Modelling Predictors of Students' General Programme Satisfaction in an Open Distance Learning (ODL) Context in Nigeria

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Abstract

The demand for ODL continues to grow globally and this have created a pressing concern for students' satisfaction with programmes and services provided by ODL institutions, particularly in developing countries. Limited research has specifically modelled the predictors of students' general programme satisfaction in an ODL context in Nigeria. Therefore, this study modelled predictors of Students' General Programme Satisfaction in a selected ODL institution in Nigeria. The study adopted a non-experimental design of correlational research type. A model was proposed comprising four constructs: teaching and learning experience (TLE), infrastructural facilities (IF), support services (SS), and general programme satisfaction (GPS). 546 ODL students selected using simple random sampling technique participated in the study. Data collected for the study were analysed using a Partial Least Square-Structural Equation Modelling (PLS-SEM) technique. Results revealed that TLE ($\beta=0.326$, $t=6.533$, $p<0.01$), IF ($\beta=0.097$, $t=2.170$, $p=0.03$) and SS ($\beta=0.350$, $t=6.256$, $p<0.01$) positively and significantly influence ODL students' GPS. However, SS is the most prominent predictor. Also, the results showed that the relationship between TLE and general programme satisfaction was positively moderated by the programme level of the students. In contrast, the employment status of the students negatively moderated the relationship between SS and GPS. There is need for ODL institutions to prioritize robust support services, improve teaching and learning experiences and ensure adequate infrastructural facilities to enhance programme satisfaction among the students.

Keywords: Teaching and learning experiences, infrastructural facilities, social support, SEM, ODL

Introduction
Open and Distance Learning (ODL) which refers to an educational approach where the majority, if not all, of the teaching is delivered remotely, with the instructor and learner being physically separated, has emerged as a vital alternative to traditional higher education (Ghosh et al., 2012). ODL offers flexible learning opportunities for individuals who may face challenges accessing conventional on-campus education (Itasanmi et al., 2020). This mode of learning is characterised by its commitment to promoting openness and flexibility, offering broader access to education and allowing for adaptability in curriculum, structure, and other key aspects of the learning experience (Ghosh et al., 2012; Maphosa & Bhebhe, 2020). ODL is rapidly emerging as a crucial and widely accepted component of mainstream education systems globally, playing a significant role in driving social and economic development (Bozkurt, 2019). It is especially important in developing countries, where its impact is increasingly emphasized (Zhu & Chikwa, 2021). ODL presents numerous opportunities for developing countries to achieve their broad educational objectives. Three primary factors have fueled the rapid rise in interest in distance learning: the increasing need for ongoing skills development and retraining, technological advancements that have enabled the remote teaching of a growing number of subjects and the emergence of COVID-19 which highlighted the importance of flexible and remote education options during crises (Adedoyin & Soykan, 2020; UNESCO, 2020; Ali, 2020).

As the demand for ODL continues to grow globally, ensuring students' satisfaction with ODL programmes and services has become a pressing concern, particularly in developing countries (Anietor, 2019). Students' satisfaction refers to a temporary attitude shaped by a student's assessment of their educational experience (Itasanmi & Oni, 2020). It reflects the student's subjective evaluation of academic outcomes and experiences. Therefore, it is influenced by the level of knowledge and perceived performance of educational services (Weerasinghe et al., 2017). The importance of students' satisfaction in ODL programmes cannot be overemphasized. It is a cornerstone of a successful ODL programme (Panigrahi, 2021). Students' satisfaction is primarily associated with how well the ODL programme meets their educational and personal needs (Mdakane et al., 2016). It has been found to have a direct effect on student retention (Sembiring, 2015), success (Ali & Ahmad, 2011), and institutional reputation (Alam et al., 2021).

