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Job crafting-satisfaction relationship in electrical/electronic technology education programme: Do work engagement and commitment matter?

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A R T I C L E   I N F O

A B S T R A C T

This study investigates the multiple mediating roles of work engagement and work commitment in the job crafting-job satisfaction relationship. The participants of the survey were 247 electrical/electronic technology education lecturers in Nigeria Universities. We applied bivariate correlation, regression and path analysis via 5000 re-samples bias corrected (BC) bootstrap method, and confirmatory factor analysis for data analyses. The findings showed that job crafting has positive significant prediction of work engagement, work commitment, and job satisfaction. We also found that work engagement and work commitment has positive significant prediction of job satisfaction. The path analytical results revealed that work engagement and work commitment has full multiple mediation on the job crafting-satisfaction relationship. In the same vein, work engagement partially mediated job crafting and work commitment relationship. Similarly, we found that work commitment partially mediated the relationship between work engagement and job satisfaction.

La relación entre *job crafting* y satisfacción en un programa de tecnología eléctrica/electrónica: la importancia de la implicación y el compromiso

R E S U M E N

Este trabajo investiga los diversos papeles mediadores de la implicación y el compromiso laborales que hay en la relación entre *job crafting* y satisfacción. En el estudio participaron 247 profesores de educación en tecnología eléctrica/electrónica de universidades nigerianas. Como análisis de datos se calculó la correlación bivariada, la regresión y el análisis de rutas mediante el método de *bootstrap* de 5.000 muestras con corrección de sesgos, así como el análisis de factores confirmatorio. Los resultados mostraron que el job crafting predice positivamente y de modo significativo la implicación y el compromiso laborales, así como la satisfacción. También se comprobó que la implicación y el compromiso laborales predicen positiva y significativamente la satisfacción laboral. Los resultados del análisis de rutas mostraron que la implicación y el compromiso laborales ejercen una total mediación múltiple en la relación entre *job crafting* y stisfacción. En el mismo sentido, la implicación laboral media parcialmente en la relación entre el *job crafting* y el compromiso laboral, lo mismo que se observó que el compromiso laboral mediaba parcialmente en la relación entre implicación laboral y la satisfacción.

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The educational organization approach to work conditions is gradually paving ways for more job demands from employees. The nature of employment is changing as a result of the present "transformations of the work environment caused by global competition, faster innovations, and lighting from production economies to service and knowledge oriented economies and the rapid advancement of information technologies" (Sekiguchi, Li, & Hosomi, 2014, p. 3). Similarly, the consistent organization work overload, time pressure, and emotional demands have been observed to have a positive relationship with employees' burnout (Alarcon, 2011; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). Erdogan and Bauer (2005) also affirmed that organizations increasingly expect jobholders to act on information and react to circumstances by demonstrating proactive behaviors.

The job demands in the present day higher educational organization require the lecturers to craft their job, be properly engaged on their job, and be committed to the organization, but maybe with a little emphasis on their satisfaction. The design and nature of lecturers' jobs can significantly shape how they experience meaningfulness of their work (Berg Dutton & Wozesmewski, 2013; Grant, 2007). By implication, the demand is more peculiar to electrical/electronic (E/E) technology lecturers. In Nigeria, the job tasks of an E/E technology lecturer involve teaching activities, administrative duties, and research engagement (Chukwuedo & Igbinedion, 2014). Although the tasks are common among lecturers in all fields of study, the E/E technology lecturer also deals with workshop/laboratory tasks that involve handling modern, complex, and emerging electrical and electronic devices practical purposes. Hence, the need for proactive behaviour via effective work engagement and commitment.

Job crafting is seen as a form of proactive behavior (Grant & Ashford, 2008). It involves both active and reactive behaviors through which lecturers increase fit for their work environment by changing it (Eggerth, 2008; Parker & Ohly, 2008; Tims & Bakker, 2010). Job crafting represents actions employees take to alter the physical boundaries of a job (type or number of activities), the cognitive task boundaries of a job (how one sees the job), and the rational boundaries of a job (whom one interacts with at work) (Berg & Dutton, 2008; Demerouti & Bakker, 2014; Wrzesriewski & Dutton, 2001). Thus, job crafting does not just occur in the workplace and usually without the knowledge of supervisors, but the aim is for positive impact and improvement in the job (Lyons, 2008).

In developing countries as Nigeria, E/E technology lecturers in the universities are surrounded with various on-the-job irregularities ranging from limited or no electrical and electrical devices and circuits to carry out practical in the workshop, overcrowded class size, multiple job tasks, balancing work-family affairs, political instability, ill-equipped or no workshop facilities, to the gap between what is obtainable in the industry and the educational system. The lecturer thus needs to craft his/her job to attain the goal of the university education to ensure the production of demand driven manpower for the world of work. These activities that the lecturer must undertake therefore engage him/her on the job. Bakker, Tims, and Derks (2012) therefore stated that work engagement should be predicted when employees craft their jobs.

