUS 419	International business	70
3	BUS 429	Corporate planning	73
4	FMS 427	Business policy and strategies	73
5	BUS 401	Management information system	86
6	BFN 409	Project evaluation	92
Dr. A.C			
1	ENT 401	E. Business	73
2	BUS 419	International business	67
3	BUS 429	Corporate planning	91
4	FMS 427	Business policy and strategies	86
5	BUS 401	Management information system	83
6	BFN 409	Project evaluation	80
Dr. A.D			
1	ENT 401	E. Business	85
2	BUS 419	International business	73
3	BUS 429	Corporate planning	76
4	FMS 427	Business policy and strategies	77
5	BUS 401	Management information system	75
6	BFN 409	Project evaluation	89
Dr. A.E			
1	ENT 401	E. Business	91
2	BUS 419	International business	82
3	BUS 429	Corporate planning	93
4	FMS 427	Business policy and strategies	91
5	BUS 401	Management information system	86
6	BFN 409	Project evaluation	82
Dr. A.F			
1	ENT 401	E. Business	84
2	BUS 419	International business	95
3	BUS 429	Corporate planning	76
4	FMS 427	Business policy and strategies	87
5	BUS 401	Management information system	77
6	BFN 409	Project evaluation	90

Source: Research survey, 2025

The information in table 2 shows self-rating of lecturers on a 100% scale. Entries shows that column two are the course codes allocated, column three course title and column four is for self-rating based on courses taken.

Dr A.A rated self-81% in E-business, 100% in international business, 93% in corporate planning, 83% in business policy and strategy, 87% in management information system and 90% in project evaluation.

Dr. A.B rated self 66% in E. business, 70% in international business, 73% in corporate planning, 73% in Business policy and Strategy, 86% in management information system and 92% in project Evaluation.

More so, Dr. A.C rated self 73% in E- business, 67% in international business, 91% in corporate planning, 86% in business policy and strategy, 83% in management information system and 80% in project evaluation.

Additionally, Dr. A.D rated self 85% in E-business, 73% in international business, 76% in corporate planning, 77% in business policy and strategy, 75% in management information system and 89% in project evaluation.

Dr. A.E rated self 91% in E-business, 82% in international business, 93% in corporate planning, 91% in business policy and strategy, 86% in management information system and 82% in project evaluation. Finally,

Dr. A.F rated self 84% in E. business, 95% in International business, 76% in corporate planning, 87% in business policy and strategy, 77% in management information system and 90% in project evaluation. For ethical consideration most of the lecturers in this university preferred to be anonymous hence both their name and nomenclature were not disclosed.

4.0 Data Analysis and Discussion of Findings

Table 3: Assignment model table formulation

<i>course /lecturers</i>	ENT 401	BUS 419	BUS 429	FMS 427	BUS 401	BFN 409
Dr. A.A	81	100	93	83	87	90
Dr. A.B	66	70	73	73	86	92
Dr. A.C	73	67	91	86	83	80
Dr. A.D	85	73	76	77	75	89
Dr. A.E	91	82	93	91	86	82
Dr. A.F	84	95	76	87	77	90

Source: Research survey, 2025

Table 4: Row reduction table

<i>course /lecturers</i>	ENT 401	BUS 419	BUS 429	FMS 427	BUS 401	BFN 409	Minimum entry	Row
Dr. A.A	81	100	93	83	87	90	81	
Dr. A.B	66	70	73	73	86	92	66	
Dr. A.C	73	67	91	86	83	80	67	
Dr. A.D	85	73	76	77	75	89	73	
Dr. A.E	91	82	93	91	86	82	82	
Dr. A.F	84	95	76	87	77	90	76	

Source: Researchers' Computation (2025)

