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Junior High School Students' 21st-Century Skills and Academic Achievement in English, Mathematics, and Science

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ABSTRACT

This study explored the relationship between 21st-century skills and academic achievement among junior high school students at San Agustin Institute of Technology (SAIT) during the 2023–2024 school year. It aimed to identify which specific skills most significantly influence student performance in core academic subjects. A descriptive-correlational research design was utilized, involving 221 students. Data were collected using a validated questionnaire with a Cronbach's alpha of 0.888. Statistical treatments included mean and standard deviation, Pearson's r correlation, and multiple regression analysis. Students demonstrated a high level of 21st-century skills, with personal and social responsibility scoring the highest. Academic achievement in English, mathematics, and science was rated as very satisfactory. Correlation results revealed that critical thinking, problem-solving, and decision-making skills were significantly associated with performance in mathematics. Creativity and innovation were linked to achievement in English and mathematics, while communication skills were correlated with science achievement. Regression analysis identified creativity and innovation as significant predictors of English performance only. The findings suggest that creativity and innovation are essential for academic success in English. Therefore, English educators are encouraged to incorporate strategies that nurture these skills to enhance learning outcomes.

KEYWORDS: *21st-Century Skills, Academic Achievement, English, Mathematics,*

INTRODUCTION

Academic achievement is success in learning much more in grade-oriented courses like English, Mathematics, and Science. The Department of Education (2015) set a standard for students to achieve more than 75 percent of their grades to pass the course or subject. However, many students need help getting a high-quality education, especially in developing countries, due to the declining quality and efficacy of education (Merwe, 2011; Fuller, 1986). Moreover, the 2023 Programme for International Student Assessment (PISA) result shows that the country's education quality was poor, especially in English, Mathematics, and Science. It was worsened during the COVID-19 pandemic, and many factors affect the

quality of education (Marvilla Jr. et al., 2022), also in places of armed conflicts and unstable economies in developing countries. Algani and Eshan (2019) also state that many students' got the lower than average level in English, Mathematics and Science due to many factors.

The development of 21st-century skills among students is one of the identified factors to achieve outstanding level of grades. These skills are distinguished by their capacity to innovate and adapt to changing conditions, communicate and exchange information efficiently, resolve challenging issues, and use technology to generate new knowledge (Binkley et al., 2011). Furthermore, Singh et al. (2002) emphasized that if students have time or greater time to spend on academics and enhance their critical thinking skills, there are better chances to have good or higher grades in English, Mathematics and Science. Some studies also suggest that to have a greater chance for a better grade, 21st-century skills must be integrated into the course or subject in English, Mathematics, and Science (Benek & Akçay, 2022; Khalil & Osman, 2017).

The academic achievement problem in English, Mathematics, and Science is also prevalent among the junior high students of San Agustin Institute of Technology (SAIT). In school year 2022-2023, the junior high school students measured General Weighted Average (GWA) in these three (3) subject areas are English was 87.859%, Mathematics 87.899%, and Science was 87.942% respectively. This possibly occurred since they need to enhance their skills in this 21st century. This valid observation pushed the researchers to conduct the study since several students of junior high school achieved GWA in English, Mathematics, and Science below understanding level.

Based on the above-mentioned circumstances, the present researchers believe that there is a need to conduct a study related to junior high school students 21st-century skills and academic achievement in English, Mathematics, and Science at SAIT. Besides, no studies have been conducted yet that correlate 21st-century skills incorporating creativity and innovation, critical thinking and problem-solving, communication, information proficiency, personal and social responsibility, life and career, health proficiency, and environmental awareness with academic achievement in English, Mathematics, and Science, especially in the context of private schools in Valencia City, Bukidnon.

METHODS

Research Design

This study employed a quantitative, non-experimental design using descriptive-correlational techniques. Specifically, the study would quantify and characterize the number of links or relationships between two or more variables or a set of scores using statistical methods (Creswell, 2013). The researchers opted to use this design since the researchers aimed to: (1) describe the data gathered from the respondents, (2) investigate possible relationship between 21st-century skills and academic achievement of the respondents, and (3) seeks to examine whether 21st century skills could significantly influence the respondents' academic achievement.

Research Locale

This study was conducted at San Agustin Institute of Technology (SAIT), Fr. Caroselli St., Valencia City, Bukidnon. This school is a private Catholic institution founded by an Italian

missionary priest, Fr. Manlio Caroselli S.J. in 1960. The school has elementary, high school, and college departments. The high school was categorized into two due to the K to 12 curriculum the Junior High School composed of grade 7 to 10, and the Senior High School they have various strand under the academic track: Science, Technology, Engineering, and Mathematics (STEM Strand), Accountancy and Business Management (ABM Strand), Humanities and Social Sciences (HUMSS Strand), General Academic (GAS). Under the vocational track the Technical Vocational and Livelihood (TVL Strand). The school is an ISO accredited institution and it serves the City of Valencia in providing quality education.

