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Influence of Teachers 21st Century Skills in the Context of School Learning Action Cells (SLAC) on Instructional Performance

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Abstract*—The study aimed to assess the influence of teachers 21st century skills in the context of school learning action cells on instructional performance at Maramag District 1, Division of Bukidnon, Department of Education. Correlational Quantitative Analysis was employed to analyze the data to answer the research questions. It was found out and concluded that there was no significant relationship on the extent of teachers 21st century skills influence on instructional performance in terms of Critical Thinking, Creativity, Collaboration and Communication. On the influence of Learning Action Cells to teachers' instructional performance, it was concluded that enhancing LAC can lead to improved instructional performance in teachers. While on the significant relationship between teachers' 21st century skills, LAC Participation and teachers' instructional competence, it was further concluded that performance and critical thinking have no significant correlation while performance and creativity, collaboration and communication have moderate positive correlation. While LAC and the four 21st century skills showed no significant correlation*

Keywords— *21st Century Skills; Learning Action Cell; Instructional Performance.*

I. INTRODUCTION

The 21st century demands a shift in educational practices to equip students with the skills necessary to thrive in a rapidly changing world. It is ushered in a rapidly evolving landscape of technological advancements, global interconnectedness, and complex societal challenges. This dynamic environment demands a fundamental shift in educational practices to equip students with the skills necessary to navigate and thrive in this new world. 21st century learning skills in the curriculum are not only useful for students, they are also a necessity to prepare students for their future life (Alismail & McGuire, 2015).

This necessitates a focus on developing teachers' 21st-century skills, such as critical thinking, communication, collaboration and creativity. The four C's are the essential skills required for 21st-century education. However, there are manifestations of the undeveloped 21st-century skills as revealed; there is a mismatch of skills of students with the actual skills needed to survive in a community (National Association of Colleges and Employers, 2016).

Learning action cells (LACs), a collaborative expertise session in schools on the other hand, provide a promising platform for fostering these skills among teachers and enhancing their instructional performance. The good personality traits and quality of teachers are vital factors to be considered in developing holistic learners who are value-driven, qualified with 21st-century skills, and capable of driving the country toward development and progress. Indeed, teachers' performance has a significant relation to students' achievement (Darling-Hammond et al., 2019).

This study investigates the influence of teachers' 21st-century skills within the context of school LACs on their instructional performance. The research aims to understand how LACs facilitate the development and application of these skills, ultimately impacting student learning outcomes. By examining the relationship between teachers' 21st-century skills, LAC participation, and student achievement, this study seeks to contribute to a deeper understanding of how to effectively leverage LACs to enhance teacher development and improve the quality of education.

The study is particularly relevant given the increasing emphasis on 21st-century skills in education and the growing recognition of LACs as a valuable tool for professional development. By exploring the impact of 21st-century skills within LACs, this research provides valuable insights for educators, policymakers, and researchers seeking to improve teaching practices and student learning in the 21st century. This will further pave way to a more comprehensive investigation into the intricate relationship between teachers' 21st-century skills, LAC participation, and instructional performance and offer insights for educators and policymakers seeking to enhance the quality of education and prepare students for success in the 21st century.

Objectives:

The general objective of this study is to find out the influence of teachers 21st century skills in the context of school learning action cells on instructional performance at Maramag District 1.

Specifically, this study aims to:

1. Assess the extent of teachers 21st century skills influence on instructional performance in terms of;
   i. Critical Thinking;
   ii. Creativity;
   iii. Collaboration, and
   iv. Communication
2. Evaluate the influence of LAC to teachers' instructional performance;

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3. Identify the relationship between teachers' 21st century skills, LAC Participation and teachers' instructional competence.

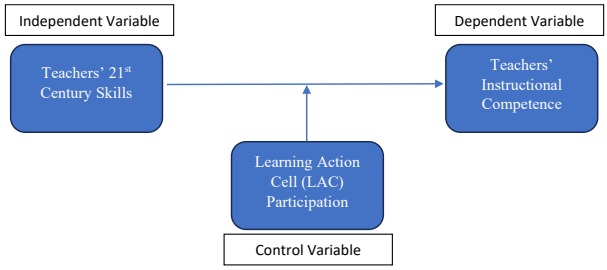
Theoretical Framework

This study draws upon a theoretical framework that integrates constructivism, social learning theory, and the 21st-century skills framework to understand the influence of teachers' 21st-century skills in the context of school learning action cells (LACs) on their instructional performance.

