Measurement Model of Soft Skills: Work Environment as a Mediator of Teaching Success

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Abstract--- Analysing the level of soft skills acquired by would-be teachers and its effect on their teaching performance reveals that value must be created before it is demonstrated. This work aims to establish the validity and reliability of an instrument designed for data collection for the main study. A non-experimental research design was adopted. Three instruments comprising 60 items were used to collect data from 95 final-year students of the faculties of education of federal universities in north–central Nigeria. No significant relationship was hypothesised between the measurement model and the hypothesised structural model, that is, the recycled questions were not accurate measures of their respective constructs. Partial least square structural equation modelling was performed by using SmartPLS version 3.0. The indicator loadings ranged between 0.6 and 0.9, the indicator reliability was ≥4.0 and the VIF was >0.5 at a 5% level of significance. Filtering the indicators into their respective constructs revealed that their Cronbach's alpha and composite reliability values range between 0.8 and 0.9, whereas their average variances extracted range from 0.5 to 0.8. Such high validity and reliability indicate that the recycled questions are accurate measures of their respective constructs, thereby suggesting that these questions can be used to collect high-quality data for the main study.

Keywords--- Measurement Model, Nigeria, SmartPLS, Soft Skills, Teaching Success, Work Environment.

I. INTRODUCTION

The world changes drastically to the point that some may start to imagine jobs without people and people without jobs. Bridging this gap introduces an issue regarding the sustainability of the skills of teachers. Experts suggest that soft skills define the sustainability of teachers' skills (Melser, 2019), with many showing that most graduate teachers are not sufficiently trained to cope with the demands of their profession (Davis, 2018; Good & Lavigne, 2018; Heris, 2017). Specifically, Ihtiyaroglu (2018) found that preservice teachers are not satisfied with the professional teaching skills they gained during their education. Meanwhile, Wu et al. (2019) revealed that the characteristics of teachers have significant direct effects on the reading comprehension of their students. Those skills that are gained by one's participation in training programmes are evaluated by considering how learners (pre-service teachers) put their skills into use (Kirkpatrick, 1998). Therefore, job performance is a function of the formal training and work environment of teachers because value needs to be created before it is demonstrated.

Most studies on soft skills have examined such topic in the formal training context (Aworanti et al., 2015; Bailey, 2014; Idrus et al., 2014; Kechagias, 2011; Klaus, 2010) and from the individual/dimensional soft skill perspective

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(Hattie, 2015; Kautz et al., 2014; Lamb et al., 2017). Studying the influence of soft skills on job performance in consideration of one's work environment can help holistically examine the effectiveness of training. Kirkpatrick (2011) explained that positive learner engagement can increase the degree of learning, change the behaviour of trainees and eventually increase their productivity. Therefore, this study aims to develop and validate an instrument for assessing the soft skills gained by pre-service teachers and their effects on their teaching performance.

1) Soft Skills

The definition of 'soft skills' differ from one profession to another. Specifically, what is deemed a soft skill in one area may be considered a hard skill in another. The general consensus states that soft skills normally complement hard skills in every ramification. In teacher education, hard skills refer to professional (content knowledge) and pedagogy competencies, whereas soft skills refer to social competence and personality (e.g. upholding ethics, effective communication, critical thinking, leadership/management skills, teamwork and problem-solving skills) (Heris, 2017). In other words, soft skills have something to do with personality attributes. The demand of employers for teaching skills are currently changing in favour of soft skills, and these employers believe that those people with soft skills can easily adapt to changing situations, quickly solve problems, promote team spirit, give critical feedback, motivate students and other employees and set the pace for others to follow (Kechagias, 2011). Expectancy X value theory of motivation posits that soft skills help teachers accomplish their tasks smarter, not harder. In the same vein, Idrus et al. (2014) argued that universities should combine soft and hard skills in the curriculum to produce confident students with a sense of balance and proportion in these skills.