Population and Sample

The respondents of the study was the junior high school students of San Agustin Institute of Technology (SAIT). Officially enrolled for the school year 2023-2024. The researchers intend to choose them as the respondents of the study since the focus of the present study is on the 21st-century skills. Probability sampling was employed to determine the sample of the study. Using Raosoft – an online sample size calculator, the researcher randomly selected of two hundred twenty-one (221) respondents out of five hundred eighteen (518) total population. During the pilot testing, thirty (30) junior high school students were randomly selected for reliability testing.

Research Instrument

The instrument used in this study was an adapted questionnaire from the study of Martins-Pacheco et al. (2020) entitled "Improvements in bASES21: 21st-Century Skills Assessment Model to K12". The first part of the questionnaire consists of a 21st-century skills incorporating the levels of the following: creativity and innovation (7 items), critical thinking and problem-solving, and decision-making (9 items), communication (6 items), collaboration and teamwork (12 items) information proficiency (7 items), personal and social responsibility (6 items), life and career (9 items), health proficiency (5 items), and environmental awareness (5 items). The second part aims to measure the level of 21st-century skills of the respondents. Meanwhile, the third part intends to measure the respondents' Academic Achievement in English, Mathematics, and Science. Experts validated the research questionnaire with a validation rating 4.18 which means very good. On the other hand, the questionnaire has a Cronbach's alpha of 0.888, indicating a very good of level of interval consistency and item questionnaire are moderately correlated with each other and can be used to collect meaningful data on variable being measured in the study.

Scoring Procedure

The respondents answered the questionnaire for 21st-century skills adapted from Martins-Pacheco et al. (2020) and this was be measured using a four-point Likert scale. Below is a tabular presentation of the scale being used with its limits, description, and interpretation.

Scale	Limits	Description	Interpretation
4	3.00 – 4.00	Strongly Agree	This means that the level of acquisition of the respondents of the 21st-century skills is very high.
3	2.00 – 2.99	Agree	This means that the level of acquisition of the respondents of the 21st -century skills is high.
2	1.00 – 1.99	Disagree	This means that the level of acquisition of the respondents of the 21st-century skills is low.
1	0.99 – 1.00	Strongly Disagree	This means that the level of acquisition of the respondents of the 21st-century skills very is low.

On the other hand, in terms of academic achievement in English, Mathematics, and Science, the respondent the Department of Education (2015) order no.8 entitled "Policy Guidelines on Classroom Assessment for the K to 12 Basic Education Program" served as basis for scoring. Presented below is a tabular presentation of the scale being used with its limits, description, and interpretation:

Grading Scale	Description	Interpretation
90% - 100%	Outstanding	This means that the respondent's level of academic achievement is outstanding.
85% - 89%	Very Satisfactory	This means that the respondent's level of academic achievement is very satisfactory.
80% - 84%	Satisfactory	This means that the respondent's level of academic achievement is satisfactory.
75% - 79 %	Fairly Satisfactory	This means that the respondent's level of academic achievement is satisfactory.
74% below	Did not meet expectations	This means that the respondent's level of academic achievement did not meet expectations. .

Data Collection

The researchers asked permission from the school principal by writing a communication letter at the onset of the study. The researchers immediately asked for the consent of the respondents and their adviser for the conduct of the study. After retrieving the questionnaires, the researcher tabulated the answers of the respondents. This tabulation was sent to the statistician for the statistical analysis of the data. Interpretation of the result was done as soon as the researchers received the result of the statistical analysis.

Statistical Treatment

The following descriptive and inferential statistics will be used to answer the research objectives of this study:

Mean and Standard Deviation were used to determine the level of 21st-century Skills, and academic achievement in English, Mathematics, and Science. Frequency Count and Percentage was used to analyze the academic achievement of the respondents in English, Mathematics, and Science. Pearson Product – Moment Correlation Analysis was used to examine whether a significant relationship exists between the 21st century skills and academic achievement in English, Mathematics, and Science, Multiple Regression Analysis was used to determine the best predictor variable on students' academic achievement in English, Mathematics, and Science.

Ethical Consideration

The researchers make sure that ethical protocols in the conduct of the research was observed. Permission from the high school principal Dr. Claire H. Lacerna, LPT, PhD and classroom advisers of the junior high school students and consent from the respondents were sought first before the conduct of the study. Respondents were fully informed on the objectives of the study and the possible risks entailed in the conduct of the study. Furthermore, respondents were encouraged to participate in the study but never coerced to do so if they refused to. Hence, respondents' participation was voluntarily. The researchers also ensured that privacy and confidentiality of the personal information of the respondents were be properly observed. No personal information from the respondents will be divulged. No data in the study were falsified and fabricated. Any form of deceit were avoided. To assure originality of work, the researchers manuscript were examined by a plagiarism software. All these ethical issues were avoided and all ethical protocols were observed by the researchers to come up with a quality and ethically-bound study.