Research has also indicated that students who exhibit higher levels of satisfaction with various aspects of distance education tend to demonstrate significantly greater learning outcomes than those with lower levels of satisfaction (Ali & Ahmad, 2011). Several personal factors (age, gender, learning style, employment status, programme level, and marital status) and institutional factors (quality of instruction, clarity of expectations, teaching approach, and timely feedback from instructors) have been recognized as key predictors of ODL students' satisfaction (Itasanmi & Oni, 2020; Zamri et al., 2021). Other important factors identified by scholars include the quality of lecturers, availability of physical and digital facilities, student-lecturer interactions, course content, library access, learning materials, a flexible curriculum, and the institution's reputation (Alam et al., 2021; Ikram & Kenayathulla, 2023; Chowdhury et al., 2024). Additionally, student loyalty, service quality, welfare services, the overall learning environment, institutional effectiveness, and social conditions influence ODL students' satisfaction (Masserini et al., 2018).

Perera and Abeysekera (2015) emphasised that learners' satisfaction in ODL programmes cannot be tied to specific factors, as students come from diverse backgrounds with varying cultural, familial, and educational experiences, along with differing ICT skills. However, previous research underscores the importance of teaching and learning experiences, infrastructural facilities, and support services in shaping students' satisfaction with ODL programmes (Itasanmi & Oni, 2020). In ODL environments, where students are disconnected from physical campuses, the quality of teaching and learning experiences plays a crucial role in shaping their overall perception and satisfaction (Khalid & Quick, 2016). Additionally, as virtual communication replaces traditional classroom interactions, the availability and quality of infrastructural facilities are essential to the learning process (Oladele & Modebelu, 2021). Support services also become critical, as ODL students lack in-person interaction in conventional education settings, making accessible and responsive support vital to their success (Shikulo & Lekhetho, 2020). Despite the recognized importance of these factors, limited research exists on how they specifically affect ODL students in Nigeria, where challenges like inadequate infrastructure, restricted technological access, and work-life-study balance may influence satisfaction levels (Itasanmi et al., 2020; Oladele & Modebelu, 2021).

Numerous studies have investigated students' satisfaction in higher education with majority focusing on traditional learning environments (Butt & Rehman, 2010; Siming *et al.,* 2015; Mallika Appuhamilage & Torii, 2019; Tandilashvili, 2019; Dhawan, 2022; Wong & Chapman, 2022; (Aman et al., 2023; Ali, 2024; Ruranga, 2024; De-Juan-Vigaray et al., 2024). Only a few examined students' satisfaction within the ODL context (Itasanmi & Oni, 2020; Abdul Fatah & Mohamed, 2022; Said *et al.,* 2022; Hashim et al., 2023). However, limited research has specifically modelled the predictors of students' general programme satisfaction in an ODL context in Nigeria. Additionally, there is a dearth of research exploring how demographic characteristics moderate the relationships between these predictors and programme satisfaction. Considering the distinct demographic diversity among ODL students who are often working adults, married individuals or old learners, understanding these moderating effects becomes essential. For instance, employed students may perceive support services differently from self-employed or unemployed due to time constraints. Also, single students might prioritize technology-enhanced learning experiences compared to married students.

Therefore, this study aims to fill this gap by conducting a model analysis of predictors of ODL students' general programme satisfaction in Nigeria. Specifically, the study investigates the influence of three key factors (teaching and learning experiences, infrastructural facilities, and support services) on general programme satisfaction. Additionally, the study explores the moderating role of gender, marital status, employment status, and programme level in the relationship between these predictors and general programme satisfaction. Understanding the extent to which these factors contribute to students' satisfaction, as well as how demographics affect this relationship, will provide valuable insights for improving the design and delivery of ODL programmes in Nigeria. By addressing these issues, this study seeks to offer practical recommendations for ODL institutions on how to enhance the learning environment, better meet the diverse needs of students, and ultimately improve overall satisfaction with ODL programmes.

