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Forecasting the Number of Teachers in Region II: A Mathematical Modeling Approach

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ABSTRACT

Sufficient number of teachers plays a crucial role to have a quality education in the Philippines. Shortage of teachers especially in urban areas which having a large number of enrollment can be a stress to the both parties delivering the best learning experience. The author determined the significant relationship between the number of teachers and number of enrollment as well as the number of schools.

Utilizing the data from S.Y. 2010-2011 to S.Y. 2020-2021 specifically in Region II using multiple linear regression analysis to determine if there exist a significant linear relationship of the variables. Constructing time series models to identify the best fit model to forecast the number of teachers in the future. Based on the result of the study, there exist a linear relationship to the two variables as well as it is combined. The identified best fit model is the Sextic polynomial time series model and it predicts the number of teachers by S.Y. 2021-2022 will increase to 11,001.

Keywords: number of teachers, enrollment, schools, shortage, mathematical modelling, education

Introduction

A large number of enrollment in every school without enough teaching staff can bring ineffectiveness in teaching and learning cycle. Furthermore, workloads of teachers is additional hustle to the public teachers, and that is why, according to other study, it suggests, policymakers shall have a comprehensive review and analysis of the policy in addition to support the teachers in numerous data for enrollment (Tarraya, 2023). According to Nalzaro (2022), teachers' competence have a significant relationship to the students' performance, and that emphasize that the teacher-to-student ratio is a factor to better learning experience in the school. The main learning environment, the school is an essential factor also in learning process of the students and teachers. In addition to that, based on the study of Dr. Esteban (2020), if the school desires the best of its human resources, the school must reflect on what it offers to ensure that the school will perform at its maximum efficiency and to increase the job satisfaction of the school's staffs.

According to the study of Trinity University of Asia, the Department of Education (DepEd) undersecretary for Human Resource and Organization Development Gloria Mercado noted that the ratio for students-to-teacher is 30 students per teacher, however, she added that the shortage today is at 86,000 teachers and for 2024, we have an allocation of 20,000. It concludes that currently, the teacher-to-students ratio is 1:40. Aside from lack of resources, and relatively low teachers' salary, the student-teacher ratio has had a significant impact on the education system in the all over the region (Oberes, 2022). Additionally, large class size have its disadvantages, it can reduce the time that the students will engage with one another, it can increase discipline problems and it can reduce the time that the teacher will engage to each student. Having a lower class size would result to a better discipline record of the students, moreover, it can increase the opportunities of more interactive learning.

In order to lessen the stress between quantities in students to teachers, implementation of additional incentives is found efficient in increasing work productivity (Jamoral et. al., 2023). Furthermore, to address this issue on educational system, it is essential to understand the trajectory of number of teachers over time, particularly in Cagayan Valley Region. Forecasting the number of teachers in Cagayan Valley Region can contribute in planning the resources of education and budget more effectively. It can also contribute with foresight into future staffing requirements, schools and districts can proactively recruit and retain qualified teachers. Administrations and Policy makers can also identify areas of potential shortages and take steps addressing these kind of issues. Schools can also ensure the class sizes which can impact student learning experiences. Furthermore, forecasting contribute to long-term strategic planning for educational institutions.

In this study, the author examines the affiliation of number of teachers in relation to the number of enrollment and number of schools. This study will allows the government and non-government agencies, administrators and policy makers to create and implement strategies that can enhance the educational system and address future problems specifically, to the best learning experience of the students in relation to teacher-to-student ratio or class size.

Statement of the Problem

This study aimed to determine the number of Teachers in Public Schools of Region II Cagayan Valley in relation to the Number of Enrollment, and the Number of Schools.

Specifically, this study aimed to:

1. Determine the trend of number of Teachers in Public Schools of Region II Cagayan Valley from SY 2010-2011 to SY 2020-2021.
2. Find if the number of number of Teachers in Public Schools of Region II Cagayan Valley has a significant linear relationship with the following variables:
    a. Number of Enrollment
    b. Number of Schools
    c. Number of Enrollment and Number of Schools altogether.
3. Construct time series model of the main variable using the following models to predict the number of Teachers for the SY 2021-2022.
    a. Linear
    b. Quadratic
    c. Exponential
    d. Polynomial (cubic, quartic, quintic, sextic)
    e. Power
    f. Moving Average
    g. Exponential Smoothing
    h. Auto regression
4. Determine the best fit models and predict the main variable for the SY 2021-2022.

Methodology

Participants

The participants in this study was the Junior High School Teachers of Public Schools in Region 2 Cagayan Valley. The main variable which is the number of Junior High Teachers of Cagayan Valley Region Public Schools was gathered from the S.Y. 2010-2011 to S.Y. 2020-2021. The other variables included in this study were the number of enrollment and number of schools in the Region.

Data Sources

The data for the number of Teachers, Enrollment and Schools were from the the Department of Education (DepEd) Education Management Information System Division - Planning Service databases.

Procedure

The author of this study gathered an existing data on the internet particular on the Department of Education website to be used in Regression Analysis. The gathered data was utilized and generated using MS Excel for the analysis.