RESULTS

Level of 21st-Century Skills

Table 1 presents the level of 21st-century skills among junior high school students at SAIT for the school year 2023-2024. Overall, 21st-century skills obtained a mean score of 3.15 (SD=0.57). This means that the level of the 21st century is high. When evaluated individually, personal and social responsibility recorded the highest mean score with a rating of 3.40 (SD=0.51), indicating "very high." Critical-thinking, problem-solving, and decision-making skills with a mean score of a rating 3.24 (SD=0.30), indicating "high," and environmental awareness with a mean score and a rating of 3.18 (SD=0.49), indicating "high." Furthermore, collaboration and teamwork with a mean score and rating of 3.15 (SD=0.43), indicating "high," and health proficiency with a mean score of 3.12 (SD= 0.47), indicating "high." Moreover, life and career, with a mean score and rating of 3.17 (SD= 0.41), indicate "high," and information proficiency, with a mean score and rating of 3.11 (SD= 0.43), indicates "high." Furthermore, creativity and innovation skills with a mean score and rating of 3.10 (SD= 0.40), indicating "high", and lastly, communication skills got the lowest mean score and rating of 2.90 (SD=0.50) of the nine domains and skills, indicating "high" results.

Table 1. *Level of 21st-Century Skills*

Item Statements	Mean	SD	Interpretation
Personal and Social Responsibility	3.40	0.51	Very High
Critical Thinking, Problem-Solving, and Decision-Making Skills	3.24	0.30	High
Environmental Awareness	3.18	0.49	High
Life and Career	3.17	0.41	High
Collaboration and Teamwork	3.15	0.43	High
Health Proficiency	3.12	0.47	High
Information Proficiency	3.11	0.43	High
Creativity and Innovation Skills	3.10	0.40	High
Communication Skills	2.90	0.50	High
Overall Mean	**3.15**	**0.57**	**High**

Legend:

Scale	Limits	Verbal Description	Verbal Interpretation
4	3.25-4.00	Strongly Agree	Very High
3	2.50-3.24	Agree	High
2	1.75-2.49	Disagree	Low
1	1.00-1.74	Strongly Disagree	Very low

Level of Academic Achievement

Table 2 shows the results on the level of Academic Achievement in English among junior high school students of San Agustin Institute of Technology. The overall mean academic achievement score in English is 89, and the standard deviation is 3.96, indicating "very satisfactory" is the English subject level of academic achievement. Data shows that 55% of respondents have a grade of 90-100, indicating "outstanding" academic achievement. Furthermore, 26% of respondents' grades range from 85-89, indicating "very satisfactory." Moreover, 18% of the respondents in 80-84 grades indicated a "satisfactory" level of academic achievement, and 1% in 75-79 grades indicated a "fairly satisfactory" level.

Table 2 *Level of Academic Achievement in Terms of English.*

Grading Range	F	%	Description	Interpretation
90-100	121	55	Outstanding	Outstanding
85-89	58	26	Very Satisfactory	Very Satisfactory
80-84	40	18	Satisfactory	Satisfactory
75-79	2	1	Fairly Satisfactory	Fairly Satisfactory
Below 75	0	0	Did not meet Expectations	Did not meet Expectations
Total	221	100		
Mean = 89	SD = 3.96		Very Satisfactory	Very Satisfactory

Table 3 presents the level of academic achievement in mathematics. The overall mean score of academic achievement in Mathematics is 86 with a standard deviation of 4.36, indicating "very satisfactory" in terms of academic achievement in Mathematics. As gleaned in the data table, 38% of the respondents have a grade of 85-89, indicating "very satisfactory," followed by 31% with 80-84 grades, indicating "satisfactory." Moreover, 27% of the respondents range in 90-100 grades indicating "outstanding," and 4% of the respondents range from 75-79 grades indicating "fairly satisfactory."

Table 3. *Level of Academic Achievement in Terms of Mathematics.*

Grading Range	F	%	Description	Interpretation
90-100	59	27	Outstanding	Outstanding
85-89	85	38	Very Satisfactory	Very Satisfactory
80-84	69	31	Satisfactory	Satisfactory
75-79	8	4	Fairly Satisfactory	Fairly Satisfactory
Below 75	0	0	Did not meet Expectations	Did not meet Expectations
Total	221	100		
Mean = 86	SD = 4.36		Very Satisfactory	Very Satisfactory

Finally, table 4 presents the level of academic achievement in Science. The overall mean score of academic achievement in Science is 87, and the standard deviation is 4.61, indicating "very satisfactory" in terms of academic achievement in Science. The results revealed that 38% of respondents have a grade of 85-89, indicating "very satisfactory," followed by 33% of the respondents' grades ranging from 90-100, indicating "outstanding" academic achievement in Science. Moreover, 24% of respondents range in 80-84 grades, indicating "satisfactory", and 6% of respondents range in 75-79 grades, indicating "fairly satisfactory.