Constructivism theory emphasizes that learning is an active process where individuals construct their own understanding based on their prior knowledge and experiences. In a constructivist classroom, the teacher's role is to act as a facilitator or guide rather than a lecturer or dispenser of information. The teacher's primary responsibility is to create a learning environment that encourages students to construct their own knowledge through exploration and inquiry (Structural Learning, 2024).

On the other hand, the study is also framed on Social Cognitive Learning Theory (Bandura, 1986) a psychological theory that explains how people learn behaviors through interactions with their environment and other people. It is based on the notion that individuals learn through their own experiences and by watching the behaviors of others. This also suggests that humans learn behaviors by observing others and choosing which behaviors to imitate.

In the study conducted by Cervone, Mercurio, & Lilley (2020) it was found out that faculty advisors could better support their students by using a self-efficacy framework and self-reflective practices. These areas directly relate to social cognitive learning theory as revised by Bandura in 1986.



II. METHODS

Research Design

This study made use of Correlational research design, a quantitative type of research that examines the relationship between two or more variables. The research aims to determine whether there is a positive or negative correlation between the variables and the strength of the relationship.

Correlational research is ideal for gathering data quickly from natural settings. That helps you generalize your findings to real-life situations in an externally valid way. By using a correlation analysis, you can condense the connection between variables into a correlation coefficient, which is a single number that represents the direction and intensity of the relationship between variables. With this number, you'll quantify the degree of the relationship between variables (Bhandari, 2023).

Research Locale

This study is conducted among purposely chosen six (6) elementary schools in the Division of Bukidnon, Region X, Department of Education.

Research Participants

The participants of this study are the randomly chosen 140 elementary teachers of Maramag District 1.

Sampling Techniques

The researcher used the Random Sampling technique based on Krejcie, R. V., & Morgan, D. W. (1970) table in determining sample size for research activities.

Instrumentation

The researcher made use of a researcher-made questionnaire validated and pilot tested in the nearby district with 0.972 Cronbach alpha reliability test.

Data Analysis

The collected data was analyzed using mean, standard deviation, regression and correlational analysis.

III. RESULTS AND DISCUSSION

Research Question No. 1. To what extent of teachers 21st century skills influence on instructional performance in terms of Critical Thinking, Creativity, Collaboration and Communication?

Table 1 presents the regression analysis on the extent to which teachers' 21st century skills influence instructional performance in terms of critical thinking. The intercept yielded an estimate of 4.514, indicating a statistically significant baseline level of instructional performance. For the levels of critical thinking, the estimates were 3.051 for level 3–1 ($p = 0.187$), 0.831 for level 4–1 ($p = 0.546$), and 1.488 for level 5–1 ($p = 0.208$).

TABLE 1. Extent of teachers 21st century skills influence on instructional performance in terms of Critical Thinking

Predictor	Estimate	SE	t	P
Intercept [a]	4.514	1.833	2.463	0.032
Critical Thinking:				
3 – 1	3.051	2.166	1.408	0.187
4 – 1	0.831	1.334	0.623	0.546
5 – 1	1.488	1.112	1.337	0.208

The regression coefficients for the critical thinking categories show positive estimates, suggesting that higher levels of teachers' critical thinking skills tend to correspond with higher instructional performance. However, the p-values for all critical thinking comparisons (0.187, 0.546, and 0.208) are greater than the 0.05 significance level. This indicates that the differences in instructional performance across these levels are not statistically significant.

The results imply that although teachers with higher critical thinking skills appear to demonstrate better instructional performance, the influence of critical thinking on instructional performance is not strong enough to produce statistically significant differences among the compared groups. Thus, while critical thinking remains an important

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component of 21st century teaching competence, its measured effect on instructional performance in this analysis appears limited or indirect.

