INTEGRATING EMERGING TECHNOLOGIES FOR EFFECTIVE SCHOOL ADMINISTRATION: THE PREDICTIVE POWER OF TECH AWARENESS AND TECH PROFICIENCIES ON TEACHERS' JOB SATISFACTION.

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Abstract

The study explored integrating the emerging technologies for effective school administration in Nsukka Education Zone, Enugu State. Two research questions and two hypotheses were raised to guide the study. The study adopted the correlational survey research design. The population of the study consisted all the 7989 teachers in public-owned secondary schools in Nsukka Education Zone. The sample size consisted of 400 teachers selected using simple random sampling. Two instruments were used to collect data for the study. A researcher-made questionnaire titled "Teacher Tech Awareness and Proficiency Questionnaire, TTAPQ" were used to collect data for tech awareness and tech proficiency respectively, and an adapted version of National Association of County and City Health Officials JSS was used to collect data for teachers' job satisfaction. The reliability of the instruments were computed using Cronbach Alpha Reliability Method. The reliability coefficient yielded for the Tech Awareness components of the TTAPQ was 0.91, while the reliability index for the Tech Proficiency cluster was 0.89. The adapted NACCHO JSS also yielded a reliability of 0.88. Face and content validation of the questionnaires were done by 3 experts from the Department of Educational Foundation, Nnamdi Azikiwe University Awka. While 2 of the experts specialized in measurement and evaluation, the other expert is specialized in Educational Psychology. Data collected were analysed using SPSS version 26. Pearson's correlation was used to answer the research question, while simple linear regression was used to test the hypotheses. The findings of the study revealed that tech awareness had weak positive correlation with teachers' job satisfaction, while tech proficiency had strong positive relationships with teachers' job satisfaction. Additionally, tech awareness and tech proficiency had strong predictive power with teachers' job satisfaction in Nsukka Education Zone. There is need to train teachers on the use of emerging technologies for curricular and administrative solutions.
Keywords: *Tech awareness, Tech proficiency, Artificial Intelligence, Blockchain technology, Job Satisfaction.*

Introduction

Just like in every other facet of human endeavour, digital technology has become pivotal to both the art and act of teaching. From curriculum planning to development and execution, the place of emerging technology can no longer be wished away. The integration of technology in the art of teaching has totally transformed the educational landscape in recent years. (Khan *et al*., 2020). This fusion has brought about many benefits, including enhanced student engagement (Liu *et al*.,

2022), improved learning outcomes (Singh & Mann, 2021), and increased efficiency in instructional delivery (Wang *et al.,* 2020).

As the world continues to embrace technology at all levels, our schools and classrooms are not left behind. Morrah and Bassey (2021) admitted that technology has become an integral part of 21st century education, thus both teachers and learners are beginning to accept that only technology-compliance can help them meet up with the current trends obtained in digitized education. Onuegbu (2020) identified ICT as a pre-requisite for modern day instruction and educational administration, attributing proper utilization of ICT in education to positive outcomes and quality delivery.

In addition to the day-to-day classroom activities, modern emerging technologies are also revolutionizing school administration, enhancing efficiency and improving decision-making processes. Artificial Intelligence (AI) tools provide teachers with aid for analysing data, tracking students' performance and enhanced personalized learning assistance (Khan *et al*., 2020; Wang *et al*., 2020). Artificial Intelligence also offers the teacher tools for automated grading and feedback (Singh & Mann, 2022) and assistive learning tools for learners with disabilities.

The internet of things is another emerging technology that has become a rave in contemporary times. IOT devices are known to facilitate "smart" classroom management, energy efficiency and enhanced security (Singh & Mann, 2021; Hlaing, 2019). Hlaing (2019) saw IOT as a key to promoting operational efficiency in the school. Todorous and Vela (2023) surmised that the use of devices such as laptops, digital whiteboards and tablets are pointers to the central role played by IOT in enhancing collaboration and communication in the classroom, promoting flexibility and dynamism in content delivery and administration.

