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## Twenty First Century Skills in Mathematics Among Senior High School Learners

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### Abstract

**Aim:** This study was conducted to determine the Twenty- First (21<sup>st</sup>) century skills in Mathematics among Senior High School learners for the school year 2020-2021.

**Methodology:** This research used descriptive-correlational method to investigate the correlation of the Twenty-First(21<sup>st</sup>) Century Skills of Senior High School Learners in the Province of Iloilo using researcher-made questionnaire. For the data interpretation, the mean was used to describe the data. T- test and ANOVA were used to test the significant differences and Pearson-r for the correlation.

**Result:** Findings revealed that there was a significant relationship in the level of problem-solving skills and the level of critical thinking skills of the Senior High School learners, the Correlation Coefficient was 0.544 and Sig. (2-tailed) was 0.000; level of critical thinking skills and the level of creativity skills of the Senior High School learners, the Correlation Coefficient was 0.562 and Sig. (2-tailed) was 0.000. The Sig. (2-tailed) or p-value was less than 0.01 level of significance which means that there was a significant relationship in the level of critical thinking skills and the level of creativity skills.

**Conclusion:** After the Senior High School (SHS) students assessed their twenty- firs century skills, DepEd and school leaders provided opportunities for the support and practice of further implementation of the 21<sup>st</sup> century skills in their lessons not only in Mathematics subject but also in all field of specialization. School leaders should consistently encourage teachers in the Senior High School to enroll and earn a graduate school degree to enhance their 21<sup>st</sup> century skills in Mathematics.

**Keywords:** Problem Solving Skills, Creativity Skills, Critical Thinking Skills

### INTRODUCTION

Learning mathematical facts and contents is important but is not enough. Students should learn how to use these facts to develop their critical thinking skills, creativity, and problem-solving skills to solve problems presented in the context (Dizon & Sanchez, 2020; Salendab, 2023). Students often struggle in learning mathematics, and much research work has taken place on best practices for teaching mathematics. Studies have been conducted on the various aspects that could affect how students learn and it is in hope that better practices will be discovered so student learning can be enhanced. One could explore the effects of proper classroom discipline, voice inflection, amount of homework, parental support and guidance. In the discipline of mathematics, the use of problem-solving skills has been extremely important and highly influential. Problem solving is the foundation of all mathematical and scientific discoveries. Thus, it is an important component of mathematics because it is the single vehicle which seems to be able to achieve its values. It is supported by the study of Kostousov and Kudryavtsev (2017), and Salendab and Cogo (2022) that education should equip students with not only in knowledge aspects but also to prepare them in solving the problem in the real world. Besides that, problem solving skill is one of the important skills that is hoped can be gained from the educational aspect (Muñoz & Sanchez, 2023; Salendab & Dapitan, 2021a).

Fitriani and Arnawa (2020) states that a good learning device will deliver students to have good mathematical problem-solving skills. This type of research was descriptive research by qualitative approach. The initial observation was aimed at finding out, reviewing and explaining problem-solving ability of high school students in mathematics learning and condition of learning devices used and developed by teachers, then whether it was



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necessary to continue research development based on realistic mathematics education to improve the mathematical problem-solving ability.

On the other hand, Arora and Chadha (2020) explains that in modern age of science and technology, the role of mathematics is supreme. In the branches of science, it is visible to everybody that one goes on changing the theories as discoveries are made one after another (Salendab & Dapitan, 2020).

Lev and Leikin (2017) observe that the interrelations between mathematical creativity, mathematical expertise and general giftedness are vague and this motivated a large-scale study that explores the relationship between mathematical creativity and mathematical ability. The study employs Multiple Solution Tasks (MSTs) as a tool for the evaluation of mathematical creativity in high-school students. The study discussed the links between mathematical creativity, excellence in school mathematics and general giftedness as reflected in an empirical study of senior high-school students in Israel, which implemented the MST tool. The study demonstrated that between-group differences are task-dependent and are a function of mathematical insight integrated in the mathematical task.