This finding aligns with contemporary literature emphasizing that critical thinking alone may not directly determine instructional performance, but rather works in conjunction with other competencies such as creativity, collaboration, and communication. Trilling and Fadel (2009) contend that the key to effective teaching in the twenty-first century is to combine a variety of abilities that, as a group, improve learning results. Similarly, Voogt and Roblin (2012) highlighted that the successful implementation of 21st century skills in teaching depends on the combined application of cognitive, interpersonal, and instructional competencies.

Table 2 presents the regression analysis on the extent to which teachers' 21st century skills influence instructional performance in terms of creativity. The intercept showed an estimate of 1.693 with a standard error of 1.254, resulting in a t value of 1.350 and a p-value of 0.200, which is not statistically significant at the 0.05 level. For the creativity levels, the estimated coefficients were 1.494 for level 3–1 (SE = 1.998, t = 0.748, p = 0.468), 1.859 for level 4–1 (SE = 1.190, t = 1.562, p = 0.142), and 1.642 for level 5–1 (SE = 1.064, t = 1.543, p = 0.147).

TABLE 2. Extent of teachers 21st century skills influence on instructional performance in terms of creativity.

Predictor	Estimate	SE	t	P
Intercept [a]	1.693	1.254	1.350	0.200
Critical Thinking:				
3 – 1	1.494	1.998	0.748	0.468
4 – 1	1.859	1.190	1.562	0.142
5 – 1	1.642	1.064	1.543	0.147

The regression estimates for creativity are positive, suggesting that higher levels of teachers' creativity may correspond to higher instructional performance. However, the p-values of 0.468, 0.142, and 0.147 exceed the 0.05 significance threshold. This indicates that the observed differences in instructional performance across the creativity levels are not statistically significant.

The findings imply that although teachers who demonstrate higher creativity skills may show slightly improved instructional performance, the statistical results suggest that creativity does not significantly predict instructional performance in this analysis. This indicates that creativity alone may not be a strong determinant of instructional effectiveness but may contribute when combined with other teaching competencies.

This finding is supported by research suggesting that creativity in teaching enhances learning environments but does not automatically translate into measurable instructional outcomes. Studies have indicated that creativity must be integrated with instructional strategies and pedagogical knowledge to effectively impact student learning and teacher performance (Voogt & Roblin, 2012; Trilling & Fadel, 2009).

Table 3 presents the regression analysis on the influence of teachers' 21st century skills on instructional performance in terms of collaboration. The intercept has an estimate of 3.07, with a standard error of 1.155, yielding a *t* value of 2.66 and a p-value of 0.019, indicating statistical significance. However, the regression coefficients for collaboration levels (3–1, 4–1, and 5–1) show NaN values for the estimates, standard errors, *t*-values, and *p*-values.

TABLE 3. Extent of teachers 21st century skills influence on instructional performance in terms of collaboration.

Predictor	Estimate	SE	t	P
Intercept [a]	3.07	1.155	2.66	0.019
Critical Thinking:				
3 – 1	NaN	NaN	NaN	NaN
4 – 1	NaN	NaN	NaN	NaN
5 – 1	NaN	NaN	NaN	NaN

The presence of NaN (Not a Number) values indicates that the statistical model was unable to compute estimates for the collaboration predictors. This situation typically occurs when there is insufficient variation in the data, perfect multicollinearity, or missing observations within the collaboration variable.

Because the regression coefficients for collaboration could not be calculated, the extent to which collaboration influences instructional performance cannot be statistically determined from this model. While the intercept suggests a significant baseline level of instructional performance, the lack of computed values for collaboration levels prevents meaningful interpretation of its predictive influence.

Regression estimation is made impossible by the frequent occurrence of NaN outcomes when datasets lack sufficient variability or when some categories have no observations, as the statistical literature explains (Field, 2018). In educational research, collaboration is widely recognized as a critical 21st century teaching skill that enhances professional learning communities and shared instructional practices; however, its empirical measurement requires sufficient and balanced data across categories to produce reliable estimates.

Table 4 presents the regression analysis on the extent to which teachers' 21st century communication skills influence instructional performance. The intercept yielded an estimate of 0.4966 with a standard error of 1.101, resulting in a t value of 0.4510 and a p-value of 0.659, indicating that the intercept is not statistically significant.

