Teachers emotional intelligence to predictive work performance using linear and non-linear models

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Abstract

Aim: Teachers’ job performance has been impacted by rapid changes and reforms in educational systems around the world. Despite these advancements, the debate about how to forecast teacher success remains complicated and difficult to assess. The role of emotional intelligence in teacher success is investigated in this research, which fills a void/gap in the literature. The relationship between Emotional Intelligence (EI), which has four dimensions: self-regulation, self-awareness, self-motivation, and social ability (relationship management), and job performance is examined in this research.

Methodology: 160 teachers from six technical colleges in Nigeria’s north-east were polled. The data was gathered through a questionnaire survey, and analyse using artificial intelligence model (FFNN, LSSVM, NF and MLR).

Findings: The models were assessed using determination coefficient (R²), root mean square error (RMSE) and correlation coefficient (R). The result obtained from the simple models showed that neuro fuzzy sub clustering hybrid (NF-SCH) shows (R² = 0.8814502 and 0.8375132) both training and testing, the correctness of models has been improved which increase accuracy of the single models up to 17%, 18%, and 20% FFNN, MLR and LSSVM for calibration and up to 40%, 73% and 70% FFNN, MLR and LSSVM for verification respectively the results show a strong connection between emotional intelligence and work satisfaction.

Implications/Novel Contribution: Overall, this study adds to the body of knowledge on emotional intelligence by having practical management implications for school administrators and the Nigerian higher education system.

Keywords: EI, work performance, teachers, TVE, Artificial Intelligence (AI)

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INTRODUCTION

Globally Educational system have increasingly experiencing changes, through the influencing of teacher’s job performance Given these improvements, it is challenging to discuss how to forecast the success of teachers and it is also difficult to assess.

Vocational teachers should be capable of not teaching theory in classroom but also training leaners in the workshop so that they can work in their specific field. Thus, technical and vocational teachers need to be equipped with technical competency since it’s the combination of knowledge and skill whose are related to work performance. Personality is correlated with an attitude, skill and knowledge that is critical in assessing the success of an instructor. Blašková, Blaško, and Kucharčíková (2014) argued that teachers with personalities could build good relationships with learners and to enhance the students’ learning. The personality of a teacher has a direct connection to his or her profession.

Technical Vocational Educational and Training (TVET) is a broad concept that includes, as well as general learning, the study of the technology and the associated sciences, and activities, attitudes, understanding and know-how of occupations in different Social and Economic sectors (Ezeanokwasa, Nwachukwu, & Yaba, 2014; Nedal & Alcoriza, 2018). TVET is working to gain the expertise and skills for the workplace, in order to increase the prospects for sustainable growth and development in the understanding economy and the rapidly evolving

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workplace, according to Amirian and Behshad (2016). TVET therefore equips people through a wide variety of expertise, skills and attitudes that are now recognized as important to substantial involvement in work and life, not just with technical and professional skills and effects on the performance of the company.

According to Rastegar and Memarpour (2009) it is believed that personal competence in emotional intelligence enables people to perceive emotional intelligence their emotions, they regulate their emotions properly, and how they respond (Ismail, Nopiah, & Rasul, 2020; Okpala, Omojuwa, Elenwo, & Opoko, 2017). EI is a key component of an educator for the productive teaching and learning process.

According to Ismail et al. (2020) It has been argued that high-quality professional development of teachers is important for effective, high-quality teaching and educational attainment. It was decided in particular that professors need to develop their professional skills continuously, enhance their abilities and keep up-to-date with new professional developments (Dolev & Leshem, 2017). EI has been related to various aspects of life by a growing body of study, including personal well-being, social relationship quality and professional efficacy in the field of education, EI has been related to various facets of school life, such as students’ learning, academic success and pro-social activity and, more recently, effective teaching (Dolev & Leshem, 2017). This research explores the gap in literature by exploring the role of emotional intelligence in the success of teachers’ work. Changes have increasingly taken place in educational systems around the world, influencing the job performance of teachers. 