Conceptual Model and Hypotheses

Figure 1: Conceptual model for the study from which the hypotheses were derived.
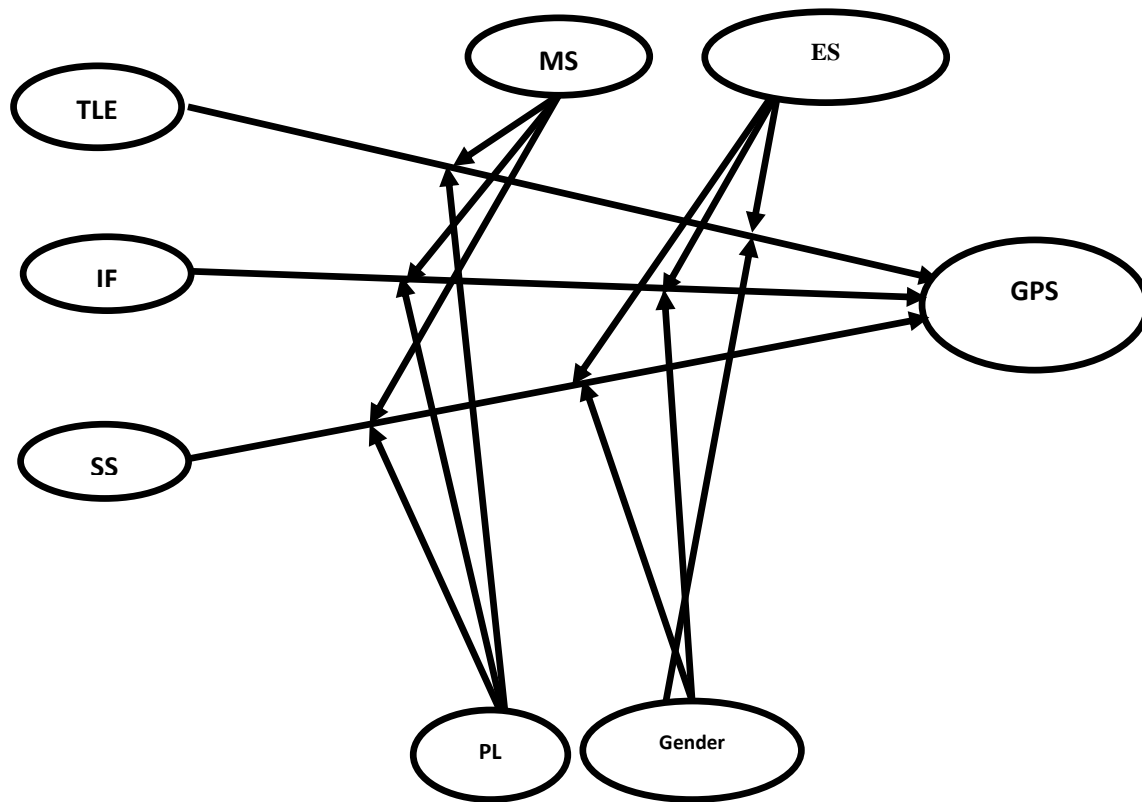
Based on the objective and conceptual model of the study, it was hypothesized that ODL students' ratings of the basic three components of the ODL system (teaching and learning experiences (TLE), infrastructural facilities (IF) and support services (SS)) will significantly influence their general programme satisfaction (GPS). Also, gender, marital status, employment status, and programme level were hypothesized to moderate the relationship among the variables examined in the study. Specifically, the study's hypotheses are stated as follows.

H_1: There is a positive relationship between IF and GPS.
H_2: There is a positive relationship between TLE and GPS.
H_3: There is a positive relationship between SS and GPS.
H_4: Gender significantly moderates the relationship between IF and GPS.
H_5: MS significantly moderates the relationship between IF and GPS.
H_6: PL significantly moderates the relationship between IF and GPS.
H_7: ES significantly moderates the relationship between IF and GPS.
H_8: Gender significantly moderates the relationship between IF and GPS.
H_9: MS significantly moderates the relationship between IF and GPS.
H_{10}: PL significantly moderates the relationship between IF and GPS.
H_{11}: ES significantly moderates the relationship between IF and GPS.
H_{12}: Gender significantly moderates the relationship between IF and GPS.
H_{13}: MS significantly moderates the relationship between IF and GPS.