TABLE 4. Extent of teachers 21st century skills influence on instructional performance in terms of communication.

Predictor	Estimate	SE	t	P
Intercept [a]	0.4966	1.101	0.4510	0.659
Critical Thinking:				
3 – 1	4.5517	1.413	3.2218	0.006
4 – 1	2.9241	0.966	3.0256	0.009
5 – 1	1.3241	1.005	1.3177	0.209

The regression coefficients show positive estimates, indicating that higher levels of teachers' communication skills are associated with higher instructional performance. Furthermore, the p-values for levels 3–1 (0.006) and 4–1 (0.009) are less than the 0.05 significance level, which means these levels significantly influence instructional performance. However, the p-value for level 5–1 (0.209) is greater than

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0.05, indicating that this level does not show a statistically significant difference compared with the reference group.

TABLE 5. The influence of LAC to teachers' instructional performance?

Performance	Predictor	Estimate	SE	Z	P
3 - 2	Intercept	-18.611	0.248	-74.974	< .001
	Critical Thinking:				
	3 – 1	-3.349	1.70e-15	-1.97e−15	< .001
	4 – 1	9.754	1.182	8.256	< .001
	5 – 1	9.093	1.177	7.726	< .001
	Creativity:				
	3 – 1	-3.349	1.99e-15	-1.68e−15	< .001
	4 – 1	1.456	0.420	3.464	< .001
	5 – 1	17.391	0.386	45.058	< .001
	Collaboration:				
	3 – 1	0.000	NaN	NaN	NaN
	4 – 1	7.885	1.163	6.777	< .001
	5 – 1	7.614	1.167	6.524	< .001
	Communication:				
	3 – 1	-3.349	1.07e-15	-3.12e−15	< .001
	4 – 1	0.112	0.512	0.218	0.828
	5 – 1	18.736	0.529	35.416	< .001
4 - 2	Intercept	-19.993	0.246	-81.196	< .001
	Critical Thinking:				
	3 – 1	-4.839	2.93e-25	-1.65e−25	< .001
	4 – 1	10.325	1.153	8.954	< .001
	5 – 1	9.992	1.140	8.766	< .001
	Creativity:				
	3 – 1	-4.839	2.93e-25	-1.65e−25	< .001
	4 – 1	1.977	0.395	4.998	< .001
	5 – 1	18.340	0.386	47.518	< .001
	Collaboration:				
	3 – 1	0.000	0.000	NaN	NaN
	4 – 1	7.477	1.134	6.592	< .001
	5 – 1	8.001	1.122	7.131	< .001
	Communication:				
	3 – 1	-4.839	2.93e-25	-1.65e−25	< .001
	4 – 1	0.325	0.441	0.736	0.462
	5 – 1	19.993	0.425	47.005	< .001
5 - 2	Intercept	-20.465	0.240	-85.402	< .001
	Critical Thinking:				
	3 – 1	13.916	7.27e-13	1.91e+13	< .001
	4 – 1	2.461	1.159	2.124	0.034
	5 – 1	2.427	1.134	2.140	0.032
	Creativity:				
	3 – 1	13.916	7.27e-13	1.91e+13	< .001
	4 – 1	16.306	0.240	68.046	< .001
	5 – 1	-11.418	2.53e-19	-4.51e−19	< .001
	Collaboration:				
	3 – 1	0.000	0.000	NaN	NaN
	4 – 1	9.993	1.119	8.929	< .001
	5 – 1	8.810	1.144	7.700	< .001
	Communication:				
	3 – 1	13.916	7.27e-13	1.91e+13	< .001
	4 – 1	-7.452	0.567	-13.146	< .001
	5 – 1	12.340	0.586	21.068	< .001

The results suggest that communication skills significantly influence teachers' instructional performance, particularly at moderate levels (levels 3 and 4). This indicates that teachers who demonstrate effective communication—such as clearly explaining concepts, engaging students in discussion, and providing meaningful feedback—tend to perform better instructionally. However, the lack of significance at level 5 suggests that the difference between the highest level and the baseline may not be statistically distinct in this model

This finding is consistent with literature emphasizing the importance of communication as a core 21st century teaching competency. Effective teacher communication enhances classroom interaction, promotes student engagement, and supports clearer knowledge transmission. According to Trilling and Fadel (2009), communication skills are fundamental to effective teaching because they enable educators to convey ideas clearly and facilitate collaborative learning. Similarly, Voogt and Roblin (2012) highlighted that strong communication skills contribute to improved instructional practices and better learning outcomes in modern classrooms.