Table 4. *Level of Academic Achievement in Terms of Science.*

Grading Range	F	%	Description	Interpretation
90-100	72	33	Outstanding	Outstanding
85-89	83	38	Very Satisfactory	Very Satisfactory
80-84	52	24	Satisfactory	Satisfactory
75-79	14	6	Fairly Satisfactory	Fairly Satisfactory
Below 75	0	0	Did not meet Expectations	Did not meet Expectations
Total	221	100		
Mean = 87	SD = 4.61		Very Satisfactory	Very Satisfactory

Correlation Analysis Between 21st-Century Skills and Academic Achievement in English, Mathematics, and Science

Table 5 presents the correlation analysis between the 21st-century skills with the nine (9) domains: *personal and social responsibility; critical thinking, problem-solving, and decision-making skills; environmental awareness; life and career; collaboration and teamwork; health*

proficiency; information proficiency; creativity and innovation skills; and *communication skills;* and academic achievement in areas of *English*, *Mathematics*, and *Science*. Both of these variables were initially measured using mean and standard deviation. Pearson product-moment correlation analysis was used to examine the relationship between these variables.

As gleaned in the data table, academic achievement in English. The first domain, *personal and social responsibility* (r-value= 0.018, p-value= 0.787), which means *not significant*. *critical thinking, problem-solving, and decision-making skills* (r-value= 0.066, p-value= 0.329), which means it is *not significant*. Secondly, *environmental awareness* (r-value= 0.035, p-value= 0.610), which means it is *not significant*, and *life and career* (r-value= 0.035, p-value= 0.610), which means it is *not significant*. Meanwhile, *collaboration and teamwork* (r-value= 0.035, p-value= 0.961), which means it is *not significant*, and *health proficiency* (r-value= -0.056, p-value= 0.411), which means it is *not significant.* Also, the *information proficiency* (r-value= 0.058, p-value= 0.388), which means it is *not significant*, and the *creativity and innovation skills* (r-value=0.160, p-value= 0.017), which means it is significant. Lastly, *communication skills* (r-value= -0.003, p-value= 0.959), which is *not significant*.

Furthermore, academic achievement in *Mathematics* correlates to 21st-century skills. The first domain is *personal and social responsibility* (r-value= 0.046**,** p-value= 0.499), which means *it is not significant*. Moreover, *critical thinking, problem-solving, and decision-making skills* (r-value= 0.145**,** p-value 0.031)**,** which means *significant***.** Meanwhile, environmental awareness (r-value= 0.021, p-value= 0.753)**,** which means *it is not significant*, and the *life and career* is (r-value= 0.021, p-value= 0.753)**,** which means *it is not significant*.Moreover, *collaboration and teamwork* (r-value= 0.065**,** p-value= 0.336)**,** which means *not significant*, the *health proficiency* (r-value= 0.022, p-value= 0.745) which means it is *not significant*. Also, the information proficiency (r-value= 0.131, p-value= 0.051)**,** which means *it is not significant*. The *creativity and innovation skills* (r-value= 0.133, p-value= 0.049)**,** which means *significant*. The last domain is *communication skills* (r-value= 0.068, p-value= 0.12)**,** which is statistically means *not significant.*

Meanwhile, the results of academic achievement in science correlate to 21st-century skills. The first domain is *personal and social responsibility* (r-value= 0.000, p-value= 0.999), which means statistically *not significant, and critical thinking, problem-solving, and decision-making skills* (r-value= 0.096, p-value= 0.156), which means it is *not significant*. Secondly, *environmental awareness* (r-value= 0.059, p-value= 0.386), which means it is *not significant*; the life and career (r-value= 0.059, p-value= 0.386), which is *not significant*. Meanwhile, collaboration and teamwork (r-value= 0.074, p-value= 0.27), which means it is *not significant*; the *health proficiency* (r-value= 0.036, p-value= 0.595), which means it is *not significant*. Also, the *information proficiency* (r-value= 0.113, p-value= 0.095), which means it is *not significant*. The *creativity and innovation skills* (r-value= 0.111, p-value= 0.101), which means it is *not significant*. Lastly, *communication skills* (r-value= 0.147, p-value= 0.029), which is *significant*.

Moreover, the degree of correlation of this variable with the dependent variable, which is an academic achievement in English, Math, and Science, is high. This means this independent variable has a significant relationship with the dependent variable. Therefore, the data reject the first null hypothesis that states “There is no significant relationship between 21st-century skills and academic achievement of the students in English, Mathematics, and Science”.

Table 5 *Correlation Analysis between 21st-Century and Academic Achievement in English, Math, and Science.*

21ST Century Skills	*Academic Achievement on English, Math and Science*			
	English	Math	Science	Interpretation
Personal and Social Responsibility	0.018 0.787	0.046 0.499	0.000 0.999	Not Significant
Critical Thinking, Problem-Solving, and Decision-Making Skills	0.066 0.329	**0.145*** **0.031**	0.096 0.156	**Significant**
Environmental Awareness	0.035 0.610	0.021 0.753	0.059 0.386	Not Significant
Life and Career	0.035 0.610	0.021 0.753	0.059 0.386	Not Significant
Collaboration and Teamwork	0.003 0.961	0.065 0.336	0.074 0.27	Not Significant
Health Proficiency	-0.056 0.411	0.022 0.745	0.036 0.595	Not Significant
Information Proficiency	0.058 0.388	0.131 0.051	0.113 0.095	Not Significant
Creativity and Innovation Skills	**0.160*** **0.017**	**0.133*** **0.049**	0.111 0.101	**Significant**
Communication Skills	-0.003 0.959	0.068 0.12	**0.147*** **0.029**	**Significant**

Regression Analysis Between21st-Century Skills and Achievement in English

Table 6 presents the regression analysis between the independent and dependent variables of the study. Regression analysis was done to determine whether the independent variable, 21st-century skills, influences the dependent variable, academic achievement in English. Based on the analysis, the independent variable is a significant predictor of the dependent variable.