H$_{14}$: PL significantly moderates the relationship between IF and GPS.
H$_{15}$: ES significantly moderates the relationship between IF and GPS.

Methodology
The study adopted a non-experimental design of correlational research type based on structural equation modelling (SEM) analysis in which the predictive influences of ODL students' rating of the three basic components of ODL system (teaching & learning experiences (TLE), infrastructural facilities (IF), support services (SS)) on general programme satisfaction (GPS) was investigated. Also, the moderation role of gender, marital status, employment status, and programme level in the relationship among the variables was examined. The population of the study consists of ODL students in Nigeria. However, the target population of this study are students enrolled in ODL programmes at the University of Ibadan Distance Learning Centre (UIDLC) during the 2020/2021 academic sessions. The University of Ibadan Distance Learning Centre was purposefully chosen for the study based on its proximity to the researcher and the fact that it's one of the leading ODL institutions in Nigeria. A simple random sampling technique was utilized to select five hundred and forty-six (546) ODL students from the University of Ibadan Distance Learning Centre to participate in the study.

The participants of the study participated through an anonymous online survey. The survey was designed on Google Forms. Invitation to participate with a clear highlight of the objective of the study and the survey link was sent to the email addresses of all registered ODL students between December 2021 and February 2022. Participants were informed that participation in the survey was voluntary and assurance was given as regards the confidentiality of the information they provided. The study utilized a survey titled 'ODL Students' General Programme Satisfaction Survey (OSGPSS)' as the instrument of data collection. The survey was developed by the researcher based on items largely drawn from the study of Itasanmi, Oni and Adelore (2020), and other studies on ODL in Nigeria. The survey consisted of five (5) sections in all. The first session x-rayed the demographic characteristics (age, gender, marital status, employment status and programme level of the students while the second, third and fourth sections focused on ODL students' rating of the three basic components of the ODL system namely; teaching & learning experiences (10 items), infrastructural facilities (5 items), and support services (8 items). The last session (fifth) focused on ODL students' general programme satisfaction (1 item). Items measuring ODL students' ratings of teaching & learning experiences, infrastructural facilities and support services were anchored on a 5-point Likert scale of very poor-1, poor-2, fair-3, good-4 and excellent-5. General programme satisfaction is anchored on a 4-point Likert scale of very dissatisfied-1, dissatisfied-2, satisfied-3 and very satisfied-4. The survey was validated by experts and pilot-tested among ODL students in the National Open University of Nigeria (NOUN), Ibadan Study Centre. A Cronbach Coefficient of .76 was obtained for the survey. Table 1 shows the constructs for the examined variable in the study.

Table 1: Variable and Construct for the Study

Variables	Items
Teaching and Learning Experiences (TLE)	Quantity of course materials
	Clarity of the course material
	Variety in ways of communication with lecturers
	Availability and access to lecturers
	The coordination of the interactive session
	Course assessment & examination
	Quality of instruction in the ODL programme
	Opportunity for peer-based learning and social interaction
	The use of technological tools for learning
	Availability of supplementary materials to support learning
Infrastructural Facilities (IF)	Internet access
	Computer Laboratory
	Class/lecture room for interactive sessions and tutorials
	Library
	Electricity
Support Services (SS)	E-learning support systems
	Attention to students' difficulties and challenges
	Feedback mechanisms
	Technical delivery of instruction
	Orientation on technological media use in the ODL programme
	Counselling
	Tutorial support
	Library services
General Programme Satisfaction (GPS)	Overall, how satisfied are you with the ODL programme

Statistical Analysis

A Partial Least Square- Structural Equation Modelling (PLS-SEM) technique with latent variables in SmartPLS 4.0 software was used to analyze the study data in three important phases. These phases include reliability & validity measurements, model fit and Structural model path coefficients. The first phase involved assessing the validity and reliability of the measurement constructs, and the second phase ascertained if data met the approved thresholds using model fit indices. The third phase entailed analyzing the structural model to test the research hypotheses.