The school, as the focal training ground, must not stop in identifying the necessary skills needed by 21st-century learners for them to survive in the 21st-century environment (Salendab & Dapitan, 2021b; Sanchez, 2023a). For them to deal with these changes, they need to learn the essential skills that are useful in all subjects and all careers; this is what we call the Four C's of the 21st-century learning: critical thinking, communication, collaboration, and creativity. As identified by the United States-based Partnership for 21st Century Skills, 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).

Along with this, DepEd Order No. 007, s. 2020 states that the Department of Education committed to ensure educational continuity amidst the challenges. DepEd Order No. 021, s. 2019 enclosed the Policy, Guidelines on the Senior High School K-12 Program, and states to provide context to and articulate its context, features and programs. The curriculum shall use pedagogical approaches that are constructivist, inquiry-based, reflective, collaborative, differentiated and integrative. The constructivist learners are active constructor of meaningful knowledge (Sanchez, Sanchez & Sanchez, 2023).

In the present set up, existing difficulties in Mathematics of the Senior High School learners' such as failures in the performance, low achievement, low competencies were experienced not only in the Schools Division of Iloilo, but the entire county, these issues and concerns show that problem solving skills, critical thinking skills, creativity, in Mathematics among SHS learners were low and their higher-order thinking skills were questioned. DepEd Order No. 35, s. 2016 states that the successful teaching-learning process is a result of the systematic use of appropriate strategies in the delivering and assessing the learning objectives targeted for each lesson; possess a good grasp of content which they can consequently convert to sound learning objectives, are able to select and implement the most effective instructional strategies and materials to teach the identified content objectives, make instructional decisions on the basis of formative assessment results, promote sincerely their students' learning and holistic development. Thus, this paper is undertaken to determine the 21<sup>st</sup> century skills in Mathematics among Senior High Learners. It would be interesting to know which among the variables are generally significant to the Department of Education trends.

### Objective

This study was conducted to determine the Twenty- First (21<sup>st</sup>) century skills in Mathematics among Senior High School learners for the school year 2020-2021. Specifically, it sought answers to the following questions:

1. What is the level of 21<sup>st</sup> Century skills of Senior High School Learners?
2. Are there significant differences in the 21<sup>st</sup> Century Skills of Senior High School Learners?
3. Are there significant relationships in the 21<sup>st</sup> Century Skills of Senior High School Learners?

### METHOD

#### Research Design

The research design in this study was descriptive-correlational. It combines both descriptive and correlational designs. The research questions were all quantitative. It used both the descriptive and inferential statistics.



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**Population and Sampling**

The selection of the participants was according to the purpose of the study to assess senior high school learners’ twenty- first century skills in Mathematics. Research participants were senior high school learners who were officially enrolled from the Schools Division of Iloilo. This study used multistage sampling technique. The selection of the sample was accomplished in two or more stages. In stage one, the sample was divided according to the district schools in which a sample of three schools in the Schools Division of Iloilo was drawn using simple random sampling. In the second stage, all schools in the Schools Division of Iloilo were drawn was listed. With the use of simple random sampling, three schools were drawn. Thus, a sample of three schools was identified. In the last stage, all Senior High School learners was taken from each school were drawn. Using systematic random sampling with a random start by 30<sup>th</sup>, a total of 370 SHS learners was chosen.

**Instrument**

A researcher- made questionnaire was validated by 2 certified professors in the higher education institution and 1 master teacher from the Department of Education (DepEd) in the provinces of Guimaras and Roxas. In the data scaling, questions were perceived “Very High” (M= 4.21-5.00), “high” (M= 3.41-4.20), “Average” (M=2.61-3.40), “low” (M=1.81-2.60) and “Very Low” (M=1.00-1.80). Then pilot testing was utilized to 30 students of Senior high school department to determine the reliability of the research instrument.

**Statistical Treatment of Data**

Mean was used to describe the responses of the senior high school learners. T-test and ANOVA were used to test the significant differences and Pearson-r for the significant relationship or correlation.