Research Question No. 2. What is the influence of LAC to teachers' instructional performance?

It was found out that Critical Thinking that compared to the baseline (level 1), higher levels of LAC (levels 3, 4, and 5) have a significant positive impact on teachers' critical thinking abilities, with the largest effect observed at level 4. Creativity on the other hand has similar to critical thinking, higher levels of LAC (levels 3, 4, and 5) which are associated with significant improvements in teachers' creativity, with the largest effect observed at level 5. Moreover, Collaboration results indicate that higher levels of LAC (levels 4 and 5) are associated with significant increases in teachers' collaboration skills, compared to the baseline (level 1) while Communication reveals that while higher levels of LAC (levels 4 and 5) have a significant positive impact on teachers' communication abilities, the effect at level 4 is not statistically significant.

The table 5 provides detailed statistical information, including the estimates, standard errors, z-values, and p-values for the various predictors and their comparisons to the baseline. The p-values suggest that most of the observed effects are highly statistically significant ($p < .001$). Overall, the results suggest that increasing the level of LAC can have a substantial positive influence on various aspects of teachers' instructional performance, particularly in the areas of critical thinking, creativity, and collaboration.

Research Question No. 3. Is there a significant relationship between teachers' 21st century skills, LAC Participation and teachers' instructional competence?

Table 6 shows the significant relationship between teachers 21st century skills, Learning action cell and teachers' instructional competence. The data revealed that on performance and critical thinking, the correlation coefficient is 0.278, with a p-value of 0.210. This suggests a weak positive correlation between performance and critical thinking. The p-value is greater than 0.05, indicating that the correlation is not statistically significant.

TABLE 6. The significant relationship between teachers 21st century skills, Learning action cell and teachers' instructional competence

		Critical Thinking	Creativity	Collaboration	Communication
Performance	Pearson's r	0.278	0.234	0.354	0.351
	p-value	0.210	0.294	0.106	0.109
LAC	Pearson's r	-0.024	-0.288	0.034	-0.230
	p-value	0.915	0.193	0.881	0.303

Note. * p < .05, ** p < .01, *** p < .001

Furthermore, on Performance and Creativity, the correlation coefficient is 0.234, with a p-value of 0.294. This also indicates a weak positive correlation, and the p-value is not statistically significant. While performance and collaboration correlation coefficient is 0.354, with a p-value of

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0.106. This suggests a moderate positive correlation, and the p-value is approaching statistical significance and performance and communication on the other hand has a correlation coefficient is 0.351, with a p-value of 0.109. This also suggests a moderate positive correlation, and the p-value is approaching statistical significance.

Moreover, LAC and Critical Thinking correlation coefficient is 0.024, with a p-value of 0.915. This indicates a very weak correlation. LAC and Creativity correlation coefficient is 0.288, with a p-value of 0.193. This suggests a weak positive correlation and LAC and Collaboration also had a correlation coefficient of 0.034, with a p-value of 0.881. This indicates a very weak correlation, and the p-values of these indicators were not statistically significant.

IV. Conclusion

Based on the results stated, it was concluded that there was no significant relationship on the extent of teachers 21st century skills influence on instructional performance in terms of Critical Thinking, Creativity, Collaboration and Communication. On the influence of Learning Action Cells to teachers' instructional performance, it was concluded that enhancing LAC can lead to improved instructional performance in teachers. While on the significant relationship between teachers' 21st century skills, LAC Participation and teachers' instructional competence, it was further concluded that performance and critical thinking have no significant correlation while performance and creativity, collaboration and communication have moderate positive correlation. While LAC and the four 21st century skills showed no significant correlation.

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