Results

Demographic Characteristics

Table 1: Demographic Characteristics of Participants

Variable	Freq.	Percentage
Age		
16-20	1	0.2
21-25	36	6.6
26-30	147	26.9
31-35	169	31.0
36-40	86	15.8
41-45	48	8.8
46-50	39	7.1
51-55	17	3.1
56-60	3	0.5
Gender	241	44.1
Male	305	55.9
Female		
Marital Status	380	69.6
Single	161	29.5
Married	5	0.9
Divorced/Widowed		
Employment Status	238	43.6
Employed	175	32.1
Self-Employed	133	24.4
Unemployed		
Programme Level	116	21.2
100	135	24.7
200	115	21.1
300	86	15.8
400	94	17.2
500		

Table 1 below presents the demographic characteristics of the study's participants. Demographic characteristics of the study's participants revealed that about one-third (31.0%) are within the age bracket of 31-35 years and over half (55.9%) of the participants are female. Also, over two-thirds (69.6%) of the participants are single while about half (43.6%) are employed. Further, the distribution of students based on programme level indicates that one-fourth of the students are in the 200 level.

Table 2: Reliability Results

Variable	CA	CR	AVE
IF	0.837	0.884	0.605
SS	0.935	0.946	0.687
TLE	0.920	0.933	0.583

Table 2 presents the Cronbach alpha (CA), Composite Reliability (CR), and Average Extracted Variance (AVE) to test internal consistency in the constructs and the results. It was revealed in Table 2 that the measurement constructs demonstrate reliability, as both CR and AVE values surpassed 0.7 and 0.5, respectively. To ensure reliability in model constructs, it is recommended that CR and AVE values should exceed 0.7 and 0.5, correspondingly. Thus, internal consistency is evident across all constructs of the model, with CA values ranging between 0.837 and 0.935. Items with factor loadings below 0.70 were removed from the model.

Table 3: Fronell-Larcker Criterion Results

Variable	IF	SS	TLE
IF	**0.778**		
SS	0.732	**0.829**	
TLE	0.733	0.791	**0.764**

Note: The number in bold is the square root of AVE.

Table 3 presents the outcomes of the discriminant validity analysis using the Fornell-Larcker criterion. The confirmation of discriminant validity occurs when the square root of the AVE for each factor (diagonal elements) is higher than the correlation coefficients between the factors they represent. Additionally, to bolster the robustness of these findings, the study utilized the Heterotrait-Monotrait Ratio of Correlations (HTMT), an alternative method for assessing discriminant validity within measurement models. Detailed results of the HTMT discriminant validity assessment are available in Table 4.

Table 4: HTMT results

Variable	IF	SS	TLE
IF			
SS	0.833		
TLE	0.832	0.850	

Table 4 indicates the presence of discriminant validity, as all values fall below the recommended threshold of 0.90, consistent with the criteria outlined by Henseler, Ringle, and Sarstedt (2015).

Table 5: Goodness of fit results

Endogenous latent variable	R^2	Q^2	Standardized root mean square residual (SRMR)	Normed Fit Index (NFI)
EC	0.544	0.427		
			0.052	0.923

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Table 5 presents some of the goodness-of-fit results obtained. Before testing the suggested hypothesis, the model underwent examination to ensure it met all model fit indices. R^2 and Q^2 serve as indicators of model fit quality, and according to Briones-Penalver et al. (2018), these values should surpass zero. It can be inferred from Table 5 that the path model demonstrates predictive relevance as each R^2 and Q^2 value exceeds zero, indicating relevance for the specific dependent constructs as outlined by Hair et al. (2016). Also, the standardized root mean square residual (SRMR) value of 0.052 falls below the threshold of 0.08, signifying that the model's fit is acceptable. Furthermore, with an NFI (Normed Fit Index) value of 0.923, which surpasses the recommended threshold of 0.90, the model's fit is also considered acceptable.