Blockchain technology is another emerging technology that has become a cornerstone of school administration and operation in contemporary times. This modern advanced technology has been linked with innovative strides made in organizing activities and compartmentalizing records in schools. To put it more succinctly, blockchain technology helps secure storage and management of students' record and academic transcripts (Liu *et al*., 2022); decentralized and transparent tracking of professional development credits (Khan *et al*., 2020), as well as authentication and verification of educational credentials (Singh & Mann, 2021). In throwing light on how blockchain technology works, Okpalaojiego (2021) claimed that the innovative technology is named blockchain as a physical illustration of how transaction data stored in blocks appeared chained together. However, Ruhlow (2021) provided a more concise definition of blockchain technology, likening it to a "digital database" that is used to store huge chunks of information in blocks.

Cloud computing is a digital database system that enable flexible access to administrative resources, collaboration tools and data storage (Wang *et al*., 2020). Cloud computing has revolutionalised the way schools manage their administrative tasks. By migrating to the cloud, schools can now access a scalable, flexible, and cost-effective infrastructure that enhances productivity, collaboration and decision-making (Kahn *et al*., 2020). Cloud based platforms offer a range of benefits for educational administration that includes centralized management of student's data records, and transcripts (Liu *et al*., 2022; Dziuban *et al*., 2018). Also, cloud-computing ensures that hitch-free creation and management of scalable infrastructure for online

learning platforms and course management systems (Wang *et al*., 2020; Hamdan *et al*., 2019). More importantly, cloud computing allows for seamless integration with other emerging technologies such as AI and IOT to create a robust and efficient administrative ecosystem.

Interestingly, the availability of these technologies, alone, is not enough to have innovative administration in the school. This is because of the need for awareness and know-how, especially among teachers who are expected to lead the charge on this technological revolution playing out in our institutions of learning, at all levels. Sharma and Chaudhary (2020) pointed out that teachers should lead the charge in the integration of technology in the school as controllers of the classroom and core stakeholder in content development and pedagogy applications. Fears abound that technology has come to replace the role of humans in the teaching learning process (Kurshan, 2022; Manyika *et al*., 2021; Sharma & Chaudhary, 2020). However, studies have found that teachers that are proficient with technology and integrate same in their work are less likely to experience work burnout and other workload (Ezeonwumelu *et al*., 2024; Akaneme *et al*., 2021; Uzodimma *et al*., 2022).

Tech awareness refers to the knowledge and understanding of the latest technological advancements, trends and tools. It involves being informed about the capabilities, limitations, and potential applications of technology in various contexts, such as education. Tech proficiency, on the other hand, refers to the ability to manipulate these technologies to create value, enhance output and maximise creativity. Several studies have reached conflicting findings on the level of tech awareness and proficiency (Idhalama *et al*., 2023; Morrah & Bassey, 2021; Ifinedo *et al*., 2019). Other studies disagreed, pointing out a lack of awareness and technological know-how among Nigerian teachers (Ogegbo, 2020; Emelogu *et al*., 2022; Adewale, 2022). Anchored on the Technological Pedagogical Content Knowledge Theory, TPACK, the study intends to explore possible associations between tech awareness, tech proficiency and positive job-related outcomes.

Job satisfaction refers to the positive emotions associated with carrying out one's occupation or assigned tasks. Job satisfaction is a concept that entails the employee's sense of success or achievement (Dziuba *et al*., 2020). It is a construct that explains the feeling of accomplishment an employee has about his job. When an employee is satisfied with his job, there is an expectation that the said employee applies himself more to maximise output, with the hope that the conditions that stimulated the said job satisfaction are maintained, if not improved on (Dziuba *et al*., 2020; Varma, 2018).

Extensive studies have been conducted on the concept of job satisfaction with emphasis ranging from determinants to implications across various facets of occupational life. Job satisfaction has been found to predict improved productivity (Utami *et al*., 2020; Gomathy *et al*., 2022). In addition to individual productive outcomes, job satisfaction has also been linked with organizational success. This was buttressed by the findings Oswald *et al*. (2020) that organisations that work towards the job satisfaction of their employees have 12% chance of more success than organisations that neglect or ignore the satisfaction of their employees. Also, a study by Harter *et al*. (2020) revealed that employees with high job satisfaction are more likely to achieve their performance goals.

Besides productivity, job satisfaction has also been associated with higher motivation levels among employees. When an employee experiences happiness in the course of exercising his duties, the said employee is triggered to persist with his duties (Dziuba *et al*., 2020; Oswald *et al*., 2020; Varma, 2018). In fact, studies have also looked at the types of motivation linked with job satisfaction with evidence on correlations between job satisfaction and intrinsic motivation (Kim *et al*., 2022), and extrinsic motivation (Zhang *et al*., 2022). Also, job satisfaction has also been found to improve creativity among employees. A study Zhou *et al*. (2021) found that employees with high job satisfaction exhibit higher levels of creative behaviour. Similarly, Zhang *et al*., (2022) in another study, demonstrated that job satisfaction relates to creative performance.