To further enhance the relevance of soft skills in the workplace, Tang (2018) reported that soft skills are being required in an increasing number of job openings across all sectors; when employers are seeking for years of experience from their prospective employees, they are indirectly asking their applicants to possess some soft skills. Unsurprisingly, some studies suggest that soft skills are more relevant than hard skills (Bailey, 2014; Klaus, 2010), yet Jackson and Chapman (2012) showed otherwise. However, both of these skills are important in teaching and learning. Soft skills in the workplace can be viewed as a catalyst in a chemical reaction or serve as the 'ground' for the development of other skills because of their contributions to the configuration of one's meta-competence. Therefore, teachers should be given the formal qualifications and personal skills because their jobs do not only depend on specific content and pedagogy knowledge but also on proactive soft skills, including problem solving, communication, critical thinking, sense of time and leadership (Kechagias, 2011).

After highlighting the need for relevant education to drive the Nigerian economy, the Nigerian policy on education identifies the teacher as the key actor in achieving such need given that teachers nurture children into becoming members of an upstanding and competitive society. Therefore, this policy highlights the need to encourage a spirit of enquiry and creativity amongst teachers given the many benefits of having soft skills. One of these benefits fits perfectly into the current job market, in which many fields are becoming increasingly competitive. To be successful in such a tough environment, teachers must bring along a 'competitive edge' that can distinguish them from other candidates with similar qualifications and comparable evaluation results. Previous studies suggest that such advantage does not come from only hard skills but also requires a sufficient amount of soft skills (Boachin & Hofman, 2013).

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Recruiters prefer those teachers who can fit into their jobs from the very first time they are employed (Melser, 2019). If a teacher lacks soft skills, then his/her hard skills alone may not be sufficient for him/her to carry out his/her teaching task efficiently. In his investigation of soft skills, Bailey (2014) argued that having good communication skills is valuable in job interviews and can even supplement any deficiency in the technical skills of a teacher. Displaying positive traits, including courtesy, honesty, flexibility, common sense and flawless appearance, during job interviews are also important for employers. Melser (2019) argued that technical skills alone will not help teachers improve their job performance. In this case, graduates, especially those coming from tertiary education institutions, should not only possess hard skills but should also have mature personalities and a well-balanced education.

However, only few studies have examined soft skills. Presenting a short overview of these studies can help strengthen the model proposed in this work. Manninen et al. (2014) conducted an experiment on lifelong skills (attitudes) and found that one's attitudes have a direct strong effect on his/her work success, social engagement and management of his/her own life and a moderate effect on his/her tolerance. Washor (2015) examined the soft skills of interns and found that participating in internship programmes account for 27% of the variance in soft skill indices. Roos et al. (2016) found that after controlling for time, outdoor educational adventure explains 30% of the variance in the soft skills gained by education students. Whilst in the past, mastering hard skills was given priority whereas soft skills were merely considered 'nice to have", such perception has been turned around (Jackson, 2013). For instance, a survey of Google employees revealed that the best teams within the company are not the ones filled with top scientists but rather those teams with workers who possess soft skills. A synthesis of findings from various studies reveals good communication skills, lifelong learning, emphatic leadership, critical thinking ethics/professionalism and teamwork as the soft skills demanded the most from employees (Crawford et al., 2011; Davis, 2018; Good & Lavigne, 2018; Kechagias, 2011).

2) Mediating Effect of Class Size on Teaching Performance

A successful training programme should be reflected on the job performance of the trainees (Kirkpatrick & Kirkpatrick, 2009). Therefore, success in job performance is a function of characteristics associated with formal training and factors in the work environment. Providing excellent training alone does not lead to a significant transfer of learning to behaviour and lacks deliberate and consistent reinforcement from the work environment (Sandy, 2008, as cited in Kirkpatrick & Kirkpatrick, 2009). When trainees lack the necessary work environment to use their gained skills, the objectives of the training are left unfulfilled, and the expected outcomes are not realised. Studies on the correlation amongst the different levels in Kirkpatrick's evaluation model reveal that if workers consistently engage in critical on-the-job behaviour, then their individual and overall productivity increases. Understanding the influence of work environment is valuable in determining the successful transfer of skills to the trainees.

