

# DETERMINE THE RELATIONSHIP BETWEEN TEACHER KNOWLEDGE AND STUDENTS' ACADEMIC PERFORMANCE USING TEACHER COMMITMENT AS MEDIATOR

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**Abstract.** Teacher knowledge has been regarded as important tool for improving students' academic performance. Thus, the knowledge gained by teachers would transform teaching activities in the classroom. It is imperative for Nigeria teachers to keep abreast of latest information that would help teaching and learning in Nigeria secondary schools. Therefore, this study examined structural equation modeling to determine the relationship between teacher knowledge and students' academic performance with mediating effect of teacher commitment. A quantitative research approach was used to determine the relationship among the three variables. Four hundred (400) teachers were selected through stratified random sampling technique. Structural equal modeling (SEM) analysis was employed to test the data fitness in with constructs formulated in the model. Based on the findings of the study, there was direct and significant relationship between teacher knowledge and students and academic performance. Also, teacher commitment was able to mediate on the relationship between teacher knowledge and students' academic performance. The findings encourage the schools to up-date their teachers by given them in-service training.

**Keywords:** *teacher knowledge, teacher commitment, student's academic performance, teaching*

## Introduction

Teachers are expected to display the skills they have acquired to students in the classroom setting (Warrah et al., 2019; 2018). Teacher knowledge is so much concern about how teacher relate their subject matter knowledge to their pedagogical knowledge and how subject matter is related to the process of academic reasoning (Adedoyin, 2011). Teachers who possess strong subject matter knowledge give details in their lesson, link the topic to other topics, demanding many questions from students (NCTM, 2000). In secondary schools, it is necessary for teachers to have the skills of topic difficult for students and why, knowing ways to develop students to understand the subject and knowing varieties of methods that are useful for teaching a particular concept. Shulman (1986) expressed that transformation of subject matter knowledge include series of actions from the representation of ideals in various form, instruction selection of teaching methods to adapting, tailoring specific learners and context and preparation of materials. The result WAEC released for 2019 which show that 70% of students failed woefully in both English and mathematics. Olasehinde-Williams et al. (2018) expressed that this failure might because of teachers incompetent to handle the teaching and learning in the classroom. Some of the past studies (Arinde, 2010;

Gerritsen et al., 2017; Darling-Hammond, 2017; Mukminin et al., 2017) on students' academic performance asserted that the situation can be improve if qualified teachers are recruited in the system. This means that this scenario needs urgent investigations. Therefore, the purpose of this study was to investigate the relationship between teacher knowledge and students' academic performance with mediating effect of teacher commitment.

### ***Teacher knowledge***

Growing body of research evidences explicated that teacher knowledge improve students' academic performance in secondary schools (Guerriero, 2014; Blazar, 2016; Kiamba et al., 2017; Hill and Chin, 2018; Odumosu and Fisayi, 2018). Ball (1988) has stressed that having good knowledge of subject matter making the learning environment lively. Teacher's understanding of subject matter affects their capacity to simplify content to help students to understand (Kiamba et al., 2017). It has been observed that students taught by qualified teacher perform very well over the one taught by unqualified teacher (Ademulegun, 2001). When the teacher understands the subject to be taught would excel well in the classroom would make students to get the fact and information. Kiamba et al. (2017) opined that requisite knowledge of subject matter give the teacher the ability to: to teach well using different teaching methodologies and give varied and alternative questions and ability to clarify misconceptions on subject content.

Additionally, Olasehinde-Williams et al. (2018) emphasized that in order to reduce poor performance of students in Nigeria secondary school is to know the quality of teachers employed to teach in the classroom. Further stressed that teachers must have the responsibilities of getting accurate information to determine content to be teach, strategies, imparting knowledge, feedback and method to use. This is why; the national policy of education in 2013 asserted that quality teacher is the determinant of quality education. Poor knowledge of teacher is one the factor responsible for poor academic performance (Agoro and Akinsola, 2013; Ladipo, 2013). This is why, the teacher to be employ into teaching industry should be knowledge oriented. Teacher should try as much as possible to gain knowledge that would transform the students which in turn improve student academic performance.