Also, several factors have been identified to predict job satisfaction for example work-life balance has been identified as a predictor of job satisfaction. Grawitch *et al*. (2021) revealed that work-life balance helps an employee experience lower level of stress, improving well-being and consequently stimulating job satisfaction. Maertz *et al*. (2022) also found that work-life balance reduces turnover intentions, thereby increasing job life satisfaction. Another study by Cho *et al*. (2021) demonstrated adopting flexible work plan improves job satisfaction.

Also, several research works on job satisfaction have recounted the pivotal role played by monetary incentives, remuneration and compensatory benefits on job satisfaction. Studies have underscored the importance of adequate pay, comprehensive benefits packages including healthcare and retirement plans, that these contributes positively to employee job satisfaction (Brown & Lee, 2023; Martinez & Garcia, 2022; Wang & Zhao, 2020). Opportunities for career and skills development are also associated with job retention, based on job satisfaction. This implies that organiszations that encourage their staff and invest in the career development of their staff report higher levels of job satisfaction among their employees (Smith *et al*., 2023; white & Davis, 2022; Yang & Liu, 2021; Zhang & Li, 2020).

Furthermore, several other factors identified as determinants of job satisfaction include organisational justice (Colquitt *et al*., 2022; Lau *et al*., 2022; Greenberg *et al*., 2021; Masterson *et al*., 2021); feedback and recognition from employers (London *et al*., 2022; Whittaker *et al*., 2022; Aguinis *et al*., 2021; Eisenberger *et al*., 2021); job autonomy (Hackman *et al*., 2022; Deci *et al*. 2021; Parker *et al*., 2021); and leadership support from the employers (Erdogon, 2022; Kim *et al*., 2022., Park *et al*., 2021; Zhang *et al*., 2021). However, there is little evidence on how development of particular skills and awareness boosts job satisfaction. This presents a viable research gap.

This study was anchored on the Technological Pedagogical Content Knowledge, TPACK framework, propounded by Lee Shulaman in 1986 and further developed by Mishra and Koehler (2006). The theory posits that effective technology integration in education requires awareness of digital tools and technologies, knowledge of pedagogical processes and mastery of curricular content. Thus, teachers need to develop an in-depth understanding of how to effectively integrate technology in order to perform their job better. The TPACK framework can help explain how teachers' ability to merge digital awareness and proficiency in their job will maximise their job satisfaction. This is because who possess high TPACK are more likely to integrate technology are more likely to explore novel teaching experiences, improve learning outcomes, which inadvertently boosts their job satisfaction.

The role of emerging technologies in reshaping Nigeria's educational landscape can no longer be ignored. The proliferation of Artificial Intelligence technology, Internet of Things, Cloud computing and block chain technology in our society, and our schools in particular has yielded substantial positive outcomes. Evidence from literature suggest that a significant number of teachers are aware of these emerging technologies and are relatively proficient with these digital tools. However, most of the emphasis on studies, exploring teachers' tech awareness and proficiency are focused on the positive curricular and administrative outcomes associated with digital technology. This has created a research gap on possible associations among teacher's tech awareness, tech proficiency and teachers' job satisfaction. This study intends to plug this gap by investigating the potential relationship among teachers' tech awareness, teachers' tech proficiency and their job satisfaction in Nsukka Education Zone, Enugu State.

Purpose of the Study
The main purpose of this study is to determine the predictive power of tech awareness and tech proficiency on teachers' job satisfaction in Nsukka Zone. Specifically, the study seeks to:

I.   Ascertain the predictive power of tech awareness on teachers' job satisfaction
II.   Determine the predictive power of tech proficiency on teachers' job satisfaction

Research Questions
The following research questions guided the study:

i.   What is the relationship between tech awareness and teachers' job satisfaction in Nsukka Education Zone?
ii.   What is the relationship between tech proficiency and teachers' job satisfaction in Nsukka Education Zone?

Research Hypotheses
Two research hypotheses were formulated and tested at .05 level of significance.