Data Analysis

Data from S.Y. 2010-2011 to S.Y. 2020-2021 was observed to show the trend for the number of Junior High School Teachers in Region 2 using Scattered Diagram. A simple linear regression was generated to show if there is a significant linear relationship between the dependent and independent variables. And also, multiple linear regression is utilized to show if there is a significant linear relationship from the number of teachers in relation to the number of enrollment and number of schools, simultaneously. Constructing a time series model of the number of teachers to determine the best fit model in predicting the population of Junior high school teachers in Public schools in Region 2 for the S.Y. 2021-2022.

RESULTS AND DISCUSSION

Section 1: Trend of the number of Teachers

The figure below, figure 1, shows the trend of the number of Teachers in Region 2 Cagayan Valley from S.Y. 2010-201 to S.Y. 2020-2021.

Figure 1. Trend of the number of Teachers from S.Y. 2010-201 to S.Y. 2020-2021.

The figure shown above indicates an increasing number of Teachers over a decade. This suggests that the quantity of Teachers is interdependent, as it can be influenced by the various variables over the time frame.

Section 2: Significant Linear Relationship of number of Teachers

2.1. Number of Enrollment

The table shows the linear regression for the number of Teachers and number of enrollment in Public Schools of Region II Cagayan Valley from S.Y. 2010-2011 to S.Y. 2020-2021.

Table 1.

Linear Regression Result of the number of Teachers and number of enrollment in Region 2.

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-5599.73	3158.26	-1.77304	0.109977
Enrollment	0.065988	0.015083	4.374873	0.001784

P-value = 0.001784 *R2 = 0.6802* **significant at 0.01 *significant at 0.05*

Table 1 shows that the number of enrollment significantly influence the number of Teachers, as a result of its p<0.002, this indicates that there is significant linear relationship between the number of teachers and number of enrollment. It suggests that the number of teachers can be predicted by the equation $y = 0.066x - 559.73$, where x is the number of enrollment and y is the number of Teachers. From the result, the model can be explained 68.02% of the variances.

2.2. Number of Schools

The table 2 shows the linear regression result for the number of Teachers and number of Schools in Region 2 from the S.Y. 2010-2011 to S.Y. 2020-2021.

Table 2

Linear Regression Result of the number of Teachers and the Number of Schools in Region 2.

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-8471.45	3301.308	-2.56609	0.030382
Schools	41.34627	8.181384	5.053701	0.000687

P - value = 0.000687 *R2 = 0.7394* **significant at 0.01* **significant at 0.05*

Table 2 shows that the number of schools is significant predictor of the number of Teachers and as a result of its p<0.001, it indicates that there exists a significant linear relationship between the number of schools and the number of the Teachers. From the result of linear regression, the number of teachers can be predicted using the equation *y = 41.346x - 8471.45* where x is the number of schools and y is the number of Teacher. This model can be explained 73.94% of the variances.

2.3. Number of Enrollment and Number of Schools

Table 3 shows the multiple linear regression result of the number of enrollment and number of schools in relation to the main variable number o Teachers from the S.Y. 2010-2011 to S.Y, 2020-2021.

Table 3

Linear Regression Result of the Two Variances

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-9472.44	3990.797	-2.37357	0.044995
Enrollment x_1	-0.03537	0.070982	-0.49834	0.631654
Schools x_2	62.1722	42.65538	1.457546	0.183072

P - values = 0.004 *aR2 = 0.6840* **significant at 0.01* **significant at 0.05*

The multiple linear regression result shows that the Number of Enrollment and Number of Schools altogether have a significant linear relationship to the number of Teachers with a result of P<0.004. This suggests that the two variables, number of enrollment and number of schools influence the number of the teachers. This can be predicted using the equation $y = -0.035\ x_1 + 62.172 x_2 - 9472.44$, where in the value of x_1 is the number of enrollment and x_2 is the number of schools. This model can be explained 68.40% of the variances.

Section 3: Time Series Model

A. Linear

Figure 2 shows the linear time series of the number of Junior High School Teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

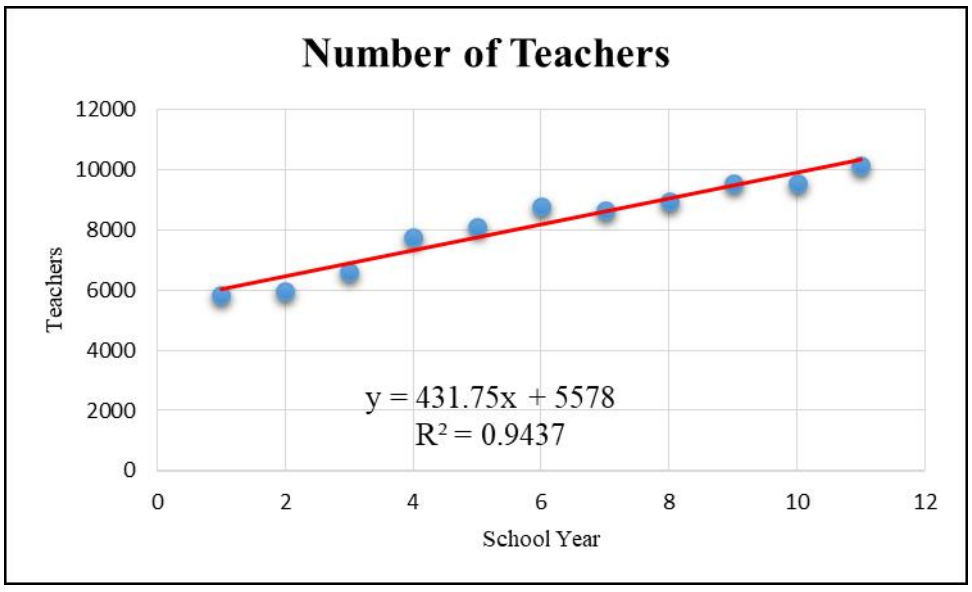

Figure 2. Linear time series of the number of Junior High School Teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