Work engagement is a motivation concept that deals with the voluntary allocation of an individual's resources directed at the range of tasks required by a particular vocational role (Christian, Garza, & Slaughter, 2011; Schaufeli & Bakker, 2003; Vallieres, McAuliffe, Hyland, Galligan, & Ghee, 2017). In the view of Maslach and Leiter (1997) engagement is characterized by energy, involvement, and efficacy, which are considered the opposites of the three burnout dimensions, namely exhaustion, cynicism, and lack of professional efficacy, respectively. Maslach and Leiter see engagement as measured opposite to burnout, but Schaufeli, Salanova, Roma, and Bakker's (2002) study showed that engagement and burnout are not the same and should be measured differently and separately. Work engagement is usually measured in three dimensions, namely vigor, dedication, and absorption (Schaufeli & Bakker, 2003). Therefore, work engagement has a close association with job performance and organizational commitment. (Silman, 2014).

Although organizational commitment is not the same as work engagement of employee (Schaufeli et al., 2002; Little & Little, 2006), it is expected that a work engaged E/E technology lecturer should be committed to his/her institution. Commitment takes place when a person, by making a side bet, links extraneous interests with a consistent line of activity (Dixit & Bhati, 2012). It is the process by which the goals of the organization and those of the individual become increasingly integrated or congruent (Dixit & Bhati, 2012). Organizational commitment (Tanriverdi, 2008) can be the degree to which an individual adopts organization values and goals and identifies them in fulfilling their job responsibilities. It is how loyal the employee feels to the organization (Mohamed & Eleswed, 2013; Mueller, Wallace, & Price, 1992; Price, 1997). To measure organizational commitment, Meyer and Allen (1997) identified three simultaneous dimensions which include affective commitment (commitment to the organization by an emotional tie), normative commitment (commitment to the organization based on perceived obligation), and continuance committeemen (commitment based on perceived cost of leaving the organization) (Allen & Meyer, 1990; Jaros, 2007; Moynihan, Boswell, & Boudreau, 2000).

Every electrical/electronic technology lecturer belong to an educational organization; hence he/she is expected to be committed to the organization. Although some of the organizational policies may not be favorable, the lecturer may need to craft his/her job, be engaged with the work, and exercise some level of commitment to align his/her goals to the goals of the organization. The totality is to ensure that the lecturer is relatively satisfied with the job.

Job satisfaction is an attitude because it has been defined as a behavior (Weiss, 2002). It is the positive or negative judgment of an employee about his/her job or working conditions (Vasiliki & Efthymos, 2013). Job satisfaction is how people feel about their jobs and different aspects of their jobs (Astrauskaite, Vaitkevicius, & Perminas, 2010; Spector, 1997). If an employee shows positive feelings about the job, the employee may show increased job crafting, work engagement, and commitment. It is necessary that the job satisfaction of the lecturers be determined via their job crafting, work engagement, and commitment so that the work condition of the E/E technology lecturers be revisited.

Theoretical Framework

This study is supported by the job demand-resources (JD-R) model (Maslach & Jackson, 1986; Tims, Bakker, & Derk, 2012). The JD-R model postulates that every job is associated with certain physiological or psychological costs or demands. This theory has been implied to job crafting, work engagement, and job satisfaction. Tims et al. (2012) define job crafting in the theoretical framework of demands-resources (JD–R) model. Demerouti et al. (2001) affirmed that it has to do with "the changes that employees make to bring a balance between their job demands and job resources with their personal abilities and needs". The JD-R model categorizes all job characteristics in two broad classes, namely, job demands and job resources. Job demands refer to persistent physical and mental effort or skills. The job demands index induces physiological or psychological costs for the employees, whereas the job resources are physical, psychological, social, or organizational qualities of the job which support achieving work goals, personal growth, learning, development and reduce job demands and the physiological and psychological costs (Bakker & Demerouti, 2007).

Based on the JD-R model, Tims et al. (2012) suggested three theoretically different dimensions of job crafting. These are: (1) increasing job resources, (2) increasing challenging job demands, and (3) decreasing hindering job demands, hence dealing with all the challenges relating to resources. This measure means that the JD-R model recognizes the challenges relating to limited resources for effective job performance in organizations. Consequent to limited resources, expanded JD-R studies (e.g., Llorens, Schaufeli, Bakker, & Salanova, 2007; Simbula, Guglielmi, & Schaufeli, 2011; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009) affirmed that employees' job tasks demand the physiological and psychological areas of their lives. This theory applies to this study in that the job of the E/E lecturer requires his or her physiological and psychological aspects so that his/her job, crafting, work engagement, and work commitment dimensions are successfully achieved.

Job Crafting and Job Satisfaction

Job crafting has been shown to give employees the sense of job meaningfulness and fulfillment; hence employees are expected to exercise satisfaction with their jobs. Studies have shown that job crafting is closely related to satisfaction (Crawford, LePin, & Rich, 2010; Tims, Bakker, & Derks, 2013). Additionally, proactive job craft individuals are satisfied with their job (Wrzesniewski & Dutton, 2001). Job satisfaction has been found to relate to the employee's expectations from the job (Astrauskaite et al., 2010) and employer's social, psychological, and physiological support to the employee. Job satisfaction has proved to be a major construct in emotional and psychological employees' well-being (Klassen, Usher, & Bong, 2010). Since job satisfaction is the extent to which people like (satisfaction) or dislike (dissatisfaction) their jobs (Spector, 1997), employees who craft their job have the propensity to derive satisfaction from their jobs. Following the evidence from literature, E/E lecturers who may apply job crafting because of the demands of producing demand driven graduates for the present day allied industries can derive some levels of job satisfaction from the ability to craft their jobs. We, therefore, hypothesize that:

Hypothesis 1. Job crafting is a significant positive predictor of job satisfaction.