### ***Students' academic performance***

Porter (2006) opined that performance is the outcome or result of one's efforts or ability. In the education setting, students' academic performance refers to the academic achievement as outcomes that signifies the degree to which a learner has attained specific goals that were the center of the activities in an instructional situation e.g. university, college and school (Ekpiken and Edet, 2014; Ayuba and Mohammed, 2014; Yahaya, 2015). Students perform very well when they understand the subject teaching by teacher. Academic performance is very broad in the sense that it covers a variety of educational outcomes (Tella, 2007).

Among the outcomes of academic performance in education are grades, scores or performance on an educational achievement test or knowledge acquired in an educational system (Richardson et al., 2012). What these indicators have in common is that they depict the intellectual capabilities of a person. In both developed and developing countries, academic performance of students has been becoming a major

issue in education. Academic performance can be measured by a test or examination to determine whether students have the privileges to continue his/her study in a secondary school (Yahya, 2015). It is on this premises that students' academic performance should be based on quality of teachers employed in the system. Concerted efforts should be done to improve students' performance.

### ***Teacher commitment***

Teaching requires dedication, commitment and excitement. Teachers remains a vital instrument of any educational system, play an important role in promoting education by enhancing abilities of students through the nature of their work (Mart, 2013). Commitment has been known to be related to teachers' performance and teachers commitment greatly contributed to academic performance of students and the teaching quality. Teacher commitment has just been recognized since 1980 when people left the teaching industry to find lucrative works. According to Vasudevan (2013) that teacher commitment has been used for teacher quality and a committed teacher has been used interchangeably for dedicated teachers.

Mart (2013) viewed teacher commitment as a strong emotional bond the educational workers have towards the schools. Commitment is a job attitude that drives the individuals to be willing to work harder to accomplish objectives and be in employment (Vasudevan, 2013). Teachers who love to teaching would exhibits hardworking and derived satisfaction from it. Commitment differentiates professional teachers from unprofessional teachers. Day et al. (2005) viewed that teachers who are committed to work would be after students' progress caters for them and guide them to accomplish the learning outcome. They endeavor to improve their method of teaching and their practices in the class as well as consider individual differences (Saliu et al.,2015). There are three commitment propounded by Meyer and Allen (1991) which include affective commitment, continuance commitment, and normative commitment. These components depicted three psychological states of employees with regards to an organization that influence their decision to maintain membership with organization (Hoang, 2012).

### ***Relationship between teacher knowledge and student academic performance***

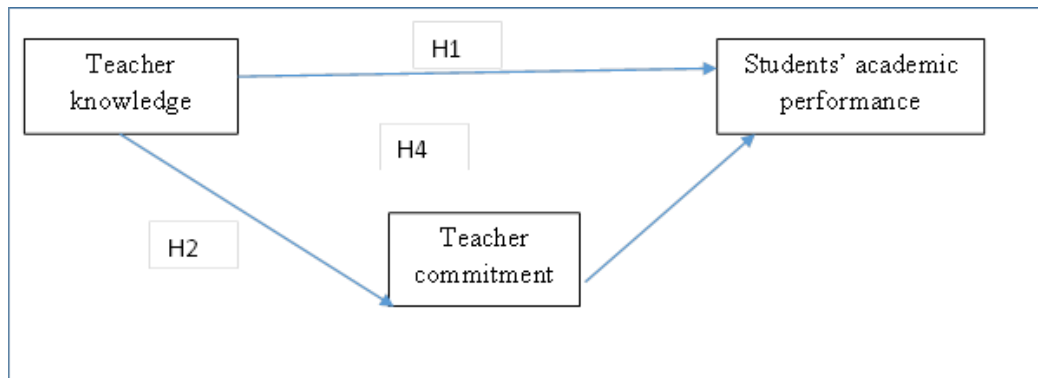
Based on the hypotheses formulated, researchers have found significant and positive relationship between teacher knowledge and student academic performance. In a study investigated by Olasehinde-Williams et al., (2018) on teachers' Knowledge Indices as Predictors of Secondary School Students' Academic Achievement in Kwara State, Nigeria. The findings of the study demonstrated that pedagogical and subject content knowledge of teacher found to be determinant of students' academic performance. Accordingly to Hill et al. (2005), who examined the effects of teachers' mathematical knowledge for teaching on student achievement, whereby the study found that mathematical knowledge has significant relationship with students achievement gain.