Given these improvements, it is challenging to discuss how to forecast the success of teachers and it is also difficult to assess. Based on the above mentioned background, the purpose of the study is to investigate EI level of technical and vocational education teacher’s and investigating its relation to factors such as job performance and some demographic variables in order to predict job performance.

Background of Study

Skills and experience are the machinery for every country’s developed socio-economically and the key for training of qualified and entrepreneurial employees needed to transform technology workers is TVET, but leaners in the TVET are viewed as the less or low performance academically whether right or wrong, but teachers Emotions, particularly educational ones, are an important part of organizations. The outcomes of substantial research have been obtained the best indicator of the success of individuals is the combination of experience, abilities, and genetic features (such as general intelligence). Present research study in the sphere of education have shown that possession of the requisite knowledge and skills is not enough for productive instruction. The traits, behaviors and values of teachers contribute to their performance as educators (Amirian & Behshad, 2016). Therefore, this study will coalesce the anecdotal account enthusiasm about the teacher’s emotional intelligence from based on their work performance.

Problem Statement

The TVET programs are structured for individuals who can profit from them and advance through them. Quality must be the watchword in order to produce these results (Oz, 2015).

There has been a lot of change in the education system worldwide. Vocational Teachers have to do several duties at the same time in this evolving situation, which often adds strain. As a result, they do not understand the feelings of their pupils, nor do they develop a good relationship with their pupils and colleagues. It is really important for them to understand the idea of emotional intelligence in order to cope with this type of situation.

Research confirms that of an individual emotional intelligence is a predictor for a workplace efficiency, although the impact of Individual output is partial and limited In less-qualified jobs (Botey, Vaquero-Diego, & Sastre, 2020; Boyatzis & Saatcioglu, 2008; Castillo & Del Valle, 2017).

EI is a key element of an educator for teaching and learning performance. During the training and training process, different students must be assisted by professional’s teachers in the TVET programme. Recently emotional intelligence has been a popular topic of debate in the field of education it has been praised as a successful predictor and leadership abilities, however little empirical research has been conducted to this assertion. The experience has provided trained teachers with EI skills in Nigerian technical and vocational institutions. This study was carried out with vocational teachers in higher institutions in the north-eastern region, who taught the TVET curriculum in
their various institutions.

**Objectives of the study**

Primarily objective of this study is to investigate and prediction vocational teachers in TVET work performance based on emotional intelligence.

**Research Questions**

1. What are the technical and vocational teachers EI competence in self-regulation, awareness, motivation and social skill levels?
2. Does EI of technical and vocational teachers predict their job performance?

**Significance of the Study**

Employed vocational teachers’ output is the cumulative estimated benefit for the organization, over a standard duration, of the discrete behavioral occurrences. In addition, the quality and quantity of each teacher in a specific classroom work, which is often an individual production, suggests that the performance of an individual is typically determined by inspiration, will and capacity to perform. An employee’s personality may represent his/her achievement. EI workers excel in their job and success (Bose & Guha, 2018). Teachers who work efficiently can teach and regulate their attitudes, thoughts, and psychological conditions at work effectively (Ghanizadeh & Moafian, 2011). This is a very critical trait of the lifelong human being. Individuals personal and professional life, vocational teachers Emotional Intelligence helps leaners to cope with all complex circumstances. If you know your emotion, leaners can balance in life. With this in mind, researchers on higher vocational education school teachers have performed this study to assess their emotional intelligence and professional adaptation (Bose & Guha, 2018). Due to the limited research about the vocational teacher’s emotional intelligence to predict job performance. Therefore, the study will address the value of emotional intelligence in predicting job performance among the vocational teachers.