Job Crafting in Relation to Work Engagement and Commitment

It has been established that working conditions are closely related to burnout, work engagement, and job satisfaction (Crawford et al., 2010; Podsakoff, Mackenzie, Lee, & Podsakoff, 2003). Wrzesniewski and Dutton (2001) proposed that job crafters are satisfied workers. Research has also revealed that engaged individuals are highly energetic and self-efficacious who exercise influence over events that affect their lives (e.g. Schaufeli et al., 2002). Some other previous studies have consistently shown that job resources are associated positively with work engagement (e.g., Halbesleben, 2010). Job resources have a particular impact on engagement when job demands are high (Hakanen, Bakker, & Demerouti, 2005). When E/E technology lecturers are faced with increased job demands (challenges) and have sufficient job resources, they are expected to flourish in their work. It, therefore, implies that a proactive lecturer is likely to have high work engagement. We, therefore, hypothesize as follows:

Hypothesis 2. Job crafting is a significant positive predictor of work engagement.

On provision of job resources for employees, it is expected that employees would be committed to the organization. Not all employees are motivated to meet the needs for control, positive image, and connection at work (Wrzesniewski & Dutton, 2001).

Individuals who look forward to meeting these needs at work are likely to look forward to opportunities to craft their jobs in ways that allow them to meet their needs. Others may find that these needs are met elsewhere in their lives. The attainment of the organizational task may depend on the job design of the employee (Kanten, 2014). Hence, employees may abide with the organization. Wrzesniewski, McCauley, Rozin, and Schwarts (1997) and Wrzesniewski and Dutton (2001) proposed that work and motivational orientations of an organization as well as the perceived opportunities for employees lead to the crafting of jobs by employees. These are also apparently antecedent to commitment; hence Ghitulescu (2006) found a positive link between job crafting and commitment. Based on the fact that E/E lecturers need opportunities, work motivation, and organizational supports to craft their job for higher organizational commitment, we, therefore, hypothesize that:

Hypothesis 3. Job crafting is a significant positive predictor of work commitment.

Work Engagement, Work Commitment, and Their Relationships with Job Satisfaction

Any employee who feels engulfed with his/her job and accept the organizational citizenship behavior for his/her organization feels fulfilled in the job, hence improves job satisfaction. When an employee is not burned-out, this does not necessarily mean that he/she is engaged in his or her work; and reversibly, when an employee is low on engagement, this does not mean that he/she is burned-out (Shaufeli & Bakker, 2003); hence job satisfaction can be derived from the engagement and commitment of an employee. Work engagement has a close relationship between job performance, organizational commitment, and job satisfaction, even amongst university education teachers (Malik, Nawab, Naeem, & Danish, 2010; Murphy, Athanausou, & King, 2002; Silman, 2014). This assertion implies that the E/E lecturer is expected to derive satisfaction on the job following his/her engagement and commitment on the job.

When an employee is not satisfied, there is every tendency that work engagement and commitment will be low. Regarding employee's tendency to retain or quit a job, Martin and Kaufman (2013) found that there is a significant relationship between employee job satisfaction, organizational commitment, and intention to leave. Similarly, there is a relationship between satisfaction and meaningful work among employees (Steger, Dik, & Shim, in press). The E/E lecturers are faced with a lot of resources challenges, yet they tend to ensure they meet the current trend of advancement in electrical and electronic devices and circuits. To ensure that the job situation and condition of E/E lecturers in Nigeria universities are investigated, we hypothesize that:

Hypothesis 4. Work engagement is a significant positive predictor of job satisfaction.

Hypothesis 5. Work commitment is a significant positive predictor of job satisfaction.

Hypothesis 6. Work engagement is a significant positive predictor of work commitment.

The Research Model

The model depicted in Figure 1 is based on the hypotheses of this study, and the mediation effects based on the variables of this study.

The model describes the relationship between job crafting, work engagement, work commitment and job satisfaction. The model is a multiple mediation that embraces a three-path mediating effect
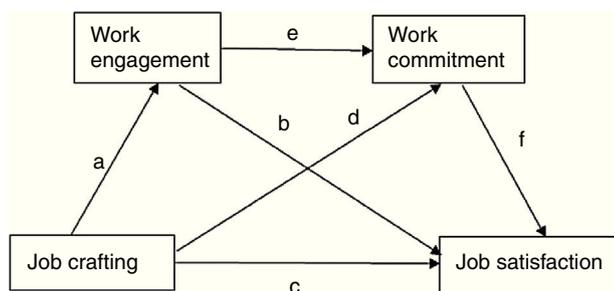
Figure 1. Conceptual Model: Path Diagram Multiple Mediation Model for Effect of Job Crafting on Performance via Work Engagement and Commitment.

via both work engagement and work commitment (Hayes, 2013; Preacher & Hayes, 2008). Our model allows one mediator (work engagement) to causally affect the other mediator (work engagement) (Hayes, 2013). Multiple mediation reduces estimate errors that separate mediation generates (Golec de Zavala & Van Bergh, 2007; Hayes, 2013; Preacher & Hayes, 2008). The three-path model demonstrates the paths for the unmediated and mediated regressions. The unmediated paths a, b, c, d, e, and f represents hypotheses one to six. By adding the two mediators, we have the three-path mediation models that allows the causality of work engagement on commitment. The paths described by a, b, and c illustrate the mediation effect of work engagement on job crafting-satisfaction relation. Paths a, e, and d is to test work engagement as a mediator on job crafting-work commitment relationship. The paths represented by d, f, and c represent the test of work commitment as a mediator on job crafting-satisfaction relation. Finally, paths e, f, and b, are to test work commitment as a mediator on work engagement-job satisfaction relationship. Hence we formulate three mediation hypotheses as follows:

Hypothesis 7. Work engagement and work commitment are significant positive mediators of job crafting and job satisfaction relationship.