Structural model

Table 6: Structural model's PLS results

Hypothesis	Relationship	Std Beta	SE	t	P-values	Decision
H1	TLE -> GPS	0.326	0.050	6.533	<0.001	Supported
H2	IF -> GPS	0.097	0.045	2.170	0.030	Supported
H3	SS -> GPS	0.350	0.056	6.256	<0.001	Supported
H4	Gender x SS -> GPS	-0.076	0.057	1.329	0.184	Not supported
H5	Gender x TLE -> GPS	0.040	0.050	0.797	0.426	Not supported
H6	Gender x IF -> GPS	-0.027	0.048	0.553	0.581	Not supported
H7	MS x TLE -> GPS	0.056	0.050	1.121	0.263	Not supported
H8	MS x IF -> GPS	-0.012	0.044	0.273	0.785	Not supported
H9	MS x SS -> GPS	-0.013	0.056	0.240	0.811	Not supported
H10	PL x IF -> GPS	-0.060	0.047	1.268	0.206	Not supported
H11	PL x TLE -> GPS	0.088	0.052	1.677	0.094	Supported
H12	PL x SS -> GPS	-0.006	0.054	0.109	0.913	Not supported
H13	ES x IF -> GPS	0.050	0.048	1.037	0.300	Not supported
H14	ES x TLE -> GPS	-0.024	0.056	0.426	0.670	Not supported
H15	ES x SS -> GPS	-0.103	0.057	1.797	0.073	Supported

Table 6 presents the PLS results for the structural model. Table 6 revealed that TLE had a significant positive effect on GPS (β = 0.326, t=6.533, p <0.001), IF had a significant positive effect on GPS (β = 0.097, t=2.170, p =0.030) and SS significantly predicts GPS (β = 0.350, t=6.256,

p <0.001). Among the three basic factors (TLE, IF and SS), SS is the prominent factor that predicts ODL students' GPS. It is additionally noteworthy that at the 10% significance level, PL positively moderate the relationship between TLE and GPS while ES negatively moderate the relationship between SS and GPS. However, other moderators in the model are deemed insignificant, given that all their p-values exceed 0.10.
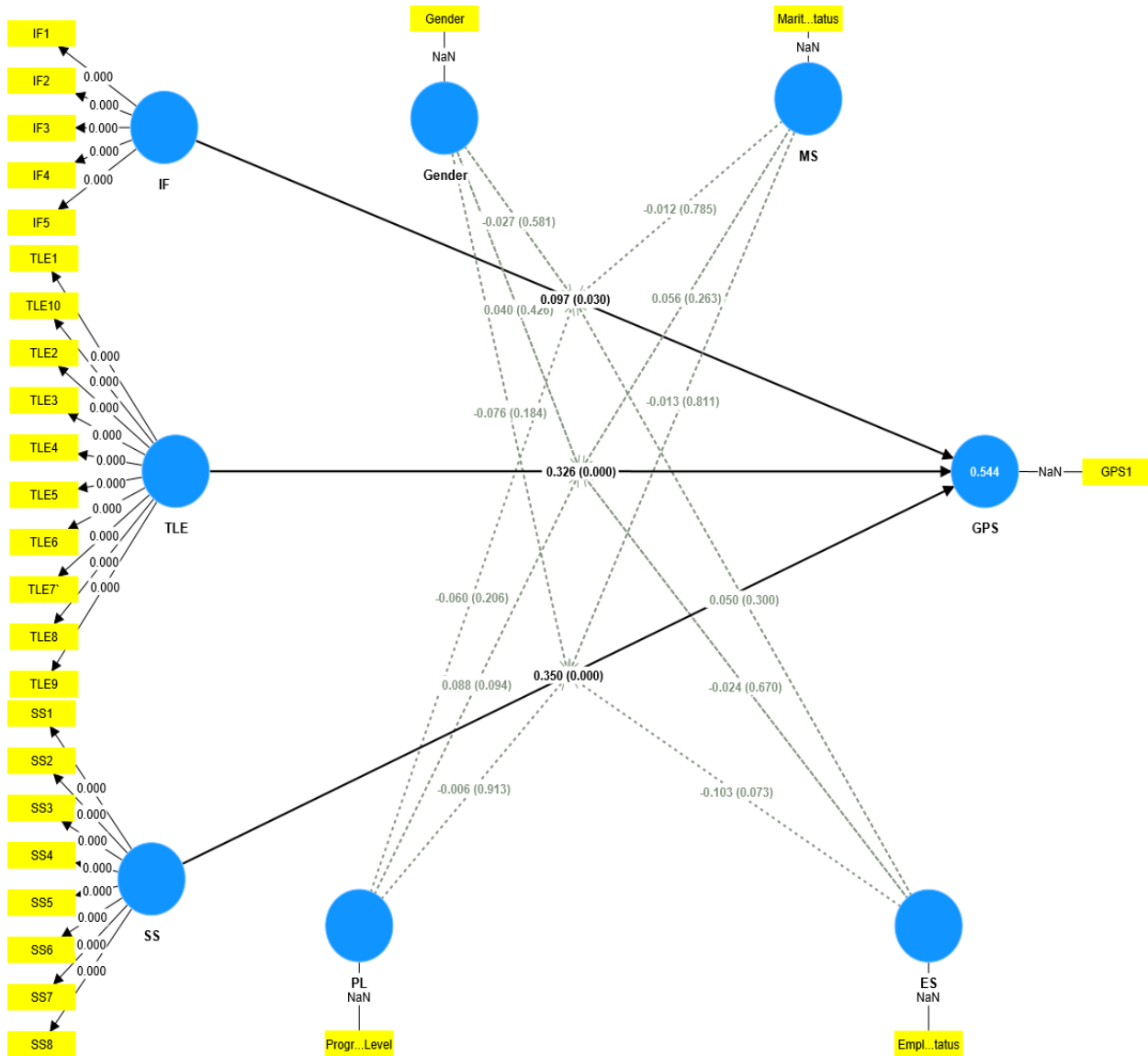
Figure 2: SEM with coefficients