**Ethical Considerations**

For the ethical consideration, the researcher sent permission letter via hand-carry mail to the schools division superintendent of all secondary schools offering SHS in the Division of Iloilo and to all School heads, and senior high school mathematics coordinators. Second, the researcher maintained the privacy of participants during and after the collection of data. Codes were used to hide their identity. Third, the study observed anti-plagiarism act by recognizing other researchers who contributed to this study. Lastly, the researcher considered the data and the people involved in the study with a high level of confidentiality.

**RESULTS AND DISCUSSION**

**Table 1.** The level of problem-solving skills, critical thinking skills and creativity skills of Senior High School Learners when grouped as a whole.

21 <sup>st</sup> Century Skills	N	M	Description
Problem Solving Skills	370	3.5768	High
Critical Thinking Skills	370	3.7239	High
Creativity Skills	370	3.7736	High

Scale of Means: 4.21-5.00 Very High (VH); 3.41-4.20 High (H); 2.61-3.40 Moderate (M); 1.81-2.60 Low (L); 1.00-1.80 Very Low (VL)

The weighted mean of 3.5768 indicated that problem solving skills of Senior High School(SHS) learners were high, their critical thinking skills weighted mean of 3.7239 were also high and their creativity skills weighted mean of 3.7736 were also high.

Findings revealed that problem solving skills of the 21<sup>st</sup> century learners in mathematics responded high most of the items and moderate for few items in the questionnaire. Parents educational attainment significantly affect mathematics performance of the learners. Meanwhile, though it had the lowest mean by the respondents, this indicates temporary responses behavior shows by the learners in the subject. In terms of their critical thinking skills, the Senior High School Learners responded high most of the items and moderate for few items in the questionnaire as well. Mode of learning significantly affect mathematics performance of the learners. Meanwhile, though it had the lowest mean by the respondents, this indicates temporary responses behavior shows by the learners in the subject. Lastly, the creativity skills, the Senior High School Learners responded high most of the items and moderate for few items in the questionnaire. Mode of learning significantly affect mathematics performance of the learners. Meanwhile,



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though it had the lowest mean by the respondents, this indicates temporary responses behavior shows by the learners in the subject.

**Table 2.** Difference in the Level of Problem-Solving Skills among Senior High School Learners when Classified According to Sex, School Type, Mode of Learning Delivery and Grade Level

Variables	Mean Rank	df	T-test	Sig.2(tailed)	Remarks
<b>Sex</b>					
Male	3.4798				
Female	3.6098	368	-2.196	.029	Significant
<b>School Type</b>					
Medium	3.6369				Not
Large	3.5548	368	1.404	.161	Significant
<b>Mode of Learning Delivery</b>					
Modular	3.5867				Not
Synchronous	3.5736	368	.217	.829	Significant
<b>Grade Level</b>					
Grade 11	3.5715				Not
Grade 12	3.5803	368	-.167	.867	Significant

The table shows the difference in the level of Problem Solving Skills among Senior High School Learners when classified according to sex, school type, mode of learning delivery and grade level. There was no significant difference in the level of problem solving skills among senior high school learners when classified according to sex, the T-test was -2.196 and a p-value was 0.029. The p-value was lesser than 0.05 level of significant meant that there was a significant difference in the level of problem solving skills among senior high school learners when classified according to sex. This mean that sex is not a determinant of being capable learners. The level of problem solving skills of the male learners do not vary significantly to that of the female learners. Therefore, the null hypothesis that there was no significant difference in the level of problem solving skills among senior high school learners when classified according to sex is rejected.

There was no significant difference in the level of Problem Solving Skills among Senior High School Learners when classified according to school type, the T-test was 1.404 and a p-value was 0.161. The p-value was greater than 0.05 level of significant meant that there was no significant difference in the level of problem solving skills among senior high school learners when classified according to school size. This means that school size is not a determinant of being capable learners. The level of problem solving skills of the Medium School learners do not vary significantly to that of the Large School learners. Therefore, the null hypothesis that there was no significant difference in the level of problem solving skills among senior high school learners when classified according to school size is not rejected.