Hypothesis 8. Work engagement is a significant positive mediator of job crafting and work commitment relationship.

Hypothesis 9. Work commitment is a significant positive mediator of work engagement and job satisfaction relationship.

In this study, we do not consider the predictive effects of demographic characteristics of the lecturers. We, premeditatedly agree with any existing literature based on this prediction. Hence we did not formulate any hypothesis regarding such effects.

Method

Participants

The participants of this study were 247 electrical and electronic lecturers in Nigerian universities, selected from the six geopolitical zones. These groups of lecturers teach electrical/electronic courses at different levels of education. The lecturers are trained from the field of engineering and technical/technology education to teach electrical/electronic courses, as the two areas of study training university graduates for skill acquisition in electrical/electronic technology (Federal Republic of Nigeria, 2004).

Measures

Demographic characteristics. We measured the lecturers' gender, university job tenure, highest academic qualification, age, and marital status as the demographic characteristics. Gender represents male (173, 70%), and female (74, 30%). The university job tenure

was grouped into categories of fewer than ten years (172, 69.6%), 10 to 20 years (49, 19.8%), 21 to 30 years (26, 10.5%), and above 30 years (none). The lecturer categories of highest educational qualification are first degree (8, 3.2%), masters' degree (155, 62.8%), and doctorate (84, 34%). The age categories include fewer than 26 years (8, 3.2%), 26 to 35 years (65, 26.3%), 36 to 45 years (73, 29.6%), 46 to 55 years (84, 34%), 56 to 65 years (8, 3.2%), and above 65 years (9, 3.6%). Finally, we measured marital status as single (24, 9.7%), married (214, 86.6%), widowed (9, 3.6%), divorced (none), and separated (none).

Job crafting. This behavior is a four-dimension scale for measuring increasing basic job resources, decreasing hindering job demands, increasing social job resources, and increasing challenging job demands (Tims et al., 2012). These four dimensions of job crafting are measured using a job crafting scale developed by Tims et al. (2012). The scale has four sub-scales in the order of its dimensions. In order to measure the dimensions, item statements were developed for increasing structural job resources (e.g., "I try to develop my capabilities"), decreasing hindering job demands (e.g., "I make sure that my work is mentally less intense"), increasing social job resources (e.g., "I ask my supervisor to coach me"), and increasing challenging job demands (e.g., "When an interesting project comes along, I offer myself proactively as project co-worker"). The job crafting scale is a 21-item scale, with 5, 6, 5, and five items respectively in each sub-scale (the four dimensions). Each sub-scale is a 5-point frequency rating scale ranging from *never* (1) to *always* (5).

Work engagement. This is a three-dimension scale which include absorption, dedication, and vigor. It is measured using the Utrecht Work Engagement Scale (UWES) (Schaufeli & Bakker, 2003; Schaufeli et al., 2002). The UWES has three sub-scales which are in line with the three dimensions of work engagement. In measuring these dimensions, declarative statements for vigor (e.g., "At my work, I feel bursting with energy"), dedication (e.g., "I am enthusiastic about my job"), and absorption (e.g., "Time flies when I'm working") were used to form the items of the scale (Schaufeli & Bakker, 2003; Schaufeli et al., 2002). The UWES is a 17-item instrument with initially 7-point rating scale ranging from *never* (0) to *always* (6), to measure work engagement, but for uniform scale in this study we used it (UWES) as a five-point rating scale of *never* (1), *rarely* (2), *sometimes* (3), *often* (4), and *always* (5). The UWES is sub-scaled into three to measure vigor (6 items), dedication (5 items), and absorption (6 items).

Work commitment. This is measured using the organizational commitment scale developed by Allen and Meyer (1990). Organizational commitment is measured in three dimensions which include Affective Commitment, Continuance Commitment, and Normative Commitment; hence the organizational commitment scale has three corresponding sub-scales. It is a 24-item scale ranging from *strongly disagree* (1) to *strongly agree* (5), and with each subscale having eight (8) items. The subscales for measuring the three dimensions were structured in declarative statements to measure affective commitment (e.g., "I enjoy discussing about my organization with people outside it"), continuance commitment (e.g., "It would not be too costly for me to leave my organization now"), and normative commitment (e.g., "I think that people these days move from company to company too often").

Job satisfaction. This was measured using the Job Satisfaction Survey (JSS) developed by Spector (1985). The JSS originally was made up of nine (9) factors (sub-scale) which generate 36 items. The nine factors can be used as the JSS for data collection (Astrauskaite et al., 2010; Spector, 1985). The scale contains dimensions such as pay, promotion, supervision, benefits, contingent reward, operating procedure, co-worker, nature of work, and communication. The JSS is a 5-point Likert rating scale ranging from *strongly disagree* (1) to *strongly agree* (5), however, our study utilized eight (8) factors

or dimensions, which are pay, promotion, co-workers, the work, benefits, procedures, and physical work condition. The rating scale was the same as the original version.