**LITERATURE REVIEW**

**Emotional Intelligence**

First established is the definition of emotional intelligence as a form of social intelligence theory that referred an individual’s effect of emotional and motivational response to act wisely in relationships (Thorndike & Colony, 1982). Until the 20th century, cognition and effect were often seen and studied as two separate mental mechanisms, and feelings were usually perceived to be less than they were and often interfered with (Salovey & Mayer, 1990). In the last two decades, emotional intelligence has become an area of science. This psychological concept is relatively recent, referring to the effective integration of thought and emotion (Dolev & Leshem, 2017). The EI can be generally described as the ability to understand and manage desires” Salovey and Mayer (1990) considered EI to be A collection of skills intended to lead to the proper evaluation and management of feelings in oneself and others, the successful control of emotions in oneself and others, and the use of experience to inspire, prepare and succeed one’s life (Ghanizadeh & Moafian, 2011).

EI is also an umbrella term that covers a wide variety of interactional knowledge and skills. The aptitude to consider the feelings of others to build and maintain relationships between people, and most critically, our sense of social obligation, requires interpersonal skills and the ability to identify and realize individual motives and excitement is made up of intrapersonal skills (Katyal & Awasthi, 2005). In order to assess EI from this viewpoint, a knowledge, aptitude and skill-based model conceptualizing EI as a set of skills, independent of single characteristics or favored behavioral patterns, was proposed. The proponents of the EI capability models argued that the EI efficiency tests should be limited to a collection of emotion-related skills.

Boyatzis, Goleman, and Rhee (2000) EI viewpoint included five dimensions that concerned Self-awareness, inspiration for self-regulation, compassion and social skills. Despite differing viewpoints on the EI, concepts of emotional intelligence tend to be compatible rather than conflicting. The different conceptualizations of the EI precisely translate into an individual’s intrapersonal and interpersonal self-relationship, i.e., a relationship with themselves a relationship with others (Oz, 2015). Emotional intelligence involved the process of assessing individual solely emotions and the emotions of counterpart. feelings correctly, processing emotional information
and managing feelings to make life easier (Cordova, Dolci, & Gianfrate, 2015).

According to Mohamad and Jais (2016) “The ability to perceive feelings to boost thinking. It comprises the capacity to interpret emotions correctly, Accessing and generating emotions to support thinking; knowing emotions and emotional knowledge; reflectively managing emotions to encourage intellectual and emotional development.

Emotionality lies at the intersection of the individual and culture, since every person is connected to their communities by feeling themselves and by experiencing himself and emotions every day. This is why emotional analysis needs to take center stage in all disciplines because human beings have to be emotional (Mahasneh, 2016). EI is the capacity of people to comprehend and mark their own and others’ own feelings, to use emotional knowledge to direct thoughts and behaves, to control and/or modify emotions to respond to their situations, or to accomplish their goal(s) (Bose & Guha, 2018). According to Debes (2021) It can be claimed that the EI expertise of school principals predicts good control over their expectations of self-efficacy, the study demonstrated that the EI competence and expectations of self-efficacy of school principals were high. The findings also found that women’s expectations of self-efficacy were greater than those of men.

Work Performance/Efficiency of the Work

Job effectiveness is the accumulated expected value of the individual episodes of action that a person performs for the company over a normal period of time. Other than that, in terms of quality and quantity, it is also an individual output required from each employee in a specific job, which indicates that an individual performance is determined by motivation and desire most of the time (Mohamad & Jais, 2016).

TVET

Professional TVET is widely accepted as a crucial driving force for skills advancement. To achieve the goals and objectives of the program’s continuation, TVET in Nigeria needs to improve and maintain global socio-economic growth and technological progress.

Skills and abilities are the driving force behind the Any country’s economic growth and social progress (Goel, Hofman, Lahaie, Pennock, & Watts, 2010), and TVET (Technical Vocational Education and Training) is the key to training the labor force of technicians and entrepreneurs required for the evolving technological workforce (Ayonmike, Okwelle, & Okeke, 2015). TVET is used as a descriptive term for those fields of education, including, but not limited to, general education, the study of technology and related sciences and the growth of practical skills, attitudes, knowledge and information relating to careers in different sectors of economic and social life (Ayonmike et al., 2015). According to Mclean and David, TVET is concerned with acquiring knowledge and skills for the world of work to widen opportunities for sustainable empowerment and the socio-economic growth of the information economy and the rapidly evolving work climate. TVET therefore equips people not only with technological and vocational expertise, but also with a wide range of experience, skills and attitudes that are now recognized as necessary for good work and involvement in life (Ayonmike et al., 2015).