In a study investigated on teacher knowledge and students' academic performance, Kiamba et al. (2017) who worked on influence of teacher's subject matter knowledge on students' academic achievement of kiswahili language in public secondary schools in kathonzweni sub-county, Kenya. the finding of the study showed that teacher's subject matter knowledge had significant influence on students' achievement on Kiswahili language ( $r=0.618$ ,  $p\text{-value}=0.000$ ). Lastly, another study was investigated by Adediwura and Tayo (2007) on Perception of teachers' knowledge, attitude and

teaching skills as predictor of academic performance in Nigerian secondary schools. The finding indicated that students' perception of teachers' knowledge of subject matter, attitude to work and teaching skills has a significant relationship on students' academic performance.

### ***Conceptual framework for this study***

Three variables were used in this current study. The independent variable was teacher knowledge and dependent variable was students' academic performance. Then, the last variable was teacher commitment which serves as mediator. Teacher knowledge has direct path with students' academic performance while the arrow between teacher knowledge and teacher commitment indicated indirect path. The arrow between teacher commitment and students' academic performance show indirect path. The mediator (teacher commitment) used in the conceptual framework was strengthen the relationship between teacher knowledge and student academic performance (*Figure 1*).



***Figure 1.*** Conceptual framework used in this study.

### ***Hypotheses development***

Adedoyin (2011) refers to teacher knowledge of the subject as the knowledge of how to transform subject knowledge into a meaningful outcome for learners and it involves deep knowledge of a particular topic and how teachers present it in a simple manner. Teachers are expected to display the teaching skills they have acquired to students in the classroom setting (Metzler and Woessmann, 2012). This lead to the formation of first hypothesis. That is, teacher knowledge has significant effect on students' academic performance.

Carbonneau et al. (2008) and Mart (2013) see teacher commitment as a strong emotional bond between the educational workers and the schools. Commitment is a paramount job attitude because it drives the individuals who are expected to be willing to work harder to accomplish objectives and be in employment (Vasudevan, 2013). Past studies of Haftkhavani et al. (2012); Mart (2013); Celep and Yilmazturk (2000); and Kiplagat et al. (2012) found that teachers' commitment can translate teacher quality which in turn leads to quality education. This lead to the formation of second hypothesis. That is, teacher commitment has significant effect on students' academic performance.

Teaching requires dedication, commitment and excitement. Teachers remains a vital instrument of any educational system, play an important role in promoting education by enhancing abilities of students through the nature of their work (Mart, 2013). However,

commitment has been known to be related to teachers' performance and teachers commitment greatly contributed to academic performance of students and the teaching quality. Teacher commitment has just been recognized since 1980 when people left the teaching industry to find lucrative works as a result of this development, this lead to the formulation of third hypothesis. That is, teacher commitment has significant effect on students' academic performance.

## Materials and Methods

### Research design

The research design used in this study was quantitative approach. The approach was suitable because the researcher would be able to relevant information from sample (teachers) of the study. Some of the questionnaire used is adopted from various articles related to the study. The population of the study was all teachers working in kwara state secondary schools. The total populations of teacher were 5129. As the study used SEM, large sample were required so that the findings can generalized (Hair et al., 2010). Therefore, the study selected 400 sample based on Krejcie and Morgan (1970) sample size table. Having determined the sample size, stratified sampling method was apply to select 400.

### Research instrument

There are three variables used for the study. The three variables are teacher knowledge, teacher commitment and students' academic performance. Then, 5 point Likert scale was used for all the constructs. For all the constructs, five items were formulated each making 15 items. The items for teacher knowledge were adapted from Adedoyin (2011). Then, items for teacher commitment were from Smith (2009); Anyieni (2014); Solomon (2007); Morgan et al. (2015) and for students' academic performance adapted from Arinde (2010). Some of these adapted questionnaire were modified to suit kwara state context. The researcher personally distributed 400 questionnaires to selected secondary schools teachers in Kwara state which took about one month.