Job demands. We measured this variable using a combination of workload and emotional demand. Workload was assessed with a three-item of Karasek Job Content Questionnaire (Karasek et al., 1998). It is a measure of role load or workload (Bakker, Demerouti, De Boer, & Schaufeli, 2003a). A sample of the items is "I have excessive work in my workplace". The items were scored on five-point Likert scale ranging from *never* (1) to *always* (5). Emotional demand was assessed with a shortened three-item version of scale developed by Van Veldhoven and Meijman (1994) (reported by Wingerden, Bakker, & Derks, 2016). Items were also scored on five-point Likert scale ranging from *never* (1) to *always* (5).

Task performance. We measured task performance with a three-item of individual task proficiency scale. It is a self-report measure. This scale was reported and validated by Griffin, Neal, and Parker (2007). The items were scored on a five-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (5).

Job resources. This was measured using a combination of performance feedback and opportunity for professional development (Bakker, Demerouti, Taris, Schaufeli, & Schreurs, 2003b). Performance feedback was assessed with three items on a five-point scale ranging from *never* (1) to *always* (5). A sample of the items is "I get enough information about the objectives of my work". Opportunity for professional development was assessed with three items on a five-point scale ranging from *strongly disagree* (1) to *strongly agree* (5). A sample of the items is "There are possibilities to learn new things from my work".

Autonomy. This was measured using the 6 items of autonomy subscales of the work basic need satisfaction scale (van de Broeck, Vansteenkiste, Witte, & Lens, 2010). Autonomy is a psychological need that is satisfied when an individual chooses freely and organize his/her life, thought, and activities in the educational institution. Similarly, we believe that the need to satisfy autonomy is a plausible antecedent to job crafting and satisfaction. This subscale was scored on a 5-point frequency scale ranging from *never* (1) to *always* (5), while *sometimes* (3) is the midpoint of response options.

Data Analysis

Data analyses were carried out using SPSS 22.0, PROCESS for SPSS, AMOS 22.0, and LISREL 8.80 as statistical packages. The statistical tools we employed are mean, standard deviation, Cronbach's alpha, correlation and regression analysis, structural equation model (SEM) using path analysis (and applying 5000 re-sample bias-corrected BC bootstrapping method), and confirmatory factor analysis (CFA). The SPSS was used to determine the mean, standard deviation, Cronbach's alpha, and correlation and regression analyses. We used AMOS 22.0 to conduct path analysis by employing 5000 re-samples BC bootstrapping method (Preacher & Hayes,

2008), while PROCESS for SPSS was employed to substantiate the multiple mediation analysis that gives room for estimating specific indirect effect, which is a limitation from the use of AMOS (Hayes, 2013; Preacher & Hayes, 2008). We used LISREL for CFA.

Decision Criteria

For the test of significance, the probability (p) value was used in comparison with the alpha value of .05, and at other relevant levels. The data was subjected to CFA using several criteria, so as to determine the fitness of the scales. CFA helps to determine how well data fit a prior specified or theoretical model. This fit is usually appraised by employing chi-square statistic (χ^2), and the ratio of chi-square to the degrees of freedom (χ^2/df). The normed fit index (NFI), comparative fit index (CFI), standardized root mean square residual (SRMR), and the root means square error of approximation (RMSEA) are also employed. Recommended values of this indices include: a value between 1 and 2 for χ^2/df is preferable (Hair, Anderson, Tatham, & Black, 1992). The NFI and CFI fit indexes range from 0 to 1 with higher values indicating better fit, preferably, an index value of .90 or greater as showing an adequate fit. The SRMR and RMSEA range from 0 to 1, with values of .05 or less being desired for SRMR and with values less than .08 being reasonable for RMSEA. However, there are other recommendations such as for χ^2/df values being less than three (3) as acceptable, and more liberal values of less than .10 being favourable for SRMR.

Results

Preliminary Analysis

We conducted a preliminary data analysis to enable us determine the need for mediation analysis. When there is significant relationship between a predictor variable and an outcome, mediation analysis can be performed (Baron & Kenny, 1986). This assertion guided the preliminary data analysis. So, we determine the mean and standard deviation, Cronbach's alpha and correlation analysis for this study.

The results presented in Table 1 shows that Cronbach's alpha values for the study variables are relative large. In this study, the alpha values for job crafting, work engagement, work commitment, and job satisfaction are .888, .921, .862, and .935 respectively, which imply high measure of internal consistency. The alpha values for the antecedent and consequence variables have high internal consistency. A closer look at Table 1 reveals that the correlations among the constructs are relatively moderate and significant. Since these correlations are significant, it authenticates the need for us to perform the mediation analysis proposed in this study (Baron & Kenny, 1986).

Table 1
Mean, Standard Deviation, Cronbach's alpha, and Correlation among the Scales.