TVET has a range of priorities that vary from one country to another. In Nigeria, TVET is part of the structured framework that has integrated the education system into the three levels of education (primary, secondary and tertiary) in order to respond to the needs of the nation for skilled labor and to promote the economic status of individuals and nations in general. Therefore, because qualitative TVET is widely recognized as the basis of all growth, continuous improvement of the process is necessary for the achievement of the national TVET objectives, which in turn will lead to the achievement of the national goals of producing quality human resources for the self-sustaining national development (Ayonmike et al., 2015).

Nwachukwu et al. (2014) TVET is a critical and indispensable part of Nigeria’s growth, such as improving System level governance, involve the social partnership in the planning of technical and vocational education and training it is the cornerstone upon which the socio-economic, technological and cultural development of a country must be founded this form of education according to Gleason et al. (2010) has the economic function of supplying trained personnel changing the person and allowing him to use complex technologies. Therefore, the focus is not only on the provision of professional staff for a static economy, but also for a dynamic one in particular changing societal needs for technological development.
Instrumentation

This quantitative analysis is focused on Boyatzis et al. (2000) theory based on 15 items from Emotion Intelligent Object. These include Knowledge of oneself, self-regulation, inspiration, compassion, and social skills. Their use is limited to 15 items. The nine work output items are newly created items that are focused on work, teaching effectiveness and teaching value concepts (Ismail et al., 2020).

The researchers developed a self-administered Google Formula online questionnaire through (Google Doc, Mountain View) and LinkedIn. The survey included an introductory paragraph which informed study participants of their goals, the confidentiality of their responses and the freedom to refuse to respond or to withdraw altogether from the study. The questionnaire contains twenty-three (23) questions in four (4) items groups and three (3) demographic questions.

The participants were technical and vocational teachers who, if they had been interested in teaching at the technical college in recent years, were requested to complete the survey. Participants who did not adequately complete the survey were omitted from the dataset by matching email addresses for couples.

Creation of Model Proposed

Three distinct non-linear artificial intelligence-based models and a Single Linear Classical Model were used in this research, namely FFNN, LSSVM, Neuro fuzzy (NF) and Multi-Linear Regression (MLR), to be used for Pre-Linear Regression (MLR), to understand the scientific nature of data in the technical and vocational teachers work performance through their emotional intelligence. The computed values were evaluated using: a coefficient of determination (R²), a mean Radical Square Mistake (RMSE) and a coefficient of correlation (R). The principal motivation for using different AI models is that the actions of various models must be understood and the decision must be made for the best model to Carry out the assignment via a Set of Basic Data. It collects the input parameters via Google Doc from survey questionnaires and preprocessed with statistical analysis and analysis of correlations. Until modeling, data has been normalized and is done in such a way that both The pace and precision of the models can be enhanced.

\[ Y = 0.05 + 0.95 \times \left( \frac{x - x_{\text{min}}}{x_{\text{max}} - x_{\text{min}}} \right) \]  

Where the \( y \) = normalized data , \( x \) = calculated data, \( X_{\text{min}} \) = minimum and \( X_{\text{max}} \) = maximum respectively.

Feed Forward Neuronetwork (FFNN)

The important function of the feed forward neural network involves the fulfillment of information processing without needing the advanced mathematical model’s architecture based on the intuitive relation between the neurons.

Figure 1. Proposed flow chart for data-driven processes
As one of the most used ANNs, FFNN is a valuable tool that could capture a non-direct relation between output and input sources (Graham, White, Cologon, & Pianta, 2020). Equation (2) presents net feedback to the layers covered and yields. Like the traditional ANN, the FFNN consists of an input, one or more overlays and output layers in architecture (Figure 2).

\[ y_i = \sum_{j=1}^{N} w_{ji} x_j + w_{io} \]  

(2)

If \( N \) refers to the total number of nodes on the top layer of a node, \( I \ w_{ji} \) is the weight in the upper layers between \( I \) and \( J \) nodes; \( x_j \) is the contribution from \( j \) node; \( w_{io} \) is the tendency in \( I \) node and \( y_i \) is a transmitter signal of \( I \) node.