Saidu (2015) identified school administration support and classroom climate as key factors that may affect the process of utilising skills that are acquired from trainings in the education context. Tracey et al. (1995) posited that the work environment of some trainees may limit their ability to transfer what they have learned. Therefore, this study hypothesises that work environment does not affect the performance of final-year undergraduates trained in federal universities in Nigeria. This hypothesis is based on the findings of Kirkpatrick and Kirkpatrick (2009), Kozlowski and

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Hults (1987), Rouilerr and Goldstein (1993) and other researchers who found that organisational climate predicts job success. Kirkpatrick argued that when learning takes place, the attitude and skills at work of trainees in a suitable work atmosphere should improve (Kirkpatrick, 2011). A confidence-building environment predicts workplace behaviour (Bandura, 1986). Some examples of behavioural motivators that can mediate soft skills and job performance in the workplace include work environment (Jenkins et al., 1998; Kiruja & Elegwa, 2013), need contentment, work behaviour and job performance conduct (Lazaroiu, 2015).

Soft skills can improve employee performance by providing a suitable work environment. Accordingly, this study hypothesises that soft skills do not significantly demonstrate the influence of class size on teaching performance success. Mathieu et al. (1992) suggest that even if skills are acquired from trainings, the climate under which such skills are put into use may not support the application of these skills, that is, the trainees may not have the appropriate resources or time to use these skills. Vandenberg (2012) explained that when education funds are limited and when accountability is the order of the day, finding the right ratio of teachers to students is critical. Finding qualified teachers to work in a classroom is not enough; the number of students in the class also matters. Blatchford et al. (2007) mentioned that class size affects classroom management, classroom instruction and the academic achievement of students. Therefore, teachers need to have adequate skills to cope in any situation given that they may not have control over the number of students in their classrooms.

II. METHODOLOGY

Figure 1 shows the hypothesised soft skills model, which aims to determine the level of soft skills developed by would-be teachers. This model also explains the relationship of soft skills with the teaching performance success of secondary education teachers in north–central Nigeria.
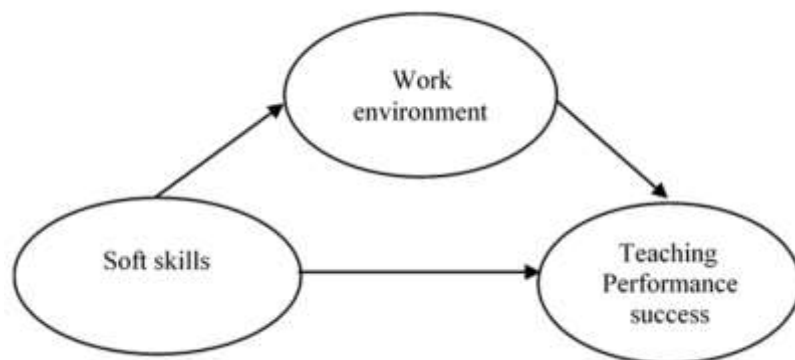

Figure 1: Hypothesised Soft Skills Model

The potential way that these soft skills reveal the influence of class size on teaching performance success is also evaluated. Lamb et al. (2017), Crawford et al. (2011), Kechagias (2011), Good and Lavigne (2018) identified good communication skills, lifelong learning, emphatic leadership, critical thinking, professionalism and teamwork as the soft skills that teachers need to have to be successful in the workplace. After studying the instruments employed in previous studies, we hypothesise that the recycled questionnaire items do not accurately measure their respective

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constructs. In other words, this study hypothesises that the measurement model does not relate to the constructs in the proposed structural model.

1) Participants

A non-experimental design, particularly a survey design, was adopted in this work because a 'numeric description of trends, attitudes, or opinions of a population can be obtained by studying a sample of that population' (Creswell, 2014). The study population was intended to include all final-year students of the faculties of education of seven federal universities in north–central Nigeria. However, given that this work only aims to gather data to validate the applicability of the developed instrument for the main study, the data were only collected from 100 final-year students of the faculty of education of the Federal University of Kashere in Gombe, Nigeria. Hills (1998), Isaac and Micheal (1995) explained that a preliminary study should have a sample size of 10 to 30 observations. Meanwhile, for those studies that involve partial least square structural equation modelling (PLS-SEM), Hair et al. (2008) suggested that an appropriate sample size should be used to produce reliable estimates. Gorsuch (1983) recommended at least 5 participants per construct and around 100 individuals per data analysis. Therefore, in this pilot study, a total of 100 questionnaires were distributed amongst the target group, of which 95 were filled and returned, thereby representing a 95% response rate.