Variables	Mean	SD	1	2	3	4	5	6	7	8
Job Crafting	4.13	0.733	(.888)							
Work Engagement	4.38	0.595	.459**	(.921)						
Work Commitment	4.03	0.849	.447**	.344**	(.862)					
Job Satisfaction	3.88	0.811	.362**	.384**	.578**	(.935)				
Job Demands	4.28	0.547	.112*	.105**	.101*	.224	(.879)			
Task Performance	4.15	0.635	.253**	.316**	.331**	.321	.246*	(.902)		
Autonomy	3.78	0.553	.250**	.381*	.304*	.251*	.335	.103*	(.813)	
Job Resources	3.02	0.514	-.201*	-.081	-.116	.015	-.117	-.105*	.098	(.779)

Note. Cronbach's alpha values are in the diagonal.
* $p < .05$, ** $p < .01$.

Table 2
Linear Regression Analysis of Job Crafting Predicting Work Engagement and Work Commitment, and Each Relatively Predicting Job Satisfaction.

Variables	R^2	F	β
Job Crafting → Work Engagement	.207	65.390	.459[***]
Job Crafting → Work Commitment	.196	61.059	.447[***]
Job Crafting → Job Satisfaction	.127	36.852	.362[***]
Work Engagement → Job Satisfaction	.144	42.292	.384[***]
Work Commitment → Job Satisfaction	.332	123.088	.578[***]

Note. R^2: adjusted R-square; degrees of freedom (df) = 245; β: regression coefficient.
[***] $p < .001$

Table 4
Total and Direct Effects of Job Crafting on Job Satisfaction.

Effects	Estimate	SE	t	95% CI Lower	95% CI Upper
Total	.400[***]	.064	6.071	.270	.530
Direct	.063(ns)	.067	0.933	-.070	.195

Note. ns: not significant; SE: standard error; CI: confidence interval.
[***] $p < .001$.

Data Analysis for the Unmediated Pathways

To test for the unmediated pathways, we conducted a simple linear regression analysis between the study variables. This analysis is also used to substantiate the need for mediation analysis, so that we can perform path analysis to test the mediated pathways, by employing 5000 re-samples BC bootstrapping method in the model of this study (MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2008)). The regression result for the unmediated pathways is presented in Table 2.

The results presented in Table 2 depicts the simple linear regression analysis to test hypothesis 1 to 3. We found that job crafting positively predicted work engagement, β = .459, $F(245) = 65.390$, $p < .001$. The adjusted $R^2 = .207$ shows that 20.7% of the variance in work engagement is explained by job crafting. This value is a large effect (Cohen, 1988). Additionally, our result also showed that job crafting positively predicted work commitment, β = .447, $F(245) = 61.059$, $p < .001$. The adjusted $R^2 = .196$ indicate that 19.6% of the variance found in work commitment is explained by job crafting. Similarly, this value illustrates a large effect. Furthermore, we found that job crafting positively predicted job satisfaction, β = .362, $F(245) = 36.852$, $p < .001$. The adjusted $R^2 = .127$ shows that 12.7% of the variance in job satisfaction is explained by job crafting. In another analysis, our study showed that work engagement positively predicted job satisfaction, β = .384, $F(245) = 42.292$, $p < .001$. The adjusted $R^2 = .144$ shows that 14.4% of the variance in job satisfaction is explained by work engagement. This effect is on the average. Finally, we found that work commitment positively predicted job satisfaction, β = .578, $F(245) = 123.088$, $p < .001$. This prediction reveals adjusted $R^2 = .332$, which means that 33.2% of the variance in job satisfaction is also explained by work commitment. According to Cohen (1988), this effect is also large.

Since these predictions are statistically significant, we conducted mediation analysis by performing path analysis, and we also employed 5000 re-sample BC bootstrapping method. We employ BC bootstrapping method because our sample is not relatively large to generalize the findings of our study to all electrical/electronic technology lecturers, even beyond Nigeria (MacKinnon et al., 2004; Mallinckrodt, Abraham, Wei, & Russell, 2006).

The unmediated result (total effect) obtained through PROCESS for SPSS is also significant, β = .4002, $SE = .0659$, $t = 6.0706$, $p < .001$,

as shown in Table 3. This result also supports the fact that the three-path multiple mediation analysis is plausible in this study.

Data Analysis for the Mediated Pathways

Because we found that the mediated indirect pathways in our model are statistically significant, we conducted mediation analysis using BC bootstrapping method by applying a larger re-sample approach to overcome the possible limitations that will arise from our small sample size (Mackinnon et al., 2004). This test authenticates and substantiates the evidence from the regression analysis of both unmediated and mediated pathways. The results are presented in Table 4.

The path analysis of the BC bootstrapping for our multiple mediation model shows the standardized direct and indirect effects of the mediated pathways in the model. The 95% CI of the direct and indirect effects were determined with 2000 bootstrapping re-samples (Preacher & Hayes, 2008).

From the results of the multiple mediation analysis, the direct effect was found to be statistically non significant (CI = -.092 to .210, $p > .05$) with respect to the mediating effects of work engagement and work commitment on the relationship between job crafting and job satisfaction. The corresponding indirect effect was statistically significant (CI = .208 to .412, $p < .001$). Since the direct effect was significant and the indirect effect significant, we found that work engagement and work commitment fully mediated the job crafting-satisfaction relation.