**Vector Machine Least-Square Support (LSSVM)**

An improved algorithm for the Least-Squares Support Vector Machine (LSSVM) algorithm is the simple SVM, which offers a computational advantage (reduces the computational advantage), Burden) over the regular SVM by transforming the problem of quadratic optimization into a linear equation system (Zhou, Brown, Snavely, & Lowe, 2017). Instead of solving a quadratic problem by solving a linear sequence of equations, the LSSVM algorithm used in the SVM standard provides a solution. For both classification and regression, the LSSVM Challenge may be used for. More data on the model are available from (Zhou et al., 2017).

\[ y = f(x) = w\phi(x_i) + b \]  

(3)

Where \( \phi(x_i) \) indicates feature spaces, the input vector \( x \) is not linearly mapped.

Minimize:  
\[ \frac{1}{2} \| w \|^2 + C \left( \sum_{i} (\xi_i + \xi_i^*) \right) \]  

(4)

Subject to:  
\[ \begin{align*}  
    w_i \phi(x_i) + b_i - d_i & \leq \varepsilon + \xi_i^* \\
    d_i - w_i \phi(x_i) + b_i & \leq \varepsilon + \xi_i^* \\
    \xi_i, \xi_i^* & \geq 0, \quad i = 1, 2, \ldots, N 
\end{align*} \]

\( \frac{1}{2} \| w \|^2 \) Where \( ^2 \) the norm of the vector weights and \( C \) refers to the regulatory constant. Figure 3 demonstrates the general conceptual model system of SVM. The parameters of the multipliers of Lagrange are known as \( \alpha_i \) and \( \alpha_i^* \). In Equation vector \( w \) (3) can be determined after the problem optimization solution has been found.

\[ w^* = \sum_{i=1}^{N} (\alpha_i - \alpha_i^*) \phi(x_i) \]  

(5)
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The overall shape of LSSVM, therefore, informs Equation 6.

\[
f(x, \alpha_i, \alpha_i^*) = \sum_{i=1}^{N} (\alpha_i - \alpha_i^*) K(x, x_i) + b
\]  

(6)

Where \( k(x_i, x_j) \) are the function of the Kernel, and \( b \) is the word bias. The common kernel function is radial basis function. (Gaussian) it is expressed as:

\[
k(x_1, x_2) = \exp(-\gamma \|x_1 - x_2\|^2)
\]  

(7)

Where \( y \) is the kernel parameter.

**Fuzzy-Neuro (NF)**

NF is a paradigm of learning as one of the algorithms for data intelligence. Neural network and FL capacity and unknown phenomena inherent in the systems are understood to be controlled. Due to its capacity, NF acts as a real-world estimator. True estimation functions. There are three forms of NF in general, namely Tsumoto, Sugeno, and Mamdani, with broader implementations of the Surgeon Method (Abba et al., 2017). There are various types of functions required for membership, such as Triangular, Sigmoid, Gaussian and Trapezoidal. The overall structure of NF reveals.
If FIS is presumed to have two "x1" and "x2" inputs and one "f" output, the following rules apply to a first-order sugeno fuzzy.

Rule 1: if \( \mu(x_1) \) is \( A_1 \) and \( \mu(x_2) \) is \( B_1 \) then \( f_1 = p_1x_1 + q_1x_1 \) \( \quad (8) \)

Rule 2: if \( \mu(x_1) \) is \( A_2 \) and \( \mu(x_2) \) is \( B_2 \) then \( f_2 = p_2x_2 + q_2x_2 \) \( \quad (9) \)

Parameters \( A_1, B_1, A_2, B_2 \) are members of the \( x_1 \) & \( x_2 \) input feature. The outlet function parameters of the neuro fuzzy model are \( p_1, q_1, r_1, p_2, q_2, r_2 \). Five-layer neural network setup is accompanied by NF structures and formulation (Elkiran, Nourani, Abba, & Abdullahi, 2018).