2) Instruments

The soft skills scale was prepared based on items used in the literature. Experts suggest that soft skills can be indirectly measured through communication, teamwork, critical thinking, lifelong learning, professionalism/ethics and leadership (Crawford et al., 2011; Good & Lavigne, 2018; Kechagias, 2011; Melser, 2019). A total of 34 items were extracted from Kechaigas (2011). Amongst these items, 7 were used to measure leadership, 5 were used to measure professionalism, 5 were used to measure critical thinking, 6 were used to measure lifelong learning, 6 were used to measure teamwork and 5 were used to measure communication. Each statement was rated on a five-point Likert scale, with 1 indicating 'strongly disagree' and 5 indicating 'strongly agree'. A sample statement is 'Possessing soft skills is exemplified by meeting datelines'. A higher score indicates that PTs have been adequately prepared by their TEs during their undergraduate teacher training. Other items measured in the scale included 'punctuality at work', 'loyal to duty', 'paying attention' and 'keeping deadlines'. The original instrument had a reliability of 0.968, which was revalidated by Aworanti et al. (2015) in Nigeria by using SPSS. A near-similar reliability of 0.961 was obtained.

Teaching performance was assessed by using 11 items extracted from Kirkpatrick (2012). Each statement was rated on a five-point Likert scale ranging from 1 ('strongly disagree') to 5 ('strongly agree'). An example statement is 'The application of learned skills will lead to increased productivity (student achievement) and time consciousness amongst students'.

Work environment was measured by using work-climate-related indicators extracted from the training evaluation template of Kirkpatrick (2012). Twelve statements were rated on five-point Likert scale ranging from 1 ('strongly

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disagree') to 5 ('strongly agree'). An example statement is 'I will have confidence to apply my skills when I have the necessary resources'.

3) Data Analysis

Various statistical approaches were employed to derive meaning from the data and test the hypotheses. Specifically, descriptive statistics using measures of central tendencies were employed in the preliminary analysis to evaluate the response rates and demographic information of the respondents, whereas PLS-SEM was used to test the hypotheses and to deal with the multi-item variables and mediation path. All analyses were conducted in SmartPLS version 3.0. According to Hair et al. (2017), the above procedure for determining the reliability and validity of the proposed instrument can produce latent variables scores, thereby avoiding those problems associated with sample size and complex models with many variables. In this case, the above procedure is deemed suitable for exploratory research. A commercially available SmartPLS software was used in the data analysis given its capability in estimating both outer and inner models at the same time (Ringle et al., 2012). Meanwhile, SPSS was used to conduct for the preliminary investigation of the data.

III. RESULTS AND ANALYSIS

In this preliminary study, the survey data were inputted into SPSS for evaluation before they were exported into a .csv file in Microsoft Excel. These data were verified beforehand to ensure that they are not far from normal distribution. Skewness and kurtosis were used to evaluate the extent of the symmetrical distribution of variables (Hair et al., 2017). The skewness and kurtosis values of all items ranged between –1 and 1, which are below the levels for the transformation of variables as suggested by Ghisseli et al. (1981). No missing values, invalid observations or outliers were reported. The demographic profiles of the respondents are shown in Table 1.

Table 1. Demographic profile of the respondents

Respondent Characteristics	N= 95	%
Gender		
Female	24	25.2%
Male	71	74.8%
Teaching experience level		
Continuing students	42	44.2%
New student	53	55.8%
Age (Range) in years		
20–30	71	74.7%
31–40	24	25.3%