Thus, the finding showed that the (f-value = is 1.218, p-value= 0.285) is less than the 0.05 significance level. In other words, 21st-century skills affect the academic achievement of junior high school students in English at San Agustin Institute of Technology.Therefore, the data reject the second null hypothesis that states**"There is no domain of 21st-century skills that best predict the academic achievement of the students in English".**

Table 6. *Regression Analysis between 21st -Century Skills and Academic Achievement in terms of English*

21st Century	Academic Achievement in terms of English					
	Unstandardized Coefficients		Standardized Coefficients	t-value	p-value	Interpretation
	Beta	Std. Error	Beta			
(Constant)	84.999	3.358		25.315	0.000	
Personal and Social Responsibility	-0.081	0.596	-0.010	-0.136	0.892	Not Significant
Critical Thinking, Problem-Solving, and Decision-Making Skills	0.603	1.223	0.046	0.493	0.622	Not Significant
Environmental Awareness	0.639	0.726	0.079	0.880	0.380	Not Significant
Life and Career	-0.573	0.940	-0.059	-0.609	0.543	Not Significant
Collaboration and Teamwork	-0.355	0.994	-0.038	-0.357	0.722	Not Significant
Health Proficiency	-0.814	0.772	-0.097	-1.054	0.293	Not Significant
Information Proficiency	0.479	0.870	0.051	0.550	0.583	Not Significant
Creativity and Innovation Skills	**2.136**	**0.837**	**0.214**	**2.551**	**0.011**	**Significant**
Communication Skills	-0.821	0.780	-0.103	-1.053	0.294	Not Significant
	R		.222[a]	p		0.285[b]
	R^2		.049	S		3.946
	F		1.218			

The 21st-century skills indicator *creativity and innovation skills* obtained a beta coefficient of 84.999. This suggests that there is an increase in the level of 21st-century skills and every

increase in academic achievement in English. Thus, the obtained regression model is: Academic Achievementin English= 84.999+ 2.136* *Creativity and Innovation Skills.*

Meanwhile, the computed multiple correlation is .222. This is the multiple correlation between the significant independent and dependent variables. On the other hand, the adjusted R2=.049 means that 49% of the variation of the academic achievement in English of the 21st-century skills with the indicator of creativity and innovation skills was explained by its linear relationship with the predictor variable. Also, the computed S = 3.946 is the measure of the prediction's accuracy. The smaller its value, the better.

Regression Analysis Between21st-Century Skills and Achievement in Mathematics

Table 7 presents the regression analysis between the independent and dependent variables of the study. Regression analysis was to determine whether the independent variable, 21st-century skills, influences the dependent variable, academic achievement in Mathematics. Based on the analysis, the independent variable is a significant predictor of the dependent variable. Thus, the finding showed that the (F-value = 0.951, p-value = 0.482) is less than the 0.05 significance level. In other words, 21st-century skills affect the academic achievement of junior high school students in mathematics at San Agustin Institute of Technology. Also, the academic achievement of math is weak and significantly influenced by 21st-century skills.Therefore, the data is accepted the third null hypothesis that states**"There is no domain of 21st-century skills that best predict the academic achievement of the students in Mathematics".**

Table 7. *Regression Analysis between 21st-Century Skills and Academic Achievement in Terms of Mathematics.*

21st Century	Academic Achievement in terms of Math					
	Unstandardized Coefficients		Standardized Coefficients	t-value	p-value	Interpretation
	Beta	Std. Error	Beta			
(Constant)	78.064	3.715		21.015	0.000	
Personal and Social Responsibility	-0.133	0.659	-0.016	-0.201	0.841	Not Significant
Critical Thinking, Problem-Solving, and Decision-Making Skills	2.035	1.353	0.141	1.505	0.134	Not Significant
Environmental Awareness	-0.631	0.803	-0.071	-0.786	0.433	Not Significant
Life and Career	0.606	1.040	0.056	0.583	0.560	Not Significant
Collaboration and Teamwork	-0.797	1.100	-0.078	-0.724	0.470	Not Significant

Health Proficiency	-0.123	0.854	-0.013	-0.144	0.886	Not Significant
Information Proficiency	0.889	0.963	0.087	0.923	0.357	Not Significant
Creativity and Innovation Skills	1.050	0.926	0.096	1.134	0.258	Not Significant
Communication Skills	-0.301	0.862	-0.034	-0.349	0.727	Not Significant
	R		.197[a]	p		0.482[b]
	R^2		.039	S		4.37
	F		0.951			

The 21st-century skills obtained a beta coefficient of 78.064, which is the increase in the level of grade of the junior high school students in SAIT every 1 level increase of 21st-century skills. Based on the analysis, there is no best predictor of 21st-century skills indicators on academic achievement in mathematics.