Figure 2 is a summary of the fitted model containing coefficients and factor loadings. Figure 2 revealed that the model exhibits good convergent validity, as all factor loadings surpass 0.70. Also, as depicted in Figure 2, the results indicate that TLE, IF, and SS collectively explain 54.4% of the total variability in GPS among ODL students. This therefore suggests a well-fitted model, demonstrating a substantial proportion of the data fitting the proposed model structure.

Discussion

The study attempted a model analysis of factors that predict the general programme satisfaction of ODL students in Nigeria. Results of the study revealed that teaching and learning experience had a significant positive effect on ODL students' general programme satisfaction. This result suggests that the quality of teaching and learning experiences directly influences ODL students' overall satisfaction with the programme. This means that how courses are delivered, the effectiveness of instructional methods and the availability of learning resources are essential factors that determine how students perceive and rate their educational experience (Ginns *et al.,* 2007). The result is consistent with previous research findings (Berbegal-Mirabent *et al.*, 2016; Caskurlu *et al.,* 2020; Itasanmi & Oni, 2020; Zamri *et al.,* 2021). This result highlights the need for ODL institutions to invest in effective instructional design that is engaging, interactive and tailored to the needs of distance learners.

Also, the study's result indicates that infrastructural facilities had a significant positive effect on ODL students' general programme satisfaction. This result is consistent with the findings of related studies (Abdullahi & Yusoff, 2019; Yosa *et al.,* 2021). Studies have shown that access to infrastructural facilities such as classrooms, laboratories, social areas, and university libraries is important for students' satisfaction and competitiveness in higher education (Janardhan & Rajasekhar, 2012; Hanssen & Solvoll, 2015). This result indicates that the quality and availability of infrastructural facilities are foundational to the overall satisfaction of students in ODL programmes. The primary mode of ODL delivery in the contemporary world is digital. A reliable and accessible technological infrastructure is essential (Saidi *et al.,* 2021; Choudhury et al., 2023). Infrastructure in this context includes technological platforms, access to digital resources, internet connectivity and physical facilities that support the ODL experience. Robust, user-friendly and accessible infrastructural facilities can enhance the learning environment by providing learners with the tools and resources needed to succeed in their academic endeavours (Ansari et al., 2022; Nehemiah, 2023). This result therefore underscores the need for improving infrastructural facilities to be a major component of strategic planning in ODL institutions.