### Reliability

The reliability was conducted on three variables and their underlying items (*Table 1*). The teacher knowledge with five items have Cronbach Alpha of .649, teacher commitment with 4 items indicates strong Cronbach Alpha of .610 after deleted item 4. The last variable which was students' academic performance with 5 items have Cronbach Alpha of .669. This is in line with Sekaran (2005) which stated that Cronbach Alpha is above .6 that instrument meet the requirement. Hair et al. (2010) expressed that high reliability indicates that construct measure what is supposed to measure.

*Table 1. Reliability analysis.*

Scale/item	Corrected item-total correlation	Cronbach's Alpha if item deleted	Cronbach's Alpha	No of items
Teacher Knowledge				
A1	.388	.610		
A2	.452	.574		

A3	.458	.570	.649	5
A4	.397	.621		
A5	.375	.610		
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Teacher commitment				
A7	.359	.567		
A8	.431	.517		
A9	.443	.502	.610	
A10	.389	.577		
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Students' Academic Performance				
SAP1	.479	.600		
SAP 2	.453	.606		
SAP 3	.501	.580	.669	5
SAP 4	.257	.729		
SAP 5	.535	.576		

## Results and Discussion

There are two things discussed under the findings. The study discussed confirmatory factor result analysis and structural equation modeling result.

### *Result of confirmatory factor analysis*

CFA must first be conducted before performing SEM (Hair et al., 2010) (Figure 2). There several goodness-of-fits index someone can explore for CFA. The fitness index used for the study model is the Tucker-Lewis Index (TLI), the goodness-of-fit index (GFI), the root mean square error of approximation (RMSEA), the CMIN/DF of 1 to 5. Therefore, there are three constructs used for CFA which include teacher knowledge (5 items), teacher commitment (5 items) and students' academic performance (5 items). Thus, the first order for three constructs and their underlying items were subjected to confirmatory factor analysis. The fitness index of the model was not reach the acceptance level. That is the value of TLI, NFI and CFI must be greater than  $>.90$ . Since the value is less, the model needs to be re-specifying so as to meet the acceptance level. In order to get good fitness, these following items were deleted A10, A11, and A12. After deleted the items, the model meet the acceptance level. The fitness for model are  $Chisq=298.337$ ,  $Chisq/df=5.850$ ,  $TLI=.937$ ,  $CFI=.952$ ,  $NFI=.942$  and  $RMSEA=.050$ . This shows that the last model was reliable and good for the data. The value obtained from model is in line with Hair et al., 2010 and Bentler and Yuan (1999).

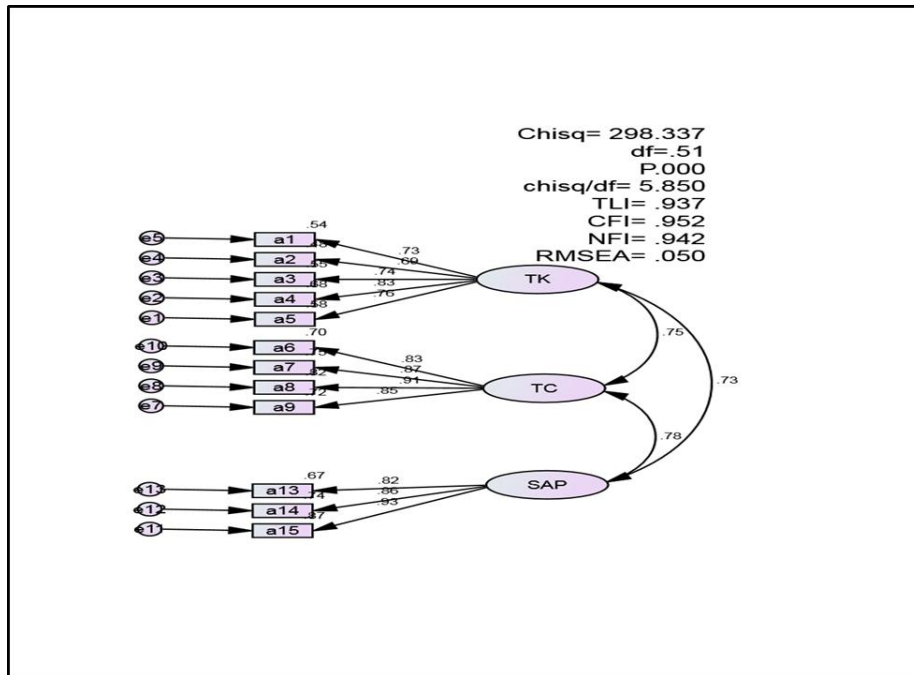


Figure 2. First order CFA after deleted a10, a11, a12 in the model.