Meanwhile, the computed multiple correlation is .197. This is the multiple correlation between the significant independent variable and the dependent variable. On the other hand, the adjusted R2=.039 means that 39% of the variation of the academic achievement in Mathematics of the 21st-century skills is explained by its linear relationship with the predictor variable. Also, the computed S = 4.37 is the measure of the accuracy of the prediction. The smaller its value, the better.

Regression Analysis Between21st-Century Skills and Achievement in Science

Table 8 presents the regression analysis between the independent and dependent variables of the study. Regression analysis was done to determine whether the independent variable, 21st-century skills, influences the dependent variable, academic achievement in Science. Based on the analysis, the independent variable is a significant predictor of the dependent variable. Thus, the finding showed that the (f-value= *0.770,* p-value = *0.644)*is less than the 0.05 significance level. In other words, 21st-century skills affect the academic achievement of junior high school students in science at San Agustin Institute of Technology. Also, academic achievement in Science is significantly influenced by 21st-century skills. Therefore, the data is accepted the fourth null hypothesis that states "There is no domain of 21st-century skills that best predict the academic achievement of the students in Science".

Table 8. *Regression Analysis between 21st-Century Skills and Academic Achievement in Terms of Science.*

	Academic Achievement in terms of Science					
21st Century	**Unstandardized Coefficients**		**Standardized Coefficients**	**t-value**	**p-value**	**Interpretation**
	Beta	Std. Error	Beta			
(Constant)	82.465	3.937		20.946	0.000	

Personal and Social Responsibility	-0.590	0.699	-0.066	-0.845	0.399	Not Significant
Critical Thinking, Problem-Solving, and Decision-Making Skills	0.181	1.434	0.012	0.126	0.900	Not Significant
Environmental Awareness	-0.631	0.803	-0.071	-0.786	0.433	Not Significant
Life and Career	0.116	1.102	0.010	0.105	0.917	Not Significant
Collaboration and Teamwork	-0.687	1.166	-0.064	-0.589	0.556	Not Significant
Health Proficiency	-0.421	0.905	-0.043	-0.465	0.642	Not Significant
Information Proficiency	0.884	1.020	0.082	0.866	0.387	Not Significant
Creativity and Innovation Skills	0.536	0.982	0.046	0.546	0.586	Not Significant
Communication Skills	1.335	0.914	0.145	1.460	0.146	Not Significant
	R		.178[a]	p		0.644[b]
	R^2		.032	S		4.62
	F		0.770			

The 21st-century skills obtained a beta coefficient of 82.465, which is the amount of increase in the grade of the junior high school students in San Agustin Institute of Technology for every 1 level increase in 21st-century skills. Based on the analysis, there is no best predictor of 21st-century skills indicators of academic achievement in mathematics.

Meanwhile, the computed multiple correlation is .178. This is the multiple correlation between the significant independent variable and the dependent variable. On the other hand, the adjusted R2=.032 means that 32% of the variation of the academic achievement in Mathematics of the 21st-century skills is explained by its linear relationship with the predictor variable. Also, the computed S = 4.62 is the measure of the accuracy of the prediction. The smaller its value, the better.

DISCUSSION

21st-Century Skills

The level of 21st-century skills among junior high school (JHS) students at San Agustin Institute of Technology was high. This conclusion was based on the "high" to "very high" ratings given by the students themselves in various categories of 21st-century skills. These domains include personal and social responsibility, critical thinking, problem-solving and decision-making skills, environmental awareness, collaboration and teamwork, health

proficiency, life and career skills, information proficiency, creativity and innovation, and communication skills. The results suggest that JHS students of the said institution are well-prepared to face the challenges of modern society in terms of their personal and academic development. These students are likely to engage positively in the community and are responsible individuals who value conscience, ethics, and social responsibility. They can analyze complex issues, develop solutions, and make resourceful and practical decisions.

Furthermore, these students foster awareness of environmental challenges and are eager to contribute to global ecological health. They work well with others and believe they can contribute to teams in both academic and workplace environments. Additionally, they can communicate effectively and have the ability to find, evaluate, and use information efficiently. They are also capable of thinking outside the box and developing new ideas necessary for progress and innovation. Above all, they have a strong foundation for life and future employment and value the importance of physical and mental health.

The findings stated above parallel the works of several experts (Agaoglu& Demir, 2020; Chalkiadaki, 2018), wherein students with a high level of 21st-century skills effectively use these abilities in real-world settings. By developing, enhancing, and identifying their skills, students are better equipped to succeed in school and apply fundamental concepts in various aspects of life. Also, it is in demand in the labor force environment, which is congruent with the study (Berrozpe & Boeren, 2019).