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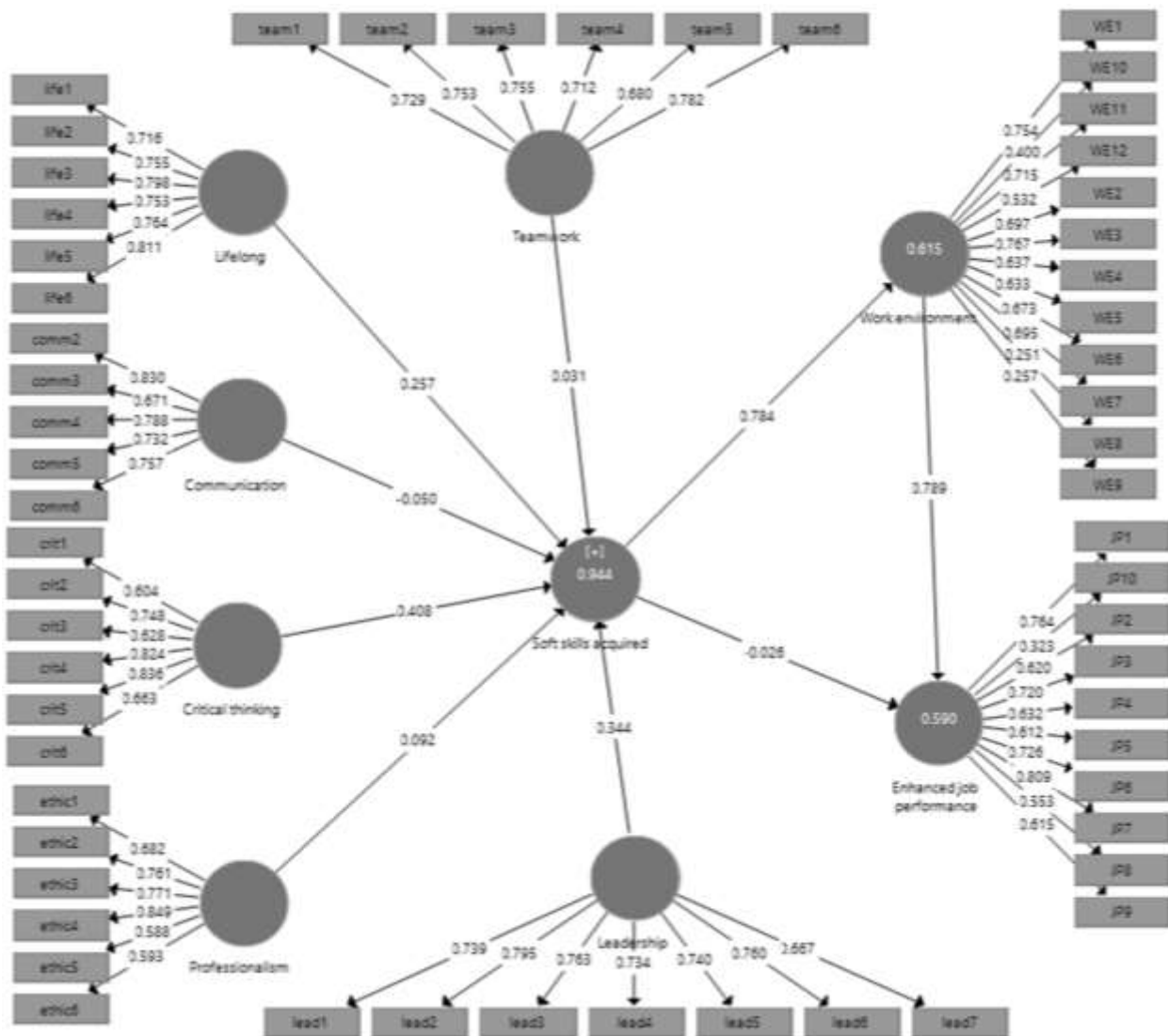
Figure 2: Hypothesised Model Constructs with Indicators and PLS-SEM Results Before Evaluation

According to experts, determining the quality of a model requires a thorough assessment of the quality of the measurement model by testing all of its items and the scale reliability, convergent validity and discriminant validity of its construct measures (Hulland, 1999; Tenenhaus et al., 2005). Figures 2 and 3 show the measurement models with PLS-SEM results before and after evaluation, respectively.