In considering the mediating effect of work engagement on job crafting-work commitment relation, we found that the direct effect (CI = .210 to .501, $p < .01$) and the indirect effect (CI = .018 to .147, $p < .01$) were statistically significant. We, therefore, affirmed that work engagement partially mediated the relationship between job crafting and work engagement. Similarly, we found that the direct effect (CI = .036 to .323, $p < .05$) and the indirect effect (CI = .020 to .177, $p < .01$) were statistically significant when work commitment was tested for mediation on the relationship between work engagement and job satisfaction. This result implies that work commitment partially mediated the work engagement-job satisfaction relation.

Results of Table 4 reveals that the total effect is significant, β = .400, $p < .001$, hence the justification for mediation analysis. The direct effect is not significant, β = .0628, $p = .352$, hence we conclude complete mediation.

Table 3
Summary of BC Bootstrapping Mediation of Work Engagement & Commitment.

Hypothesis	Direct Effect Estimate	95% CI LL	95% CI UL	Indirect Effect Estimate	95% CI LL	95% CI UL	Remark
JC → WE → WC → JS	.057 (ns)	-.092	.210	.305[***]	.208	.412	Full Mediation
JC → WE → WC	.366[**]	.210	.501	.081[**]	.018	.147	Partial Mediation
WE → WC → JS	.190[*]	.036	.323	.086[**]	.020	.177	Partial Mediation

Note. JC: job crafting; WE: work engagement; WC: work commitment; CI: confidence interval; LL: lower limit; UL: upper limit; ns: non-significant.
[*] $p < .05$, [**] $p < .01$, [***] $p < .001$.

Table 5
Mediation and Specific Indirect Effects of Work Engagement and Commitment.

		Bootstrapping					
		Bias-Corrected			Percentile		
			95% CI			95% CI	
Specific Indirect Effects	Estimate	SE	Lower	Upper	SE	Lower	Upper
Ind1: JC→WE→JS	.096	.039	.026	.181	.041	.023	.182
Ind2: JC→WE→WC→JS	.044	.020	.011	.091	.020	.011	.091
Ind3: JC→WC→JS	.197	.054	.106	.315	.052	.107	.309
Total	.337	.063	.220	.467	.063	.226	.473
Contrasts							
C1: Ind1 minus Ind2	.053	.045	-.031	.146	.047	-.036	.149
C2: Ind1 minus Ind3	-.101	.069	-.233	.038	.069	-.232	.034
C3: ind2 minus Ind3	-.154	.061	-.285	-.052	.059	-.281	-.050

Note. Ind: specific indirect effect; C: contrast; JC: Job Crafting; WE: Work Engagement; WC: Work Commitment; JS: Job Satisfaction; CI: Confidence Interval.

Table 6
Fit indices for confirmatory factor analysis model of some measures.

Model	χ^2	df	χ^2/df	CFI	NFI	SRMR	RMSEA
4-factor JC	430.05	183	2.35	.91	.93	.06	.06
3-factor WE	274.92	116	2.37	.90	.91	.07	.08
3-factor WC	617.52	249	2.48	.91	.90	.08	.07
1-factor JS	94.80	20	4.74	.82	.74	.20	.17

Note. JC: job crafting; WE: work engagement; WC: work commitment; JS: job satisfaction.
$p < .05$.

Table 5 is presented to determine the specific indirect effects of job crafting on job performance through work engagement and work commitment. The specific indirect effects, as presented in Table 5, are .096 (through work engagement), .197 (through work commitment), and .044 (through work engagement and commitment). Taking work engagement and commitment as a set, the result shows that they mediate the effect of job crafting on satisfaction (bias-corrected CI: .011 - .091; percentile CI: .011 - .091). Similarly, a closer look at the specific indirect effects indicates that both work engagement and work commitment are mediator of job crafting-satisfaction relation since the 95% CI of both bias-corrected and percentile do not contain zero.

Confirmatory Factor Analysis

Data presented in Table 6 reveals that the factor models for job crafting, work engagement, and work commitment are, although close to fitness, did not satisfactorily fit the theoretical model. Some of the indices fall within the acceptable criteria, while very few slightly deviated from the criteria. Hence, we concluded that the job crafting, work engagement, and work commitment are relative to their fitness in this study. The result also showed that the one-factor model job satisfaction did not satisfy the criteria for a good model fitness for the current study.

Discussion

The specific purpose of our research is to ascertain the multiple mediating and specific indirect effects of work engagement and work commitment on job crafting-satisfaction relations. With respect to hypothesis 1, we predicted and established that job crafting directly explains employee satisfaction in achieving a task. Our findings suggest that lecturers' job satisfaction is a function of their job crafting. Similarly, our findings agreed with hypotheses 2 and 3, which revealed that job crafting explains the level of work engagement and work commitment. This result strengthens the importance of job demands and resources control mechanism in organizational behavior and research in general, and in the educational sector in particular. Although resources are

momentarily inadequate in the educational institutions for electrical/electronic technology lecturers, our findings suggest that these categories of lecturers, and perhaps other lecturers, should possess a high level of job crafting competence so as to attain a high-level job or task performance for job satisfaction. The findings of our hypotheses 1 through 3 are in agreement with previous findings which showed that job crafting significantly correlated or predicted job satisfaction, and work engagement (e.g., Beer, Tims & Bakker, 2016; Van Wingerden, Bakker et al., 2016; Van Wingerden, Derks, & Bakker, 2015).