Layer 1: Each node \( i \) is an adaptive node with a node feature.

\[ Q_1^i = \mu_{A_i}(x) \] for \( i = 1, 2 \) or \[ Q_1^i = \mu_{B_i}(x) \] for \( i = 3, 4 \) \( \quad (10) \)

Where \( Q_1^i \) is Affiliation grade for \( x \) or \( y \) input. Gaussian was the membership function selected because it had the lowest error in prediction.

Layer 2: Each rule between inputs is connected by the T-norm operator that functions as “AND” operator.

\[ Q_2^i = w_i = \mu_{A_i}(x) \cdot \mu_{B_i}(y) \] for \( i = 1, 2 \) \( \quad (11) \)

Layer 3: The norm is labeled for each neuron, and the output is named “Normalized firing strength”.

\[ Q_3^i = \tilde{w}_i = \frac{w_1}{w_1 + w_2}, 1, 2 \]

Layer 4: Each node \( I \) is an adaptive node in this layer and performs the consequence of the rules.

\[ Q_4^i = \tilde{w}_i (p_1x + q_1y + r_1) = \tilde{w}_i f_i \] \( \quad (12) \)

Layer 5: The total output of this layer is calculated as the sum of all incoming signals.

\[ Q_5^i = \sum \tilde{w}_i f_i = \frac{\sum w_i f_i}{\sum w_i} \] \( \quad (13) \)

**Multi-Linear Regression (MLR)**

Regression models generally expect the extent of the correlation between the parameters of inputs and outputs, as well as the relationship between them. Linear regressions are usually fitted using the least square approach, although other methods can be used equally, such as limiting the “lack of fit” in some of the standards or reducing the penalized variant loss of the least square function as for the ridge regression. Linear regression is primarily separately categorized into two major product divisions and simple linear regression. Linear regression is considered easy if a single input variable is used to predict the association between a single output. However, the purpose is to calculate the relationship between two or more input variables in order to evaluate a model, the variables of the unit criterion are known as multi-linear regression. MLR, in which each value of the input parameter is associated with the output variable value, is the most commonly used form of linear regression used in various fields of study. It is known that MLR shows a straight-line correlation in terms of excellent estimates of all data points concerning both the output and the target variables (Khademi, Jamal, Deshpande, & Londhe, 2016). The MLR model is, as shown in Equation (14).

\[ y = b_0 + b_1 x_1 + b_2 x_2 + \cdots + b_i x_i \] \( \quad (14) \)

Where, is the value of the predictor of \( i_{th} \) \( b_0 \) is the constant of regression, and \( b_i \) be the coefficient of the predictor \( i_{th} \).

**Evaluation Criteria for Data-Driven Models**

Generally, for any form of data-driven approach, compared between expected and calculated values, work performance accuracy is assessed using different parameters. Herein analysis, the coefficient of the \( R^2 \)
determination as an attraction - of - fit, coefficient of correlation (R) and statistical errors, For the evaluation of the models, RMSE was used:

\[
R^2 = 1 - \frac{\sum_{j=1}^{N} [Y_{\text{obs},j} - (Y_{\text{com},j})]^2}{\sum_{j=1}^{N} [(Y_{\text{obs},j})]^2} 
\]

\[
R = \frac{\sum_{i=1}^{N} (Y_{\text{obs},i} - Y_{\text{obs}}) (Y_{\text{com},i} - Y_{\text{com}})}{\sqrt{\sum_{i=1}^{N} (Y_{\text{obs},i} - Y_{\text{obs}})^2 \sum_{i=1}^{N} (Y_{\text{com},i} - Y_{\text{com}})^2}} 
\]

\[
RMSE = \sqrt{\frac{\sum_{i=1}^{N} (Y_{\text{obs},i} - Y_{\text{com},i})^2}{N}} 
\]

Where \( N \), \( Y_{\text{obs}} \) and \( Y_{\text{com}} \) They are the number of data the data observed the normal value of the data observed and the calculated values. individually.