It is shown from the figure above, the model for linear time series in predicting the number of Teachers is $y = 431.75x + 5578$. The coefficient of determination (R2) is shown 0.9437 indicating the it can be explained 94.37% change in the number of Teachers.

B. Quadratic

Figure 3 shows the quadratic time series of the number of Junior High School Teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

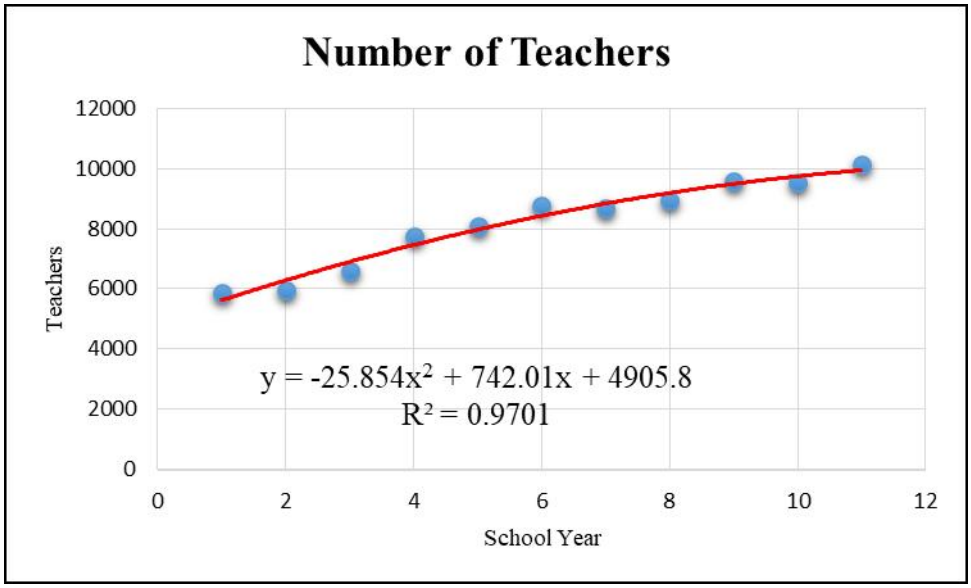

Figure 3. Quadratic time series of the number of Junior High School Teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

As it shown from the figure above, the model for the Quadratic time series for the number of the Teachers is $y = -25.854x^2 + 742.01x + 4905.8$. This could be the model as predictor for the quadratic time series. The coefficient of determination (R2) is 0.8484 indicating that 84.84% can be explained in the number of Teachers.

C. Exponential

Figure 4, the exponential time series model of number of Junior High School Teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

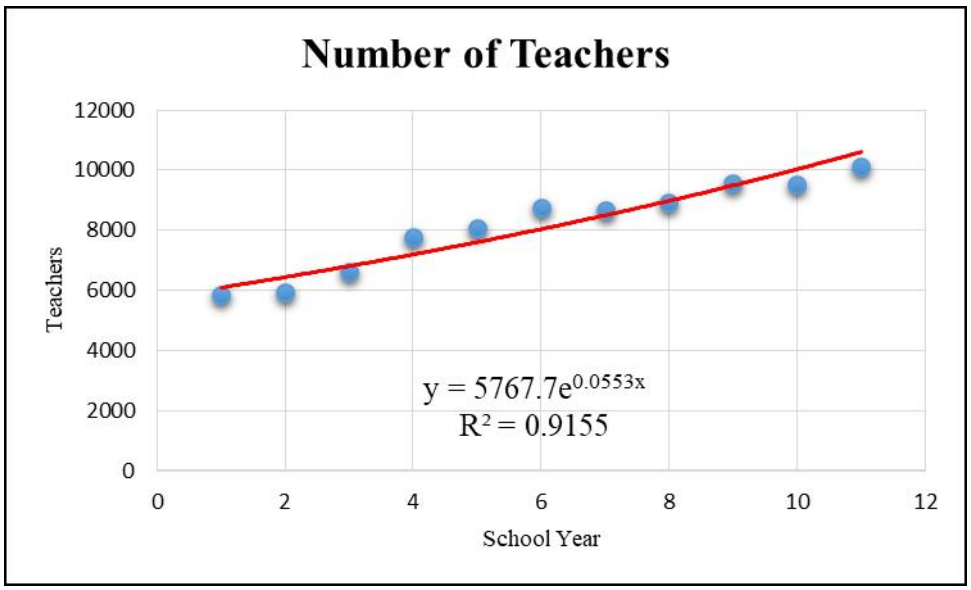

Figure 4. Exponential time series of the number of Junior High School Teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

The figure 4 presents the exponential time series model of the number of teachers with the equation of $y = 5767.7e^{0.0553x}$ and its coefficient of determination (R2) is 0.9155. This R2 explained that the model fits 91.55% in predicting the number of teachers.