### The structural equation model analysis

The structural equation model analysis was performed on structural equation modeling to determine the relationship between teacher knowledge and students' academic performance with mediating effect of teacher commitment (Figure 3 and Table 2). The direct path and indirect path of the model were examined. The direct path between teacher knowledge and students' academic performance was 0.34, the indirect path between teacher knowledge and teacher commitment was 0.75 and indirect path between teacher commitment and students academic performance was 0.52.

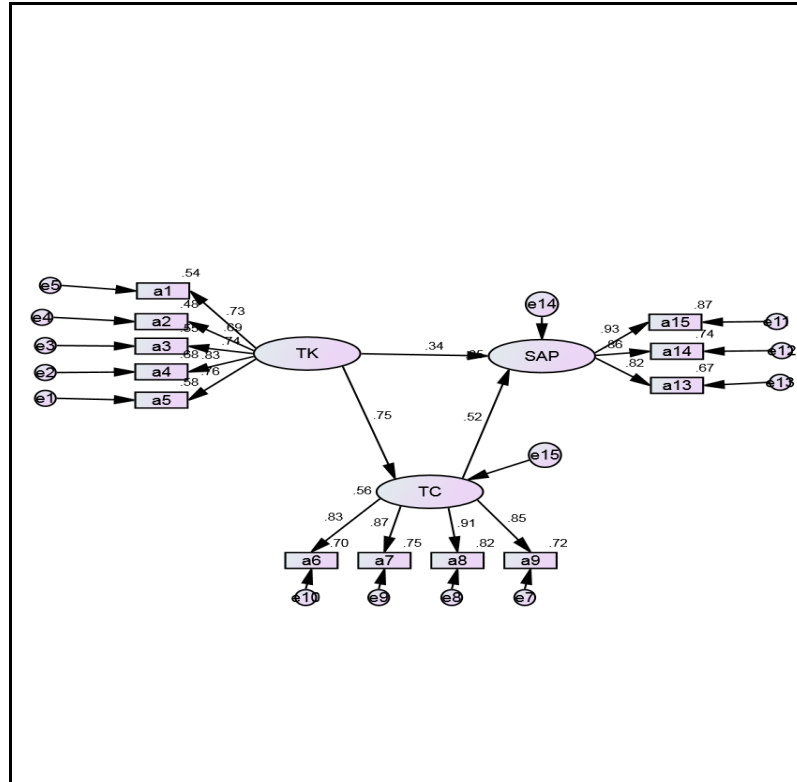


Figure 3. The structural analysis for TK, TC and SAP.

Table 2. Regression weights for teacher knowledge, teacher commitment and students' academic performance.

Construct	Path	Construct	Estimate	S.E.	C.R.	p-value	Results
Teacher knowledge	→	Teacher Commitment	.745	.048	16.420	***	Significant
Teacher commitment	→	Students' academic performance	.337	.065	6.324	***	Significant
Teacher knowledge	→	Students' academic performance	.524	.060	10.090	***	Significant