H_{01}: Tech awareness has no predictive power on teachers' job satisfaction in Nsukka Education Zone.

H_{02}: Tech Proficiency has no predictive power on teachers' job satisfaction in Nsukka Education Zone.

Method
This study adopted the correlation research design. The population of the study consisted all the 7989 teachers in public-owned secondary schools in Nsukka Education Zone. A sample of 400 teachers were selected from the 59 public secondary schools in Nsukka Education Zone using multi-stage sampling.

The first stage of sampling involved dividing the entire Education Zones into Local Government Areas (LGA). Each LGA represented a cluster from which three schools were selected using stratified random sampling. Four schools were selected from Nsukka urban. Forty teachers were selected from each of the ten schools selected using simple random sampling. The simple random sampling technique was used. Strips of papers had inscriptions of "yes" and "no" and were folded and shuffled. Only teachers that picked the paper that had "Yes" were selected. Data

were collected using two instruments. A researcher-made questionnaire titled "Teacher Tech Awareness and Proficiency Questionnaire, TTAPQ", and an adapted version of National Association of County and City Health Officials JSS. The researcher made TTAPQ consists of 25 items; 15 items on respondents' tech awareness and 10 items on respondent's tech proficiency. Those items were scored on a 5-point Likert scale of strongly Agree, Agree, Undecided, Disagree and strongly Disagree, and weighted 5, 4, 3, 2 and 1 respectively. The adapted NACCHO Job Satisfaction Survey consists of 46 items scored and weighted thus, strongly Agree (5), Agree (4), Undecided (3) Disagree (2), and Strongly Disagree (1). The reliability of the instruments was computed using Cronbach Alpha Reliability Method. The questionnaires were issued out to 50 teachers from secondary schools in Obollo Afor Education Zone. The reliability coefficient yielded for the Tech Awareness components of the TTAPQ was 0.91, while the reliability index for the Tech Proficiency cluster was 0.89. The adapted NACCHO JSS also yielded a reliability of 0.88. These were considered appropriate for the study. Face and content validation of the questionnaires were done by 3 experts from the Department of Educational Foundation, Nnamdi Azikiwe University Awka. While 2 of the experts specialized in measurement and evaluation, the other expert is specialized in Educational Psychology. Data collected were analysed using Statistical Package for Social Science, SPSS version 26. Pearson's correlation was used to answer the research question, while simple linear regression was used to test the hypotheses at .05 level of significance.

Results

Research Question One: What is the relationship between tech awareness and teachers' job satisfaction in Nsukka Education Zone?

Table 1: The Relationship between Tech Awareness and Teachers' Job Satisfaction?

	R	R^2	Adjusted R^2	Sig. Value
Tech Awareness – Teachers Job Satisfaction	.497**	.275	.264	.000

**. Correlation is significant at the 0.01 level (2-tailed).

Data in Table 1 revealed the relationship between tech awareness and teachers' job satisfaction in Nsukka Education Zone. A correlation coefficient of .491 implied a weak but positive relationship between the dependent and independent variables. Thus, it could be argued that tech awareness has a weak significant relationship with teachers' job satisfaction in Nsukka Education Zone.

Research Question Two: What is the relationship between tech proficiency and teachers' job satisfaction in Nsukka Education Zone?

Table 2: The Correlation between Tech Proficiency and Teachers' Job Satisfaction?

	R	R^2	Adjusted R^2	Sig. Value
Tech Proficiency – Teachers Job Satisfaction	.858**	.689	.685	.000

**. Correlation is significant at the 0.01 level (2-tailed).

Table 1 revealed that the correlation coefficient between tech proficiency and teachers' job satisfaction is 0.858. This implies that there is a strong and positive relationship between tech proficiency and teachers' job satisfaction Nsukka Education Zone.

Hypothesis One: Tech awareness has no predictive power on teachers' job satisfaction in Nsukka Education Zone.

Table 3: Regression Analysis on the Influence of Tech Awareness on Teachers' Job Satisfaction in Nsukka Education Zone.

		Coefficients[a]						
	Model	**Unstandardized Coefficients**		**Standardized Coefficients**				
		B	**Std. Error**	**Beta**	**R**	**Sig.**	**F**	**Sig.**
1	(Constant)	.548	.189					
	Tech Awareness	.610	.145	.671	.497[a]	.000	30.78	.000[b]

a. Dependent Variable: Teachers' Job Satisfaction
b. Predictors: (Constant), Tech Awareness

The predictive influence of tech awareness on teachers' job satisfaction yielded a B value of 0.671 ($p < 0.05$), with the p – value (0.00) less than 0.05. This implies that there is significant influence of tech awareness on teachers' job satisfaction in Nsukka Education Zone.