D. Polynomial (Cubic, Quartic, Quintic, Sextic)

D.1. Cubic

Figure 5, the cubic polynomial time series model of the number of Junior High School Teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

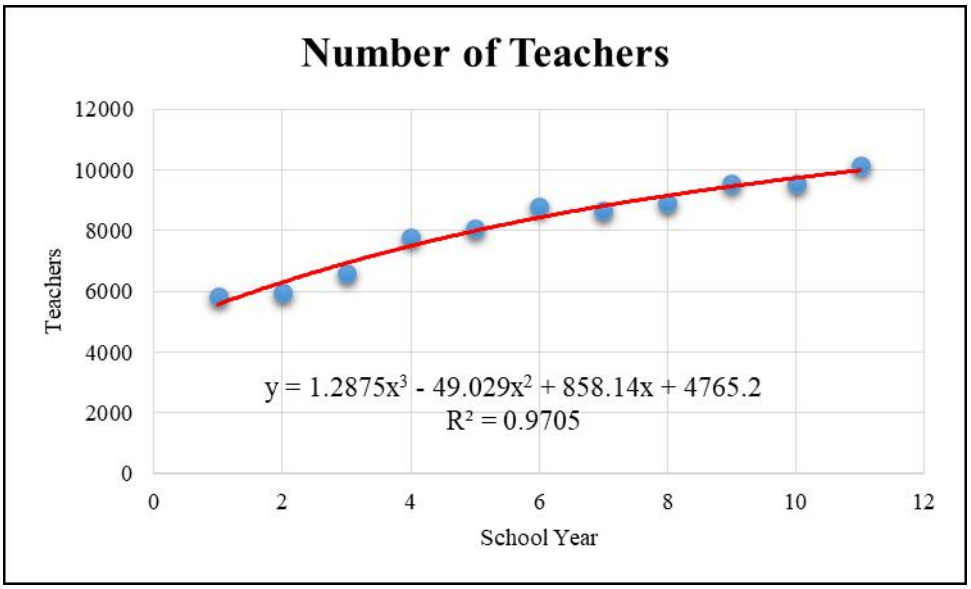

Figure 5. Cubic polynomial time series of the number of Junior High School Teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

The model equation $y = 1.2875x^3 - 49.029x^2 + 858.14x + 4765.2$ describes the cubic polynomial of the number of teachers. This model has a coefficient of determination (R2) of 0.9705, this explains the model fits 97.05 of the variance.

D.2. Quartic

In the figure below, figure 6 is the Quartic polynomial time series of the number of Junior High School Teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

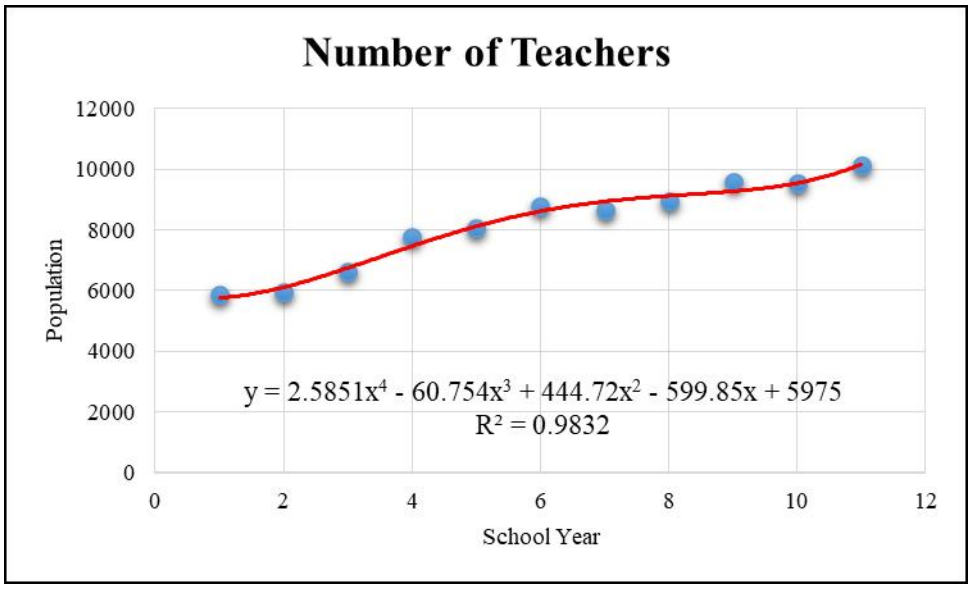

Figure 6. Quartic polynomial time series of the number of Junior High School Teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

Figure 6 presents the quartic polynomial time series model of the main variable of the study which models $y = 2.5851x^4 - 60.754x^3 + 444.72x^2 - 599.85x + 5975$. This model has a coefficient of determination (R2) equals to 0.9832, indicating that 98.32% of the variance can be explained.