Academic Achievement in English, Mathematics, and Science

Academic Achievement in this study is measured by the GWA of the respondents for the (first and second) quarters of school year 2023-2024. The findings of academic achievement in English, Mathematics, and Science are "very satisfactory," which suggests that students demonstrate strong performance across these subjects, consistently grasping concepts well and meeting quarter requirements effectively. These students thrive at time management and self-discipline, devoting substantial time to their academics. As a result, they get very good results in three important subjects: English, Mathematics, and Science. Their ability to prioritize work, make objectives, and maintain concentration enables them to grasp the content and excel academically. By constantly implementing these strategies, students increase their grades and provide a solid basis for future academic and professional success. This aligns with Pandey's (2017) research, which assessed students' success in these crucial areas, revealing that students who attain high academic achievement gain concrete dividends. These students have better employment chances and are more likely to secure high-paying jobs.

Moreover, their academic performance gains them increased attention and respect in their communities, raising their social standing. According to the studies of Stoffelsma and Spooren (2018) and Nieva (2022), this connection inspires students, pushing them to put in extra effort studying so they can achieve top-notch grades. It drives them to seek learning opportunities more intensely, striving to excel and earn high academic marks. This proactive approach boosts their academic results and fosters a deep sense of accomplishment and personal development.

Furthermore, these students may find it easier to access higher education through scholarships and admission to reputable institutions, opening doors for specialized training and career advancement. This educational attainment not only enhances economic mobility,

allowing individuals to uplift their standard of living and overcome socio-economic constraints but also reinforces the cultural belief that education is fundamental to personal success and societal progress in the country.

When assessed individually, the level of academic achievement in English is very satisfactory, implying that students acquire a great command of the language (Stoffelsma & Spooren, 2018). Their proficiency suggests that they are well-prepared to use their language skills effectively in English both at school and in future educational pursuits, thereby establishing a solid foundation for their academic journey. In addition, it shows that they have the critical thinking, comprehension, and effective articulation abilities necessary for success in this subject, both academically and professionally.

The students' very satisfactory level of academic achievement in Mathematics implies that students are proficient in both problem-solving techniques and mathematical ideas. Their level of skill indicates that they have what it takes to solve challenging mathematics problems and use quantitative reasoning in various settings. It also shows that they have the logical and analytical thinking abilities necessary for success in both academic endeavors and real-world scenarios (Nieva, 2022).

Lastly, the level of academic achievement in Science is very satisfactory, implying that students understand scientific ideas and concepts quite well. This competence implies that they are ready for more advanced scientific coursework and have the ability to think critically and solve problems in scientific settings (Bircan & Akman, 2023). Furthermore, it shows that they are prepared to conduct experiments and conduct scientific research, which is necessary for success in both academic and practical scientific efforts.

Correlation Analysis Between 21st-century skills and Academic Achievement in English, Mathematics, and Science

The correlation analysis revealed that 21st-century skills have a relationship with academic achievement. Therefore, the first null hypothesis that states, "There is no significant relationship between 21st-century skills and academic achievement of the students in English, Mathematics, and Science," is rejected. This implies that 21st-century skills, namely critical thinking, problem-solving, decision-making, creativity and innovation skills, and lastly, communication skills, are associated with students' academic achievement in English, Mathematics, and Science. The study was congruent with the study of Nami et al. (2014), who pointed out that creativity and innovation have a significant positive relationship with academic achievement. These findings imply that nurturing creativity and inspiring innovative thinking can boost students' academic performance in diverse subjects. Implementing educational approaches prioritizing these skills is essential for equipping students to thrive in today's complex and evolving global landscape.

Moreover, the research conducted by Bircan and Akman (2023) reveals a relationship between critical thinking, problem-solving, decision-making skills, and communication skills in academic achievement in Mathematics and Science. Incorporating 21st-century skills into school curriculum could potentially enhance high school students' performance in science and math. This emphasizes the pressing need for educational institutions to evolve, placing equal emphasis on developing these contemporary competencies alongside traditional academic subjects. By fostering a holistic approach to education that integrates theoretical knowledge with practical skills, schools can better equip students to tackle future challenges across

diverse fields. Overall, these findings show that the 21st-century skills of students have a significant relationship with academic achievement in English, Mathematics, and Science.

Regression Analysis Between 21st-Century Skills and Academic Achievement in English Mathematics, and Science

Based on the regression analysis, 21st-century skills influence the academic achievement of the Junior High School. Therefore, the second null hypothesis, which states that "There is no domain of 21st-century skills that best predict the academic achievement of the students in English" is rejected. In particular, only creativity and innovation skills can significantly affect students' academic achievement in English. These skills make a real difference in how well students do in English, Mathematics, and Science. When schools teach these skills alongside traditional subjects, students are better prepared to succeed academically and use what they learn in real-life situations.

According to the study of Singh et al. (2002), students who are strong in 21st-century skills like critical thinking, problem-solving, decision-making, creativity and innovation skills, and communication skills tend to earn higher grades in English, Mathematics, and Science. It implies how crucial it is for schools to nurture these skills. When teachers are able to develop these skills among students, they can significantly boost students' performance in various subjects. This prepares students more effectively to tackle the challenges they face in their future endeavors.