### Mediation analysis

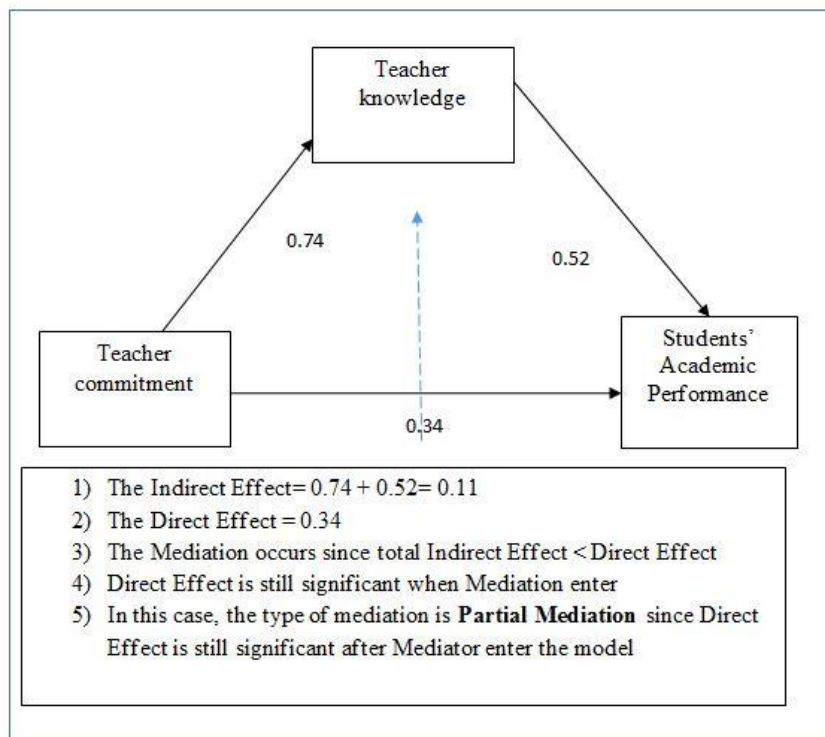
The mediation analysis was performed on the relationship between teacher knowledge and students' academic performance. The mediation occurs in a stipulation whereby the effects from exogenous variable to the endogenous variable that goes through the mediator (indirect effect) is greater than the effects from the exogenous construct that goes directly to the endogenous (direct effect). First of all, extract the standardized regression weights and the probability values which indicate the significance for the respective path. This process was adopted to test for mediation analysis in this study. As shown in Table 1.3 and figure 1.2, the direct effect between teacher knowledge and teacher commitment was 0.74 and between teacher commitment and students' academic performance was 0.34. The direct effect between teacher knowledge and student academic performance was 0.52. Therefore, mediation occurs since indirect effect was less than direct effect. This type of mediation is partial



mediation because direct effect still relevant after mediator enters the model. The result of the analysis shown in *Table 3* and *Figure 4* in relation with model.

**Table 3.** The result for hypotheses testing for the respected path in the model.

Hypothesis statement	Estimate	p-value	Result of hypotheses
H <sub>1</sub> : teacher knowledge has significant effect on student academic performance.	.412	***	Supported
H <sub>2</sub> : teacher knowledge has significant effect on teacher commitment.	.793	***	Supported
H <sub>3</sub> : teacher commitment has significant effect on student academic performance.	.601	***	Supported
H <sub>4</sub> : teacher commitment mediates the relationship between teacher knowledge and students' academic performance.	0.11	***	Partial mediation



**Figure 4.** The Standardized Regression Weights for the model.

## Conclusion

The study tested the structural equation modeling to determine the relationship between teacher knowledge and students' academic performance with mediating effect of teacher commitment. The regression weight for the relationship between teacher knowledge and students' academic performance was significant. This show that teacher

knowledge contribute to the student academic performance. In view of this, Niess (2011) express the knowledge the teachers have contributed greatly to the development of the students. It is important for teacher to get knowledge they need in order to improve the teaching and learning. The relationship between teacher knowledge and teacher commitment was significant. That is commitment of teachers to teaching industry can make teachers to acquire more knowledge. This supported by Mart (2003) that commitment given to teaching industry by teacher can lead progress in classroom activities. Again, Crosswell and Elliott (2001) opined that a well committed teacher able to accomplish the educational objectives. In the same way, significant relationship was found between teacher commitment and student academic performance. This result demonstrated that teachers have commitment to teacher able to guide the students accordingly. This is result was confirmed by Hoang (2012) that three model of teacher commitment is the one that influence teacher decision to remain a member of an organization. On top all these discussion, teacher are expected to seek for requisite knowledge needed in the teaching industry. When the possess knowledge, the students' academic performance tend to be improve. Training and re-training of teachers are fundamental for teacher development. This training would make them to get relevant information for teaching and learning.

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