RESULTS AND DISCUSSION

The models used are (FFNN, NF, LSSVM and MLR) to analyse the technical and vocational teachers job performance through Emotional Intelligence EI, data were statistically analyzed before the models calibration as shown in Table 1. In general, in order to resolve common issues that can lead to incorrect analysis, mathematical analysis is used to explain data science.

Findings and to make reasonable decisions based on raw data, MATLAB 9.3 (R^2 019a) was used for the Design of data-driven models for FFNN, NF and LSSVM models, in comparison, Excel 2016 was used to build the deterministic linear MLR model.

According Usman, Zarebanadkouki, Waseem, Katsoyiannis, and Ernst (2020) The ideal number of hidden layers is defined by the number of nodes ranging from \((2n1/2+m)\) to \((2n+1)\), while \(n\) is the number of input neurons and \(m\) is the number of output neurons. Therefore, three 3 input and one 1 output as the number of hidden neurons for the models in which age, gender and educational background are the input while work performance as the targets output variable.

Table 1: Statistical analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>A</th>
<th>T-P</th>
<th>ED-B</th>
<th>G</th>
<th>M</th>
<th>WK-P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>2.45</td>
<td>2.53125</td>
<td>2.49375</td>
<td>1.29375</td>
<td>20.545</td>
<td>5.100625</td>
</tr>
<tr>
<td>Std dev.</td>
<td>0.063195</td>
<td>0.0925366</td>
<td>0.086419</td>
<td>0.036121</td>
<td>1.311156</td>
<td>0.298423</td>
</tr>
<tr>
<td>Minimum</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>Maximum</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>16</td>
<td>85</td>
</tr>
</tbody>
</table>

\( A = \) Age, \( T-P = \) Teacher position, \( ED-B = \) Educational background, \( G = \) Gender, \( M = \) motivation, \( WK-P = \) Work performance

Table 2: Spearman pearson correlation analysis

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>T-P</th>
<th>ED-B</th>
<th>G</th>
<th>M</th>
<th>WK-P</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T-P</td>
<td>0.5360573</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ED-B</td>
<td>0.0464240</td>
<td>-0.2603619</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>-0.0886813</td>
<td>-0.1054705</td>
<td>-0.1033348</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>-0.2499159</td>
<td>-0.1514803</td>
<td>0.1340096</td>
<td>0.0697907</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>WK-P</td>
<td>-0.2660512</td>
<td>-0.2313116</td>
<td>0.2135854</td>
<td>0.058091</td>
<td>0.814650</td>
<td>1</td>
</tr>
</tbody>
</table>

\( A = \) Age, \( T-P = \) Teacher position, \( ED-B = \) Educational background, \( G = \) Gender, \( M = \) motivation, \( WK-P = \) Work performance
Outcomes of Single Models

Table 3: Results of FFNN, NF, LSSVM and MLR models

<table>
<thead>
<tr>
<th></th>
<th>Calibration</th>
<th>Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$R^2$</td>
<td>RMSE</td>
</tr>
<tr>
<td>FFNN- T</td>
<td>0.710344</td>
<td>0.1402932</td>
</tr>
<tr>
<td>FFNN- L</td>
<td>0.6157814</td>
<td>0.1615790</td>
</tr>
<tr>
<td>FFNN- P</td>
<td>0.6882031</td>
<td>0.1455565</td>
</tr>
<tr>
<td>MLR</td>
<td>0.6958412</td>
<td>0.1437626</td>
</tr>
<tr>
<td>LSSVM</td>
<td>0.6797925</td>
<td>0.1335450</td>
</tr>
<tr>
<td>NF- SCH</td>
<td>0.8814502</td>
<td>0.08975242</td>
</tr>
</tbody>
</table>

FFNN- T = Feed forward neural network Tansig, FFNN-L = feed forward neural network Logsin, FFNN-P = feed forward neural network Purelin, NF-SCH = NF- sub clustering hybrid.