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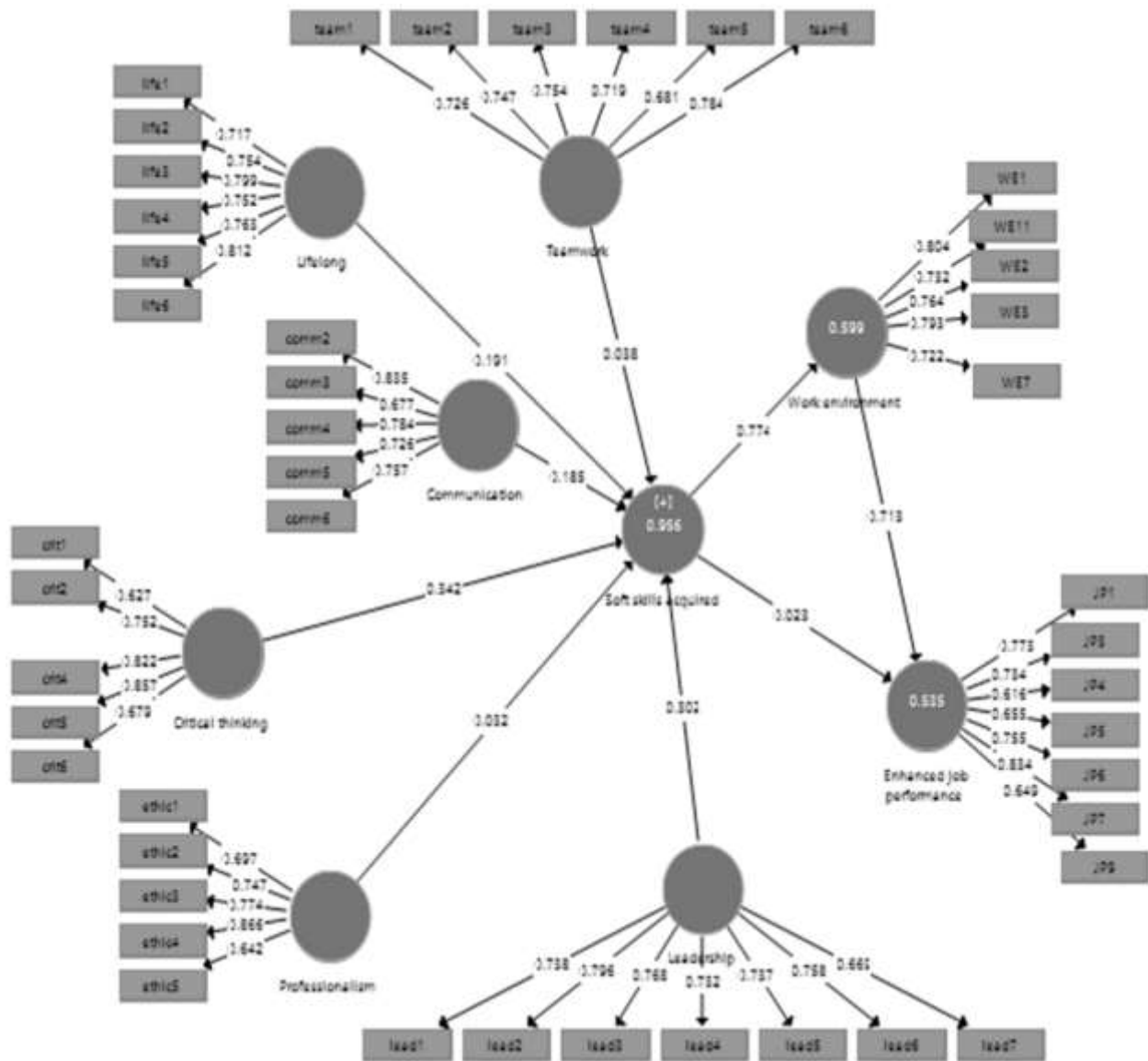
Figure 3: Soft Skills Model and PLS-SEM Result After Evaluation

1) Measurement Model Assessment

Similar to other social science studies, we had to initially establish the reliability and validity of the indicators that is known as the measurement model that contribute in given meaning to the structural model. Table 2 summarises the results of the reflective outer model, which needs to be checked by experts when conducting PLS-SEM. The proposed model has reflective outer indicators given that these indicators explain their respective constructs (Diamandopaulos, 2001) and that the measures are consequences of their respective constructs (Rossiter, 2002).