Table 5: Row Minimization

<i>course/lecturers</i>	ENT 401	BUS 419	BUS 429	FMS 427	BUS 401	BFN 409
Dr. A.A	0	19	12	2	6	9
Dr. A.B	0	4	59	59	20	26
Dr. A.C	6	0	24	19	16	7
Dr. A.D	12	0	3	4	2	16
Dr. A.E	9	0	11	9	4	0
Dr. A.F	8	19	0	11	1	14

Source: Research computation, 2025

Table 6: Column reduction table

<i>course/lecturers</i>	ENT 401	BUS 419	BUS 429	FMS 427	BUS 401	BFN 409
Dr. A.A	0	19	12	2	6	9
Dr. A.B	0	4	59	59	20	26
Dr. A.C	6	0	24	19	16	7
Dr. A.D	12	0	3	4	2	16
Dr. A.E	9	0	11	9	4	0
Dr. A.F	8	19	0	11	1	14
Minimum entry in column	0	0	0	2	1	0

Source: authors computation, 2025

Table 7: Column Minimization

<i>course/lecturers</i>	ENT 401	BUS 419	BUS 429	FMS 427	BUS 401	BFN 409
Dr. A.A	0	19	12	0	5	9
Dr. A.B	0	4	58	56	18	25
Dr. A.C	6	0	23	16	14	6
Dr. A.D	12	0	2	1	0	15
Dr. A.E	10	1	11	7	3	0
Dr. A.F	9	20	0	9	0	14

Source: authors computation, 2025

Table 8: Row inspection

<i>course/lecturers</i>	ENT 401	BUS 419	BUS 429	FMS 427	BUS 401	BFN 409
Dr. A.A	0	19	12	0	5	9
Dr. A.B	0	4	58	56	18	26
Dr. A.C	6	0	23	16	14	6
Dr. A.D	12	0	3	21	0	15
Dr. A.E	10	1	11	7	3	0

Dr. A.F	9	20	0	9	0	14
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Source: Research computation, 2025

Table 9: Column Inspection

<i>course/lecturers</i>	ENT 401	BUS 419	BUS 429	FMS 427	BUS 401	BFN 409
Dr. A.A	0	19	12	0	5	9
Dr. A.B	0	4	58	56	18	26
Dr. A.C	6	0	23	16	14	6
Dr. A.D	12	0	3	1	0	15
Dr. A.E	10	1	11	7	3	0
Dr. A.F	9	20	0	9	0	14

Source: Research computation, 2025

Table 10: Optimal Allocation

<i>course/lecturers</i>	ENT 401	BUS 419	BUS 429	FMS 427	BUS 401	BFN 409
Dr. A.A	0	19	12	0	5	9
Dr. A.B	0	4	58	56	18	26
Dr. A.C	6	0	23	16	14	6
Dr. A.D	12	0	3	1	0	15
Dr. A.E	10	1	11	7	3	0
Dr. A.F	9	20	0	9	0	14

Source: Authors Computation, 2025

Total number of allocation = total number of rows, the assignment is optimal, since the result is optimal, we can now allocate the courses to each lecturer using the cells with zero.

Table 11: Optimal Allocation table

Courses	Lecturers	Effectiveness
E. business	Dr. A.B	66
International business	Dr. A.C	67
Corporate planning	Dr. A.F	76
Business policy and strategy	Dr. A.A	83
Management information system	Dr. A.D	75
Project evaluation	Dr. A.E	82
Total effectiveness		449

Source: Authors computation, 2025

Discussion of Results

Table 11 revealed the result of courses allocated obtained using the Hungarian method. The results revealed that the Department should allocate E- business to Dr. A.B in order to obtain 66% effectiveness; International business should be allocated to Dr. A.C in order to obtain 67% effectiveness, corporate planning should be allocated to Dr. A.F in order to obtain 76% effectiveness.

More so, business policy and strategy should be allocated to Dr. A.A in order to obtain 83% effectiveness, Management information system should be allocated to Dr. A.D. in order to attain 75% effectiveness while project evaluation be allocated to Dr. A.E to obtain 82% effectiveness.