D.5. Quintic

Below is the figure 7 of the Quintic polynomial time series model of the number of teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

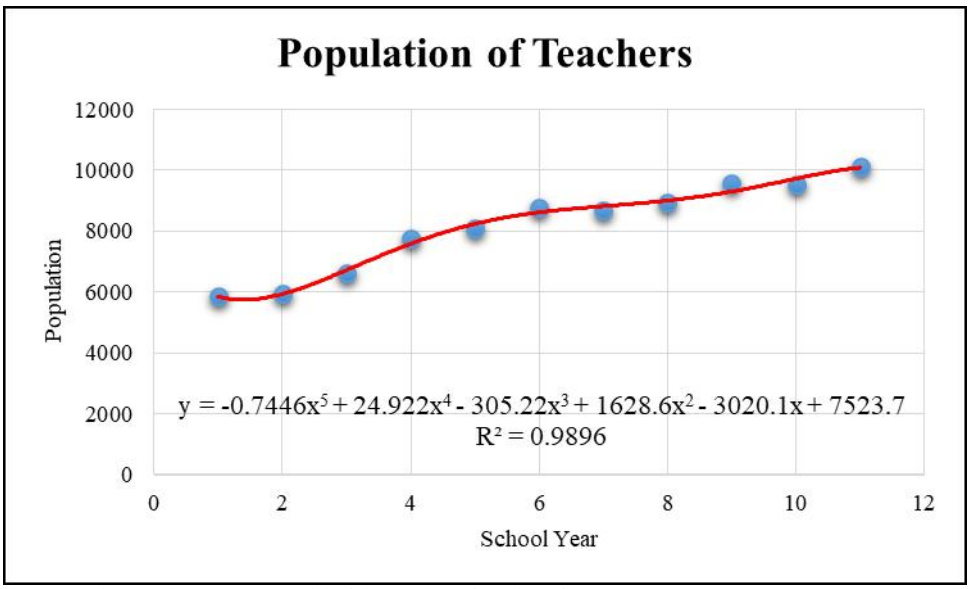

Figure 7. Quintic polynomial time series model of the number of teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

Figure 7 shows the model equation of Quintic polynomial time series model of the number of teachers which is equivalent to $y = -0.744x^5 + 24.922x^4 - 305.22x^3 + 1628.6x^2 - 3020.1x + 7523.7$. The coefficient of determination is 0.9896 indicating that 98.96% is explained by the model.

D.6. Sextic

Figure 8 presents the sextic polynomial time series model of the number of teachers from the S.Y. 2010-2011 to S.Y. 2020-2021.

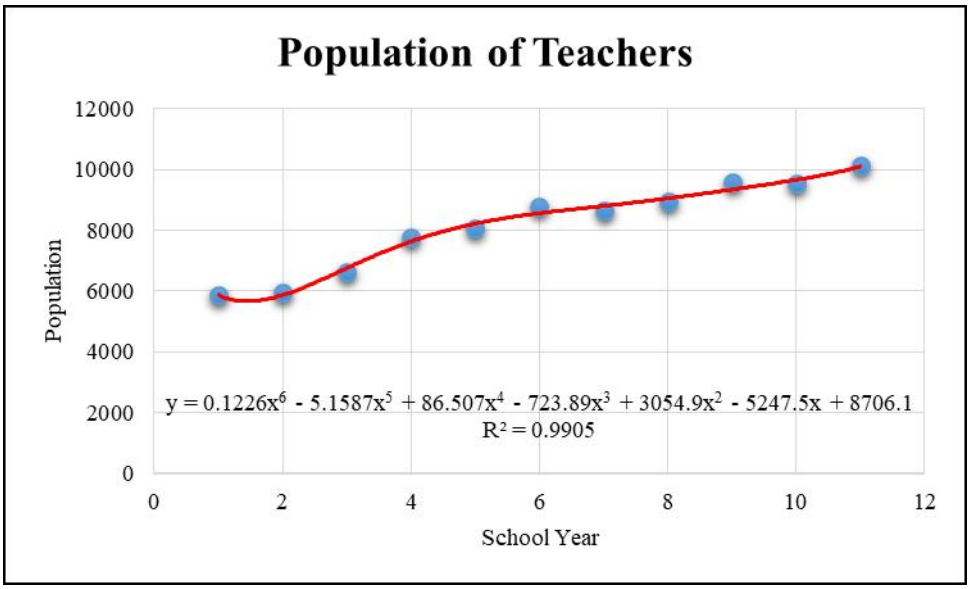

Figure 8. Sextic polynomial time series model of the number of teachers from the S.Y. 2010-2011 to S.Y. 2020-2021.

The shown equation $y = 0.1226x^6 - 5.1587x^5 + 86.507x^4 - 723.89x^3 + 3054.9x^2 - 5247.5x + 8706.1$ is the model predictor for the sextic time series model for the number of teachers. The coefficient of determination (R2) is 0.9905 indicating a high unit change on time equivalent to 99.05% of variance in the number of teachers.