There was no significant difference in the level of Problem Solving Skills among Senior High School Learners when classified according to mode of learning delivery, the T-test was .217 and a p-value was 0.829. The p-value was greater than 0.05 level of significant meant that there was no significant difference in the level of problem solving skills among senior high school learners when classified according to mode of learning delivery. This mean that mode of learning delivery is not a determinant of being capable learners. The level of problem solving skills of the Modular learners do not vary significantly to that of the Synchronous learners. Therefore, the null hypothesis that there was no significant difference in the level of problem solving skills among senior high school learners when classified according to mode of learning delivery is not rejected.

There was no significant difference in the level of Problem Solving Skills among Senior High School Learners when classified according to grade level, the T-test was -.167 and a p-value was 0.867. The p-value was greater than 0.05 level of significant meant that there was no significant difference in the level of problem solving skills among senior high school learners when classified according to grade level. This mean that grade level is not a determinant



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of being capable learners. The level of problem solving skills of the Grade 11 learners do not vary significantly to that of the Grade 12 learners. Therefore, the null hypothesis that there was no significant difference in the level of problem solving skills among senior high school learners when classified according to grade level is not rejected.

**Table 3:** Difference in the Level of Problem-Solving Skills among Senior High School Learners when Classified According to Father Educational Attainment and Mother Educational Attainment.

Source of Variations	df	Sum of Squares	Mean Square	f-value	Sig.2(tailed )	Remarks
<b>Parents Educ. Attainment</b>						
Between Groups	2	.361	.180	.726	.485	Not Significant
Within Groups	367	91.244	.249			
Total	369	91.605				

p> .05 alpha

The table shows the difference in the level of Problem Solving Skills among Senior High School Learners when classified according to father educational background and mother educational background using the Analysis of Variance. There was no significant difference in the level of problem solving skills among senior high school learners when classified according to father’s educational background, the F-test was .726 and a p-value was .485. The p-value was less than 0.05 level of significant meant that there was no significant difference in the level of problem solving skills among senior high school learners when classified according to father’s educational background. The level of problem solving skills among senior high school learners that are elementary, secondary and college respondents. Therefore, the null hypothesis that there was no significant difference in the level of problem solving skills among senior high school learners when classified according to father’s educational attainment was not rejected.

There was no significant difference in the level of problem solving skills among senior high school learners when classified according to mother’s educational background, the F-test was 2.143 and a p-value was .119. The p-value was less than 0.05 level of significant meant that there was no significant difference in the level of problem solving skills among senior high school learners when classified according to mother’s educational background. The level of problem solving skills among senior high school learners that are elementary, secondary and college respondents. Therefore, the null hypothesis that there was no significant difference in the level of problem solving skills among senior high school learners when classified according to mother’s educational attainment was not rejected.

**Table 4.** Difference in the Level of Critical Thinking among Senior High School Learners when Classified According to Sex, School Type, Mode of Learning Delivery and Grade Level

Variables	Mean Rank	df	T-test	Sig.2(tailed)	Remarks
<b>Sex</b>					
Male	3.6670				
Female	3.7433	368	-1.149	.251	Not Significant
<b>School Type</b>					
Medium	3.7975				
Large	3.6970	368	1.540	.124	Not Significant
<b>Mode of Learning Delivery</b>					
Modular	3.7683				Not



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Synchronous	3.7096	368	.870	.385	Significant
<b>Grade Level</b>					
Grade 11	3.7117				Not
Grade 12	3.7321	368	-.345	.730	Significant

The table shows the difference in the level of Critical Thinking among Senior High School Learners when classified according to sex, school type, mode of learning delivery and grade level. There was no significant difference in the level of critical thinking among senior high school learners when classified according to sex, the T-test was -1.149 and a p-value was 0.251. The p-value was greater than 0.05 level of significant meant that there was no significant difference in the level of critical thinking among senior high school learners when classified according to sex. This mean that sex is not a determinant of being capable learners. The level of critical thinking of the male learners do not vary significantly to that of the female learners. Therefore, the null hypothesis that there was no significant difference in the level of critical thinking among senior high school learners when classified according to sex is not rejected.