Hypothesis Two: Tech Proficiency has no predictive power on teachers' job satisfaction in Nsukka Education Zone.

Table 4: Regression Analysis on the Influence of Tech Proficiency on Teachers Job Satisfaction

		Coefficients[a]						
	Model	**Unstandardized Coefficients**		**Standardized Coefficients**				
		B	**Std. Error**	**Beta**	**R**	**Sig.**	**F**	**Sig.**
1	(Constant)	.718	.218					
	Tech Proficiency	.811	.134	.818	.858[a]	.000	98.35	.000[b]

a. Dependent Variable: Teachers' Job Satisfaction

b. Predictors: (Constant), Tech Proficiency

The predictive influence of tech proficiency on teachers' job satisfaction as revealed in Table 4 yielded a Beta value, B = 0.818 ($p < 0.05$) and the p – value (0.00) is less than 0.05. Thus, the null hypothesis was rejected. As a result, it could be stated that tech proficiency has significant influence on teachers' job satisfaction in Nsukka Education Zone.

Discussion of Findings

In table 1, it was revealed that there is a weak correlation between teacher's tech awareness and their job satisfaction. This implied that although there is a positive correlation noted among the

variables, the correlation was not strong enough to determine the job satisfaction of secondary school teachers in Nsukka Education Zone. Thus, mere knowledge of emerging technologies is not enough to stimulate job satisfaction. This goes against the findings of Zhang *et al*., (2022) that inferred that when employees are aware of factors that trigger their motivation, there is a spike in productivity and job satisfaction. However, the findings of the study tallied with that of White and Davis (2022) that found access to career development opportunities as a vital predictor of job satisfaction. Yang and Liu (2021) also agreed with the findings of this study claiming that when employees are working in an environment that stimulates growth, they tend to enjoy their jobs more.

Table 2 also showed a strong correlation between teachers' tech proficiency and their job satisfaction. This augurs well with the findings of Oswald *et al*. (2020) that saw productivity as a predictor of job satisfaction. Also, Martinez and Garcia (2020) concurred with the findings of this study. They (Martinez & Garcia) found that when employees acquire more skills, on the job, it triggers a ripple effect on productivity, and consequently job satisfaction. Cho *et al*. (2021) also agreed that proficiency in specialized skills enables the employee devise astute work plans that makes job execution easier, enhancing job satisfaction. Therefore, evidence abound in present and past empirical studies that there is a relationship between tech proficiency and teachers' job satisfaction.

Table 3 and 4 revealed a strong prediction of tech awareness and tech proficiency respectively, on teachers' job satisfaction in Nsukka Education Zone. This is backed by evidence from several studies. Smith *et al*., 2023) found that employees that have honed their skill set find it easier to execute their jobs. Maertz *et al*. (2022) also revealed that lower levels of stress on the job is a predictor of job satisfaction. When teachers are aware of technological solutions and are very proficient with same, they tend to find it easier to do their jobs. Also, Cho *et al*. (2021) reported that workers who had flexible work plans are more likely to experience job satisfaction than their peers that have a more rigid work plan. Emerging technologies have been heralded for entrenching flexibility in employees' work schedule, thereby stimulating high levels of job satisfaction.

Conclusion

The findings of this study is in line with the tenets of TPACK framework as it was found that a successful integration of technology in pedagogy and content did not only enhance positive outcomes in output, it also increased the levels of teacher's job satisfaction. Therefore, it was inferred that tech awareness and proficiency are significantly associated with teachers' job satisfaction in Nsukka Education Zone.

Recommendations

Based on the findings of the study, the following recommendations are made;

i.   School administrations should key into the drive for adapting emerging technology solutions to help reduce teachers' stress levels.

ii. Seminars and workshops are needed to train teachers on the use of emerging technologies for curricular and administrative solutions.

iii. There is need for an integration of emerging technology into the curriculum for teacher training programmes to entrench tech literacy in teachers.

iv.   Teachers should be encouraged to continuously update their skills and knowledge in emerging technologies to stay current with most recent advancements

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