E. Logarithmic

Figure 9 below shows the logarithmic time series model of the number of teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

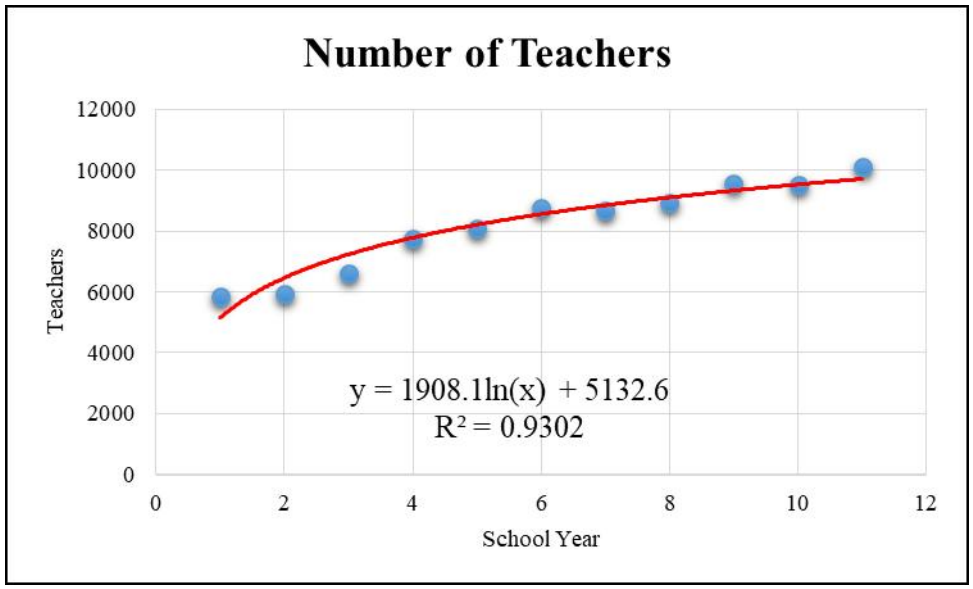

Figure 9. Logarithmic time series model of the number of teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

As it indicated in the table above, the model for logarithmic time series can predict the number of teachers equivalent to $y = 1908.1\ln(x) + 5132.6$. The model fits a coefficient of determination (R2) equals to 0.9302, it shows 93.02% can predict the number of teachers.

F. Power

Figure 10 below shows the power time series model of the number of teachers from the S.Y. 2010-2011 to S.Y. 2020-2021.

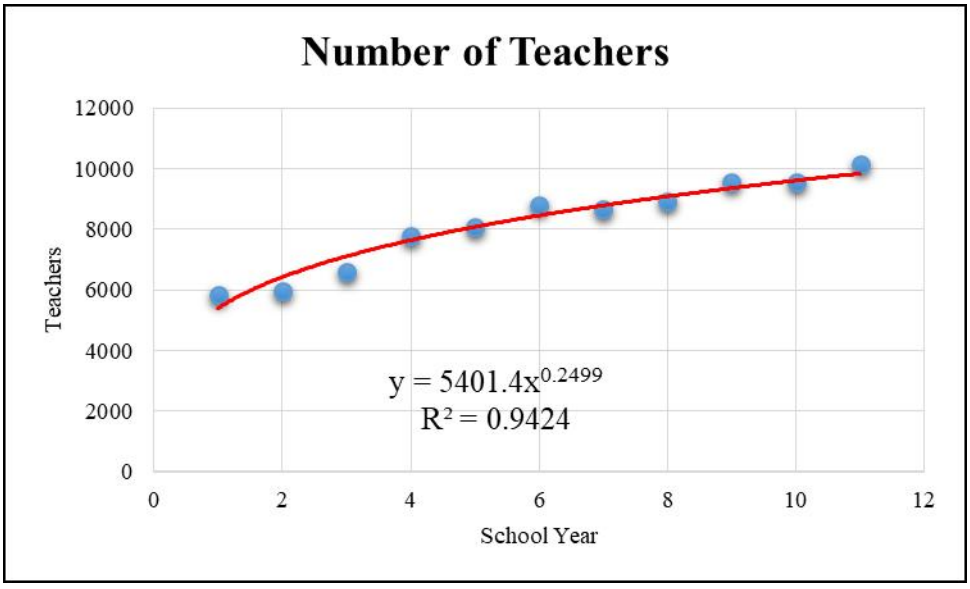

Figure 10. Power time series model of the number of teachers from the S.Y. 2010-2011 to S.Y. 2020-2021.

It is shown from the figure above, the power time series model to predict the number of teachers is $y = 5401.4x^{0.2499}$. The result indicates the coefficient determination (R2) equals to 0.9424, it means that 94.24% of the prediction can be explained by the variance.

G. Moving Average

Figure 11 below shows the moving average of the number of teachers from the S.Y. 2010-2011 to S.Y. 2020-2021.

Figure 11. Moving average model of the number of teachers from the S.Y. 2010-2011 to S.Y. 2020-2021.

The result above indicates the actual gathered data and its forecast over the period of time. The model of moving average of the number of teachers is MA(3)2021-2022 = Y2018-2019 + Y2019-2020 + Y2020-2021.