Results equally revealed that support Services significantly predict general programme satisfaction of ODL students. This result is consistent with previous research findings (Jegathesan *et al.,* 2018; Akande, 2022). This result indicates that support services are fundamental to shaping the overall experience of students in ODL programmes. ODL students who receive robust support services are likely to be more satisfied with the programme with a consequential effect on success rates, retention and reputation enhancement of the institution (Netanda *et al.,* 2017; Majaule, 2023). Support services such as feedback mechanisms, technical support, counselling, tutorial support and library services have a great impact on how students perceive and engage with the programme. This is a result of the fact that ODL students do not have the same level of physical interaction and access to on-campus resources (Mayanja et al., 2019). Thus, ODL institutions must offer a range of support services that address the diverse needs of ODL students. Such support services must be well-organized, accessible and responsive to ensure that ODL students feel supported throughout their learning journey.

Further, it was revealed that support services are the most prominent factor predicting ODL students' general programme satisfaction compared to teaching and learning experiences and infrastructural facilities. This result aligns with Itasanmi and Oni (2019) who found support

services to have the highest contribution to ODL students' satisfaction compared to teaching and learning experience, infrastructure and educational resources. The result suggests that ODL students place a high value on the assistance and guidance they receive throughout their educational journey. While teaching and learning experiences and infrastructure are important, the presence of robust support services is often what enables students to remain connected to the social and academic life of the institution (Majaule, 2023). This result underscores the importance of having ODL environments that provide more than just academic instruction and access to technology. ODL students need an ongoing support service that will cater to their academic, administrative and personal needs.

The study revealed that while the programme level of students positively moderates the relationship between teaching and learning experiences and general programme satisfaction, employment status negatively moderates the relationship between support services and satisfaction. This suggests that as students progress to higher levels in their academic programmes, the influence of teaching and learning experiences on their overall satisfaction increases. The researcher attributes this to the fact that advanced students expect more specialized content, deeper engagement, and more challenging academic work. As a result, institutions must adjust their teaching strategies to meet these growing expectations at higher levels. Conversely, a student's employment status affects their perception of the effectiveness of support services, thus influencing their overall satisfaction. In other words, employed and self-employed students benefit less from support services compared to unemployed students. This can be attributed to the work-life-study balance challenges students, especially full-time workers, face in managing work and academic demands. With limited time to access or engage with institutional support services, ODL institutions must offer more flexible support options that students can access at their convenience.

Conclusion
The current study attempted a model analysis of factors that predict the general programme satisfaction of ODL students in Nigeria. The study's results revealed that teaching and learning experiences, infrastructural facilities, and support services significantly contribute to students' overall satisfaction with the programme. However, among these, support services emerged as the most prominent factor. The study also found that while the programme level of students positively moderates the relationship between teaching and learning experiences and general programme satisfaction, employment status negatively moderates the relationship between support services and satisfaction. These results underscore the need for ODL institutions to prioritize robust support services, improve teaching and learning experiences and ensure adequate infrastructural facilities to enhance programme satisfaction among the students. ODL stakeholders can leverage these insights to refine their practices, address students' diverse needs and improve overall satisfaction in ODL settings.

Recommendations
Based on the results of the study, the following suggestions are made to improve students' satisfaction with ODL programmes:
1. ODL institutions must prioritize providing high-quality teaching and learning experiences, robust infrastructural facilities and most especially foster a comprehensive support service. Such support services must be holistic and should be flexible, and convenient to accommodate the busy schedules of employed and self-employed students.

2. ODL institutions should make a concerted effort to provide programme-level differentiation. This will allow the customization of learning experiences for students at different programme levels to meet their evolving needs and expectations.
3. There must be regular assessment of the impact of teaching, facilities and support services on students' satisfaction to identify areas that require improvement for the effectiveness of the ODL programmes.

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