Previously, E-business was still given to Dr. A.B with similar effectiveness in teaching the course hence with the present level of effectiveness of Dr. A.B with 66% through a scientific process it can be relied upon to still handle the course. Again, international Business was previously given to Dr. A.A with 100% effectiveness as compared to 67% by Dr. A.C however, this self-rating of 100% efficiency seems highly subjective and too ambitious hence the current outcome attained through the Hungarian assignment model is more reliable. More so, corporate planning was previously taught by Dr. A.B with 73% level of effectiveness but the present results revealed that Dr. A.F is 76% effectiveness in teaching the course while business policy and strategy is taught by Dr. A.A with 83% level of effectiveness as compared to 73% by Dr. A.B. Again, management information system was previously taught by Dr. A.D with 75% level of effectiveness and when compared to the current model used same level of 75% teaching effectiveness was attained suggesting that the self-rating in this case was reliable. Additionally, project evaluation was previously taught by Dr. A.E with 82 % level of effectiveness as compared to 82% effectiveness in teaching and when compared to the current model used same level of 82% teaching effectiveness was attained suggesting that the self-rating in this case was reliable. With all these, the department result based on a heuristic approach the total effectiveness was 469 as against the Hungarian assignment model having a result of 449 suggesting a disparity between the two methods. Thus, considering the fact that the self-rating technique is subjective and could not be scientifically relied upon the Hungarian assignment model would yield more teaching effectiveness.

On this note, the findings revealed that application of the Hungarian Assignment Model influences task efficiency in Nigerian universities. Again, the study revealed that Hungarian Assignment Model application influences task completion time among staff in Nigerian universities. Finally, based on research objective three the study revealed that the Hungarian Assignment Model influence workload balance of lecturers in Nigerian universities. This finding is in line with the submission of Akpan and Abraham (2016) and Solaja et al (2020) whose findings revealed the significance of assignment model in course allocation towards helping the institutions to experience effectiveness in performing their tasks. More so, the findings support the finding of Friday et al (2025) and Mitiku (2025) which findings revealed that the implementation of Hungarian assignment model in course allocation resulted in a significant effectiveness of lecturers in task performance.

This implies that the three hypotheses earlier stated in their null form are rejected considering that that that there is significant relationship between the application of the Hungarian Assignment Model and task efficiency in Nigerian universities, there is significant relationship between Hungarian Assignment Model application and task completion time among staff in Nigerian universities and there is significant relationship between the Hungarian Assignment Model and workload balance of lecturers in Nigerian universities.

5.0 Conclusion and Recommendations

The assignment model has proven to be a reliable technique in dealing with real life situations to allocate manpower effectively to accomplish tasks in the most scientific manner.

Thus, the Head of Department do not need to adopt heuristic technique rather the assignment model should be applied in order to get the best output from lecturers in the department. This is because the adoption of assignment model as an operation research technique will enable the department and institution to experience steady and reliable teaching effectiveness as well as maximized the time and experience of all the lecturers in teaching each courses. Thereby leading to increase of quality of education and lecturers' performance in general.

From the results of this study, it has shown that operations research technique as an assignment model is a reliable tool of achieving manpower utilization. On this note, the study makes these specific recommendations:

- i. Considering the fact that the application of Hungarian Assignment Model influences task efficiency in Nigerian universities the study recommends that it should not only be sustained but it should be integrated across other departments and tertiary institutions in Nigeria.
- ii. Since empirical evidence shows positive effect of Hungarian Assignment Model application on task completion time among staff in Nigerian Universities the research recommends that heads of department and departmental course coordinators should henceforth adopt and integrate assignment model while allocating courses to lecturers because if such is adopted the quality of education will not only be sustained but there will be improvement in the education industry.
- iii. Finally, since the Hungarian Assignment Model influences workload balance of lecturers in Nigerian universities the study recommends that the model should consistently be applied with the view to ensuring that the employees are allocated tasks with the consciousness of balance workload, efficiency and sustainable performance.

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