This finding is supported by the study of Harits et al. (2019), which indicated that 21st-century skills can influence academic achievement. Students must have acquired these skills to have better grades. Therefore, teachers should prioritize helping students acquire these abilities through brainstorming and project-based learning. These abilities affect academic success in mathematics and science, but more is needed when it comes to English academic achievement. Thus, including innovation and originality in the curriculum can help students do better in English and, to a lesser extent, can help them succeed in Mathematics and Science.

CONCLUSIONS

The study has four objectives: First, determine the respondents' 21st-century skills in personal and social responsibility; critical thinking, problem-solving, and decision-making; environmental awareness; life and career; collaboration and teamwork; health proficiency; information proficiency; creativity and innovation; and communication. The second is to examine students' academic achievements in English, Mathematics, and Science. Thirdly, ascertain any significant correlation between 21st-century skills and academic achievements in English, Mathematics, and Science. Lastly, find any of the nine domains of 21st-century skills that best predict the students' academic achievements in English, Mathematics, and Science. The 21st-century skills and their domain have distinct findings regarding English, Mathematics, and Science. The overall result in the 21st-century skills domains was "high," and the level of academic achievement in English, Mathematics, and Science was found to be "very satisfactory."

Findings indicate a significant relationship existed between 21st-century skills in thinking, problem-solving, and decision-making, then creativity and innovation skills, and lastly

communication skills and academic achievement in English, Mathematics, and Science. Further, the 21st-century skills, creativity and innovation skills, was the best predictor of academic achievement in English.

The study validates Piaget's (1936) Cognitive Development Theory. It posits that mental processes evolve over a lifetime, influencing how students acquire knowledge and develop thinking skills. The theory suggests that cognitive skills such as critical thinking and problem-solving underpin the acquisition of 21st-century skills like creativity and collaboration. These skills, rooted in abstract reasoning and social interaction, align with stages of cognitive development that may impact academic achievement and success.

Furthermore, Toward a Theory of Instruction by Bruner (1966) suggests systematic frameworks and strategies to optimize the learning processes. By guiding instructional design, it aims to enhance student engagement, deepen understanding, and foster essential 21st-century skills such as critical thinking and collaboration. This approach improves academic achievement and prepares students for success in a knowledge-based society. Ultimately, it equips students with tools to integrate traditional academic content with skill development, maximizing their academic and future potential.

Additionally, the last theory of this study validates Walberg's theory of educational productivity (1981). This theory highlights a crucial focus for educators and policymakers: the need to deeply analyze and improve every aspect of educational systems to ensure they work better and smarter. By understanding how teaching styles, curriculum choices, school setups, resource use, policies, and socioeconomic factors affect learning outcomes, decision-makers can make choices that truly benefit students' educational journeys. This approach aims not just to boost academic results but also to tackle wider societal and economic issues, preparing students with the skills and understanding they need to thrive in the future.

RECOMMENDATION

School administrators. The research on 21st-century skills and academic achievement among junior high school students underscores the critical role of school administration in addressing existing challenges. To address this, school administrators should prioritize integrating 21st-century skills into the curriculum. Also, creativity and innovation skills must be applied, such as providing teacher training and investing in technological resources. By implementing project-based learning and cultivating a supportive learning environment to enhance skill development, administrators can effectively prepare students for academic success and future opportunities.

Teachers. The study on 21st-century skills and academic achievement among junior high school students highlights the critical role of teachers in addressing identified challenges. To address this concern, teachers should incorporate more project-based learning and interdisciplinary approaches to foster skill development. Additionally, ongoing professional development opportunities focused on 21st-century pedagogies can better equip teachers to meet the evolving needs of their students and use creativity and innovation skills in the lesson. Encourage the students to be more innovative and creative. By implementing these strategies, teachers can play a pivotal role in preparing students for success in both academic and real-world contexts.

Parents. The research on 21st-century skills and academic achievement among junior high school students underscores parents' important role in addressing identified challenges. To support their children's development, parents should encourage exploration and provide access to educational resources that promote 21st-century skill acquisition. Additionally, fostering a home environment that values lifelong learning and modeling positive behaviors can further reinforce the importance of these skills. By actively engaging in their children's education and promoting skill development outside of school, parents can contribute significantly to their academic success and future opportunities.

Students. The study on 21st-century skills and academic achievement among junior high school students highlights students' vital role in addressing identified challenges. Students should take an active role in their education and spend time learning by seeking opportunities for skill development, engaging actively in the learning process, and utilizing available resources. Additionally, fostering a growth mindset and embracing challenges as opportunities for growth can empower students to excel academically and develop the necessary skills for success in the 21st-century. By taking ownership of their learning and embracing a proactive approach, students can better prepare themselves for future academic and professional endeavors.

Future Researchers. It should focus on the link between academic achievement in English and developing creativity and innovative skills among junior high school students. This focus will enhance understanding of how 21st-century skills contribute to educational outcomes, leading to more comprehensive theories, improved interventions, and informed policies that enhance students' language proficiency and inventive talents. Future studies may also explore other domains of 21st-century skills not covered by this study, particularly other subject areas.

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