H. Exponential Smoothing

In the figure below shows the exponential smoothing model of the number of teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

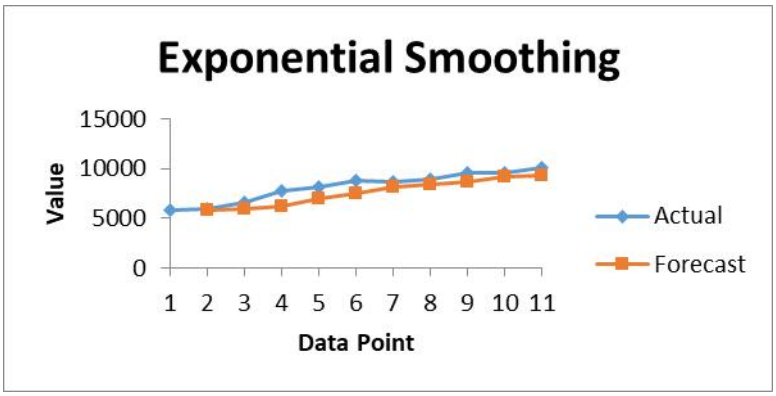

Figure 12. Exponential smoothing model of the number of teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

The above figure illustrates the actual data and forecast using exponential smoothing model over the period of time. The equation is E2021-2022 = 0.5Y2019-2020 + 0.5Y2020-2021.

I. Autoregression

i.1. First Auto regression

The table 4 shows the first auto regression of the number of teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

Table 5

First Auto Regression for the number of teachers

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	1117.228	757.6571	1.474583	0.178556
X Variable 1	0.913451	0.093749	9.743588	1.03E-05

*P-value = 0.000** *R2 = 0.9223* **significant at 0.01* **significant at 0.05*

The table 4 indicates the first auto regression analysis result. It shown above that the model of the first auto regression is $y = 1117.228 + 0.9135_{(n-1)}$. This model has P<0.000* and can be explained 92.23% of variance.

i.2. Second Auto regression

Table 5 shows the second auto regression of the number of teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

Table 5

Second Auto Regression for the number of teachers

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	2170.207	837.2367	2.592107	0.041095
X Variable 1	0.536643	0.327313	1.639542	0.152212
X Variable 2	0.268966	0.301152	0.893125	0.406185

P-value = 0.0005 *R2 = 0.9217* **significant at 0.01* **significant at 0.05*

Table 5 presents that the model equation for the second auto regression is $y = 2170.207 + 0.5566_{(n-1)} + 0.2690_{(n-2)}$. The model for the second auto regression can be explained 92.17% of variances.

i.3. Third Auto regression

Table 6 shows the third auto regression of the number of teachers from S.Y. 2010-2011 to S.Y. 2020-2021.

Table 6

Third Auto Regression for the number of teachers

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	3967.761	1250.969	3.17175	0.033801
X Variable 1	0.041636	0.403938	0.103076	0.922864
X Variable 2	0.409769	0.396899	1.032426	0.360204
X Variable 3	0.173293	0.302807	0.572288	0.597756

P-value = 0.0147 *R2 = 0.9101* **significant at 0.05*

The table above explains that the third auto regression is $y = 3967.761 + 0.0416_{(n-1)} + 0.4098_{(n-2)} + 0.1733_{(n-3)}$. This model has a coefficient of determination (R2) equals 0.9101, that indicates that it can be explained 91.01% of the variance.

Summary Table

Model	**Equation**
A. Linear	$y = 431.75x + 5578$
B. Quadratic	$y = -25.854x^2 + 742.01x + 4905.8$
C. Exponential	$y = 5767.7e^{0.0553x}$
D. Polynomial	
D.1. Cubic	$y = 1.2875x^3 - 49.029x^2 + 858.14x + 4765.2$
D.2. Quartic	$y = 2.5851x^4 - 60.754x^3 + 444.72x^2 - 599.85x + 5975$
D.3. Quintic	$y = -0.744x^5 + 24.922x^4 - 305.22x^3 + 1628.6x^2 - 3020.1x + 7523.7$
D.4. Sextic	$y = 0.1226x^6 - 5.1587x^5 + 86.507x^4 - 723.89x^3 + 3054.9x^2 - 5247.5x + 8706.1$
E. Power	$y = 5401.4x^{0.2499}$
F. Logarithmic	$y = 1908.1\ln(x) + 5132.6$
G. Moving Average	MA(3)2021-2022 = Y2018-2019 + Y2019-2020 + Y2020-2021
H. Exponential Smoothing	E2021-2022 = 0.5Y2019-2020 + 0.5Y2020-2021
I. Auto Regression	
I.1. First auto regression	$y = 1117.228 + 0.9135_{(n-1)}$
I.2. Second auto regression	$y = 2170.207 + 0.5566_{(n-1)} + 0.2690_{(n-2)}$

I.3. Third auto regression	$y = 3967.761 + 0.0416_{(n-1)} + 0.4098_{(n-2)} + 0.1733_{(n-3)}$