Our findings also confirm hypothesis 4 to 6 of this study, since the result depicts that work engagement predicted job satisfaction and work commitment, and work commitment significantly predicted job satisfaction. It follows that to increase work engagement behavior of lecturers, and other employees' leads to work commitment and job satisfaction. These outcomes suggest that effective job crafting will improve employees' ability to be engaged and committed in the workplace, which in turn facilitate the inherent and expected results in work engagement-satisfaction relations, work engagement-commitment relation, and work commitment-satisfaction relation. These results are in consensus with the few previous results (e.g., de Beer, Tims, & Bakker, 2016) who showed that work engagement significantly correlated with job satisfaction. To the best of our knowledge, our study is among the few to link these variables and hence found that work engagement predicts job satisfaction and work commitment. We also found that work commitment predicts job satisfaction, a finding that we did not find in previous studies. These results are one of the means by which our study contributes to the existing knowledge of job crafting, work engagement, work commitment, and job satisfaction.

We investigated the multiple mediation models of three pathways whereby work engagement and work commitment are the multiple mediators. The results of the multiple mediating effects of work engagement and work commitment on job crafting-satisfaction relations revealed complete mediation. To the best of our knowledge, our study is about the first to investigate the multiple mediating effects of work engagement and commitment in the existing literature of job crafting and satisfaction relations. Our results explain that the entire amount of variance that job crafting explains in job satisfaction is possible through the combined effects of work engagement and commitment. Hence, for employees to derive satisfaction in crafting their jobs, there is the need for effective application of work engagement and commitment skills. Simply put, employees' engagement and organizational commitment strategies are plausible means of achieving job crafting-satisfaction relationship in organizations.

The test of the specific mediating effects of work engagement and work commitment partly supported our hypotheses 8 and 9. Our findings showed that work engagement is a positive partial

mediator in the job crafting-satisfaction relation. This finding is another means our study is contributing to existing knowledge, literature, theory, and practice since there is little or no research on the mediating effect of work engagement on the relationship between job crafting and job satisfaction in the workplace in general, and in educational institutions in particular. Similarly, the findings of hypothesis 9 showed that work commitment is a positive partial mediator in the work engagement-satisfaction relation. To the best of our knowledge, our study is about the first to investigate this mediation effect in job crafting literature; hence this is also our contribution to knowledge. Although not the same, these findings are closely related to previous studies (e.g., Van Wingerden, Derks et al., 2016) which found that work engagement is a mediator between job crafting-performance relations. The study by Salanova and Schaufeli (2008) also found that work engagement is a mediator between job resource and proactive behaviour. From existing literature, we found no supporting studies on the mediating effect of work commitment on work engagement-satisfaction relationship. Hence, this is another significant contribution of our study to knowledge, theory and practice.

The CFA for the four-factor model of job crafting, the three-factor model of work engagement, and the three-factor model of work commitment were about the criteria of fitness. We conclude that this fitness was not relatively adequate and very satisfactory. Our findings are not exactly in consensus with previous studies (e.g., Schaufeli, Bakker & Salanova, 2006; Tims et al., 2012). This result may not be surprising in that the work environment and conditions in Nigeria are not the same in the western countries.

Implication for the Study

The findings of our study have a considerable impact on management and policy makers of higher educational institutions, E/E technology and career and organizational psychologists in Nigeria as well as other parts of the world. Higher education policy makers should exercise caution in implementing policies that may affect effective teaching and learning of electrical and electronic technology courses in the university. Considering the economic and political crises facing the world today, decision makers and management of higher education should have a rethink on how to create a conducive learning environment for lecturers to effectively and efficiently carry out their duties as this will help to improve the lecturers' proactive behaviour, work engagement, and commitment. Hence, it should be borne in mind that an individual that is not satisfied in an organization will tend to take his/her job for granted. Hence if the job satisfaction of E/E technology lecturers is not met, there will be every tendency that the lecturers will not craft their jobs or be engaged and committed so that demand-driven graduates are produced for the labour market.

Additionally, career counselors and organizational psychologists should bear in mind that the employees' outcomes are a product of their job crafting, engagement, commitment, and organizational involvement. It is, therefore, necessary that in encouraging career development and satisfaction, the strategies for employing job crafting, work engagement, and commitment be brought to the doors of both employers and employees. When career satisfaction and success is attained by E/E technology lecturers, they will tend to put in their best to add value to the educational system, and this will, in turn, become beneficial to the society.

Limitations of the Study

There is no study that can be completely devoid of limitations. Our study is, therefore, not without limitations, although it has provided some concrete and useful evidence as regards job crafting, work engagement, work commitment, and job satisfaction of E/E technology lecturers. First, the study population is distinct, and of relatively small size. So, caution should be exercised in generalizing the findings of the survey to other fields of study. However, we minimized this limitation by employing 5000 re-sample bootstrapping method which gives room for relative generalization of findings (Hayes, 2013; Preacher & Hayes, 2008). Second, this study employed a cross-sectional survey design, which does not ultimately allow causal inference to be made in any study. We, therefore, recommend that longitudinal or experimental research be conducted in future research for improved and better results. Finally, there is no doubt that individuals may not be better assessors of their strengths and weaknesses; hence there may be relatively and unintentional insincere responses by the respondents of this study.

Conflict of Interest

The authors of this article declare no conflict of interest.

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