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Table 2: Summary of Results from the Reflective Outer Model

Latent Variable	Indicators	Loadings	Indicator Reliability	Cronbach's Alpha	Composite Reliability	AVE	VIF
Enhanced job performance					0.814	0.882	0.519
	JP1	0.773	0.597				1.951
	JP3	0.734	0.538				1.820
	JP4	0.616	0.380				1.393
	JP5	0.655	0.429				1.691
	JP6	0.755	0.570				1.729
	JP7	0.834	0.695				2.486
	JP9	0.649	0.421				1.496
Work environment				0.821	0.875	0.583	
	WE1	0.804	0.646				2.072
	WE11	0.732	0.535				1.492
	WE2	0.764	0.583				1.811
	WE3	0.793	0.628				1.789
	WE7	0.722	0.521				1.466
Soft skills				0.912	0.926	0.558	
	SS1	0.772	0.521				1.847
	SS2	0.735	0.540				1.472
	SS3	0.742	0.550				2.243
	SS4	0.756	0.571				2.113
	SS5	0.815	0.664				2.415
	SS6	0.757	0.573				2.066
	SS7	0.760	0.577				2.055
	SS8	0.657	0.431				1.678
	SS9	0.714	0.509				1.910
	SS10	0.755	0.570				2.470
Communication				0.814	0.87	0.574	
	comm2	0.835	0.697				1.939
	comm3	0.677	0.458				1.538
	comm4	0.784	0.614				1.756
	comm5	0.726	0.527				1.556
	comm6	0.757	0.573				1.5
Critical thinking				0.805	0.865	0.566	
	crit1	0.627	0.393				1.292
	crit2	0.752	0.565				1.639
	crit4	0.822	0.675				2.657
	crit5	0.857	0.734				2.189
	crit6	0.679	0.461				1.568
Professionalism				0.802	0.864	0.561	
	ethic1	0.697	0.485				1.501
	ethic2	0.747	0.558				1.620
	ethic3	0.774	0.599				1.870
	ethic4	0.866	0.749				2.231
	ethic5	0.642	0.412				1.380
Leadership				0.865	0.896	0.553	
	lead1	0.738	0.544				1.888
	lead2	0.796	0.633				2.211
	lead3	0.768	0.589				2.157
	lead4	0.732	0.535				1.701
	lead5	0.737	0.543				2.069

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Latent Variable	Indicators	Loadings	Indicator Reliability	Cronbach's Alpha	Composite Reliability	AVE	VIF
	lead6	0.758	0.574				1.968
	lead7	0.669	0.447				1.663
Lifelong				0.86	0.895	0.588	
	life1	0.717	0.514				1.544
	life2	0.754	0.568				1.717
	life3	0.799	0.638				1.883
	life4	0.752	0.565				1.748
	life5	0.763	0.582				1.884
	life6	0.812	0.659				1.941
Teamwork				0.821	0.876	0.54	
	team1	0.726	0.527				1.630
	team2	0.747	0.558				1.810
	team3	0.754	0.568				1.861
	team4	0.719	0.516				1.493
	team5	0.681	0.463				1.431
	team6	0.784	0.614				1.772

2) Reliability

Table 2 shows that all indicator loadings range between 0.6 and 0.8, which exceed the 0.5 threshold recommended by Hulland (1999). These indicators, except for JP4, also have reliability values that exceed the minimum level of 0.4. Whilst conducting PLS-SEM, great care must be taken when checking the factor loadings. The loadings of each factor on its respective construct were then assessed to test reliability. The reliability of each indicator was either equal to or above 0.7. Hulland (1999) argued that an indicator reliability of approximately 0.7 and above is preferred. These results confirm the reliability of each indicator. Previous studies have used composite reliability instead of Cronbach's alpha in PLS-SEM to assess internal consistency (Bagozzi & Yi, 1988; Hair et al., 2012). The obtained composite reliability values all exceeded 0.8 (Table 2), thereby indicating the high internal consistency of the indicators. Bagozzi and Yi (1988) argued that the composite reliability should be equal to or higher than 0.7, whereas Hair (2018) proposed that the composite reliability measure is preferred over Cronbach's alpha because the former offers a better estimate of variances amongst the indicators by using the item loadings obtained within the nomological network.

3) Convergent Validity

All average variances extracted (AVE) exceeded the 0.5 threshold (Bagozzi & Yi, 1988). Fornell and Larcker (1981), as cited in Henseler et al. (2015), argued that convergent validity is established when the AVE exceeds 0.50. In this study, the AVEs for all scales ranged between 0.5 and 0.9 (Table 2), thereby confirming their convergent validity.