Section 4: Best Fit Model and Prediction

Model	Equation	R2	SE	Prediction
A. Linear	$y = 431.75x + 5578$	0.9437	368.76	57331
B. Quadratic	$y = -25.854x^2 + 742.01x + 4905.8$	0.9701	268.81	10086.9
C. Exponential	$y = 5767.7e^{0.0553x}$	0.9155	463.25	11199.5
D. Polynomial				
D.1. Cubic	$y = 1.2875x^3 - 49.029x^2 + 858.14x + 4765.2$	0.9705	266.69	10227.5
D.2. Quartic	$y = 2.5851x^4 - 60.754x^3 + 444.72x^2 - 599.85x + 5975$	0.9832	201.35	11438.2
D.3. Quintic	$y = -0.744x^5 + 24.922x^4 - 305.22x^3 + 1628.6x^2 - 3020.1x + 7523.7$	0.9896	158.65	9883.02
D.4. Sextic	$y = 0.1226x^6 - 5.1587x^5 + 86.507x^4 - 723.89x^3 + 3054.9x^2 - 5247.5x + 8706.1$	0.9905	152.67	11000.9
E. Power	$y = 5401.4x^{0.2499}$	0.9424	327.69	10050.6
F. Logarithmic	$y = 1908.1\ln(x) + 5132.6$	0.9302	2119.48	7191.79
G. Moving Average	MA(3)2021-2022 = Y2018-2019 + Y2019-2020 + Y2020-2021	NA	384.93	9742
H. Exponential Smoothing	E2021-2022 = 0.5Y2019-2020 + 0.5Y2020-2021	NA	641.86	9726.746
I. Auto Regression				
I.1. First auto regression	$y = 1117.228 + 0.9135_{(n-1)}$	0.9222	392.29	
I.2. Second auto regression	$y = 2170.207 + 0.5566_{(n-1)} + 0.2690_{(n-2)}$	0.9218	345.28	
I.3. Third auto regression	$y = 3967.761 + 0.0416_{(n-1)} + 0.4098_{(n-2)} + 0.1733_{(n-3)}$	0.9101	313.51	

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

Providing insights into potential trends and developments is just one how forecasting helps researchers or organizations plan for the future. Forecasting empowers organizations to anticipate changes, make informed decisions and navigate uncertainties more effectively. In forecasting the number of teachers in each School year is essential for effective educational planning, resource allocation, workforce development, policy formulation and ultimately student success. It enable education systems to adapt to changing demographics, societal need and educational needs, ensuring a well-prepared and adequately staffed teaching workforce to meet the needs of diverse learners.

Summary of Findings

1. The trend of the number of Teachers from S.Y. 2010-2011 to S.Y. 2020-2021 is increasing over time.

2. There is a significant linear relationship between the number of Junior High School Teachers and the two independent variables. And running regression analysis altogether, there is still exist significant linear relationship. Among the two independent variables, the number of schools suggest the greater influence to the number of teachers in Region 2 Cagayan Valley.

3. Time series models using the data from S.Y. 2010-2011 to S.Y. 2020-2021:

- $y = 431.75x + 5578$ for linear.
- $y = -25.854x^2 + 742.01x + 4905.8$ for quadratic.
- $y = 5767.7e^{0.0553x}$ for exponential.
- $y = 1.2875x^3 - 49.029x^2 + 858.14x + 4765.2$ for cubic polynomial.
- $y = 2.5851x^4 - 60.754x^3 + 444.72x^2 - 599.85x + 5975$ for quartic polynomial.
- $y = -0.744x^5 + 24.922x^4 - 305.22x^3 + 1628.6x^2 - 3020.1x + 7523.7$ for quintic polynomial.
- $y = 0.1226x^6 - 5.1587x^5 + 86.507x^4 - 723.89x^3 + 3054.9x^2 - 5247.5x + 8706.1$ for sextic polynomial.
- $y = 5401.4x^{0.2499}$ for power.
- $y = 1908.1\ln(x) + 5132.6$ for logarithmic.
- MA(3)2021-2022 = Y2018-2019 + Y2019-2020 + Y2020-2021 for moving average.
- E2021-2022 = 0.5Y2019-2020 + 0.5Y2020-2021 for exponential smoothing.
- $y = 1117.228 + 0.9135_{(n-1)}$ for first auto regression.
- $y = 2170.207 + 0.5566_{(n-1)} + 0.2690_{(n-2)}$ for second auto regression.
- $y = 3967.761 + 0.0416_{(n-1)} + 0.4098_{(n-2)} + 0.1733_{(n-3)}$ for third auto regression.

4. The best fit model is the sextic polynomial model. The prediction using this model is the number of teachers will increase to 11,001 by the S.Y. 2021-2022.

Conclusion

The results of this study indicates that the number of the teachers were influenced by the number of enrollment and number of schools. The findings show significant linear relationship on each variables that affecting the number of teachers. It emphasize the demand of teachers in order to be able to keep up with the numerous data for enrollment. As of S.Y. 2017-2018, the teacher-to-student ratio whittle down to 1:36 for Junior High School, the findings of the study is showing a good result, particularly in Region 2.

However, this result should not be treated entirely precise besides the data is from holistic data and may be there still some degree of uncertainties for some instance when it comes from school-to-teachers ratio and indeed suggest for a further study. Nevertheless, it can still aim and capture trends and derive meaningful insights that can involve decision-making, problem-solving and strategy development in educational management.

Recommendations

According to the results of the study, the following are hereby recommended:

1. Teachers recruitment and training program. Develop target recruitment strategies to attract qualified teachers, including incentives and scholarships to encourage aspirants to pursue their careers in education.

2. Administration should provide comprehensive training and professional development to equip teachers with the necessary skills and knowledge to effectively manage diverse classroom settings and meet the needs of growing student population.

3. Utilization of technology can enhance teaching and learning experiences, facilitate remote instruction, and expand access to educational resources.

4. Additional classroom must be continue to develop as the number of enrollment growing there should be sufficient classroom to be administered sufficient number of teachers.

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