Table 3 above presents the outcomes accuracy of the different models. It has been clearly seen from the comparative study of the models all four Models are predictable effectively the technical and vocational teachers job performance using the emotional intelligence. Among the four models, compared to the FFNN, NL, LSSVM and MLR models, provided a superior alternative to predicting competencies both in calibration and verification for $R^2$, $R$, and RMSE. Although the data involved in this analysis are standardized, the effect of the error would be lower associated to the non-standardized data.

However, the verification process of technical and vocational education teachers job/work performance, the forecast abilities based on goodness of fits ($R^2$) showed that The FFNN, MLR, and LSSVM models were outperformed by Neuro fuzzy (NF).

NF models as mentioned outperformed the other models by 17% for FFNN, 18% for MLR, and 20% for LSSVM.

While for verification the neuro fuzzy NF models outperformed the models by 40% for FFNN, 73% for MLR and 70% for LSSVM respectively.

Figure 5. Scatter plots for NF-SCH training
Figure 6. Scatter plots for FFNN -tansig training

Figure 7. Scatter plot for LSSVM training

Figure 8. Scatter plots for MLR training
Figure 9. Scatter plots for NF-SCH-test

Figure 10. Scatter plots for FFNN-Tansig test

Figure 11. Scatter plots for LSSVM test
The dispersed scatter plot provides a further comparison of the findings as seeing in the figures above showing the work performance train and test for NF, FFNN, MLR and LSSVM models. The best model was related to the output error relationship in figures between the observed and expected values.

The bar graph in Figure 9 & 10 shows both the calibration and verification processes, all the error values were appropriate which indicates that neuro fuzzy NF is lower/less, this shows NF outperformed the other three
A. Idris et al. / Teachers emotional intelligence to predictive models. This demonstrated that technical and vocational teachers work/job performance. The artificial intelligence models AI cover the unpredictable and dynamic environment in the determination of job/work performance.

This was consistent with the (Cordova et al., 2015; Salovey & Mayer, 1990) studies which recorded an error value above 0.05. confirmed, however, Artificial neural network has satisfactory prediction whose attributed high correlation value model with the threshold of $R = 0.8$. Table 2 Conveyed that all artificial intelligence Used dependent models serve the expectation of prediction and therefore prove to be efficient in terms of the above objectives.

![R for Training & Testing](image.png)

**Figure 15. Radar diagram for various coefficients of variance determination**

The above figure displays the radar charts for various coefficients of determination of variance. Three non-linear and one linear models for estimating the performance of technical and vocational teachers are the deciding values for the teaching and testing stages of the four models. Various studies such as (Bose & Guha, 2018) have shown that its high coefficient of correlation value is correlated with the strong output potential represented by models.

**CONCLUSION**

The main aim of this research was to test the performance of the wok in terms of self-awareness, self-regulation, impact, motivation, empathy and social skills based on models of artificial intelligence. Three non-linear single models with different transfer and membership functions, NF, FFNN, LSSVM and the classic linear regression model MLR, were used to predict job performance. After the input parameters were evaluated, it was concluded that NF delivers best outcomes in the preparation, testing and fostering phases with $R^2$ values of 0.8814502 and 0.8375152 and increased FFNN precision up to 17 percent, MLS 18 percent and LSSVM 20 percent and FFNN up to 40 percent, MLR 73 percent and LSSVM 70 percent respectively for the verification process (Graham et al., 2020).

To conclude, an aggregate comparison of the outcomes showed NF-SCH success in the private and classroom life to encourage efficiency both for teachers and the classroom, according to the proposal (Mahasneh, 2016) that training in emotional intelligence could also be used as a help to an emotionally smart teacher.

Finally, the study emphasizes the significance of emotional intelligence. The four domains of emotional intelligence (self-awareness, self-regulation, self-motivation, empathy, and social skills) tend to have a greater effect on teacher success. Emotional intelligence should be established and enhanced in a systematic and consistent manner in order to maintain high performance and competitive advantage.

**Conflict of Interest**

The author declares no interest of conflicts.
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