4) Discriminant Validity

Fornell and Larcker (1981) suggested that discriminant validity can be assessed by taking the square of each AVE and postulated that the square root of AVE of each latent variable should be greater than the correlation amongst these variables. Many experts contend that instead of using the Fornell–Larcker approach to check for discriminant validity, the Heterotrait–Monotrait ratio (HTMT) inference criterion should be used. Hair et al. (2018) mentioned that

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discriminant validity is best checked in PLS-SEM by using HTMT instead of squared AVE and argued that as a rule of thumb, HTMT should not exceed the conservative threshold of 0.85 or 0.90. The HTMT values obtained in this work were below the conservative threshold of 0.85 (Henseler et al., 2015) as shown in Table 3, thereby suggesting that the recycled items are accurate measures of their respective constructs.

Table 3: Discriminant Validity (HTMT)

	1	2	3	4	5	6	7	8	9
Communication	0.757								
Critical thinking	0.795	0.752							
Enhanced job performance	0.525	0.499	0.72						
Leadership	0.805	0.789	0.548	0.744					
Lifelong	0.697	0.766	0.437	0.722	0.767				
Professionalism	0.605	0.611	0.628	0.523	0.469	0.749			
Soft skills acquired	0.874	0.92	0.575	0.899	0.842	0.615	0.747		
Teamwork	0.611	0.738	0.425	0.662	0.763	0.413	0.761	0.736	
Work environment	0.671	0.693	0.731	0.676	0.639	0.667	0.774	0.608	0.764

Figure 4: Bootstrap Report (T-statistics)

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Bootstrapping was performed to further confirm the statistics. The bootstrapping results show that all items are reliable at the 5% level of significance given that all T-statistics are greater than 1.96 (Figure 4). Hypothesis testing in PLS-SEM is usually performed by calculating the *P*-value or T-statistics of each path coefficient (Kock & Hadaya, 2018). The results reject the null hypothesis and indicate that the indicators of the measurement model can be used to collect data for the main study.

IV. DISCUSSION

This study validates the instruments that will be used in gathering raw data for the main study. The SmartPLS results suggest that the indicators will be appropriate for use over time. Without validating these instruments, assessing the validity and reliability of the measures becomes practically impossible. The results of the instrument validation support the internal consistency reliability of the instruments and justify the rejection of the null hypothesis. In the validation, the Cronbach's alpha values increase whenever an item increases on the scale. This outcome was expected because in research higher scales typically increase scale reliability. A suggestion that they are appropriately assigned to corresponding scales. These results further increase our confidence in using recycled questionnaire items for the main study. All indicators have outer loadings ranging from 0.6 to 0.8 and reliability scores of 4.0 or higher, thereby suggesting that they all have a sufficient level of reliability and are positively related with their constructs. These results are similar to those of Aworanti et al. (2015), who obtained a high reliability for the soft skills scales. Hulland (1988) and Wong (2013) mentioned that an indicator reliability of 0.4 is acceptable in exploratory research.

All AVEs are higher 0.5, thereby supporting the measures of convergent validity. These values are higher than those reported in Husain et al. (2014), who obtained an AVE of 0.48 for work environment variables. Hair et al. (2017), Bagozzi and Yi (1988) suggested that the AVE should be equal to or higher than 0.5. In sum, all constructs used in this study explain more than 50% of the variance in the items. The composite reliability is no lower than 0.8 and is above the 0.7 threshold (Bagozzi & Yi, 1988). All p values also meet the threshold value of 0.7, thereby suggesting that all indicators have sufficient levels of internal consistency reliability (Bagozzi & Yi, 1988; Hair et al., 2018; Sarstedt et al., 2017). Comry and Lee (1992) explained that a high correlation corresponds to a high internal consistency. The internal consistency obtained in this work is similar to that reported in Everraert et al. (2010), who obtained an internal consistency value of 0.82 for the behaviour performance construct. Taken together, these findings highlight a role for devising an instrument for soft skills assessment to advance educational theory and practice.

V. CONCLUSION

Every education leader needs efficient manpower/strategy to promote the achievement of students in schools. Soft skills can improve the job performance of workers in their workplaces in developed economies. Therefore, additional research must be performed to explore the relationship between the soft skills and job performance of secondary school teachers in developing economies where the budget allocated to education is not enough to provide these teachers with an appropriate work environment. Data should be collected by using questionnaires that exhibit

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sufficient levels of reliability. The findings of this work suggest that the intended instrument for collecting data for the main study is valid and reliable.

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