There was no significant difference in the level of Critical Thinking among Senior High School Learners when classified according to school type, the T-test was 1.540 and a p-value was 0.124. The p-value was greater than 0.05 level of significant meant that there was no significant difference in the level of critical thinking among senior high school learners when classified according to school size. This mean that school size is not a determinant of being capable learners. The level of critical thinking of the Medium School learners do not vary significantly to that of the Large School learners. Therefore, the null hypothesis that there was no significant difference in the level of critical thinking among senior high school learners when classified according to school size is not rejected.

There was no significant difference in the level of Critical Thinking among Senior High School Learners when classified according to mode of learning delivery, the T-test was .870 and a p-value was 0.385. The p-value was greater than 0.05 level of significant meant that there was no significant difference in the level of critical thinking among senior high school learners when classified according to mode of learning delivery. This mean that mode of learning delivery is not a determinant of being capable learners. The level of critical thinking of the Modular learners do not vary significantly to that of the Synchronous learners. Therefore, the null hypothesis that there was no significant difference in the level of critical thinking among senior high school learners when classified according to mode of learning delivery is not rejected.

There was no significant difference in the level of Critical Thinking among Senior High School Learners when classified according to grade level, the T-test was -.345 and a p-value was 0.730. The p-value was greater than 0.05 level of significant meant that there was no significant difference in the level of critical thinking among senior high school learners when classified according to grade level. This mean that grade level is not a determinant of being capable learners. The level of critical thinking of the Grade 11 learners do not vary significantly to that of the Grade 12 learners. Therefore, the null hypothesis that there was no significant difference in the level of critical thinking among senior high school learners when classified according to grade level is not rejected.

**Table 5.** Difference in the Level of Critical Thinking among Senior High School Learners when Classified According to Father Educational Attainment and Mother Educational Attainment.

Source of Variations	df	Sum of Squares	Mean Square	f-value	Sig.2(tailed )	Remarks
<b>Parents Educ. Attainment</b>						
Between Groups	2	.909	.455	1.472	.231	Not Significant
Within Groups	367	113.307	.309			
Total	369	114.216				

p> .05 alpha



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The table shows the difference in the level of Critical Thinking among Senior High School Learners when classified according to father educational background and mother educational background using the Analysis of Variance. There was no significant difference in the level of critical thinking among senior high school learners when classified according to father's educational background, the F-test was 1.472 and a p-value was .231. The p-value was less than 0.05 level of significant meant that there was no significant difference in the level of critical thinking among senior high school learners when classified according to father's educational attainment. The level of critical thinking among senior high school learners that are elementary, secondary and college respondents. Therefore, the null hypothesis that there was no significant difference in the level of critical thinking among senior high school learners when classified according to father's educational attainment was not rejected.

There was no significant difference in the level of critical thinking among senior high school learners when classified according to mother's educational attainment, the F-test was .689 and a p-value was .503. The p-value was less than 0.05 level of significant meant that there was no significant difference in the level of critical thinking among senior high school learners when classified according to mother's educational attainment. The level of critical thinking among senior high school learners that are elementary, secondary and college respondents. Therefore, the null hypothesis that there was no significant difference in the level of critical thinking among senior high school learners when classified according to mother's educational attainment was not rejected.

**Table 6.** Difference in the Level of Creativity Skills among Senior High School Learners when Classified According to Sex, School Type, Mode of Learning Delivery and Grade Level

Variables	Mean Rank	df	T-test	Sig.2(tailed)	Remarks
<b>Sex</b>					
Male	3.7340				
Female	3.7871	368	-.819	.413	Not Significant
<b>School Type</b>					
Medium	3.9207				
Large	3.7199	368	3.191	.002	Significant
<b>Mode of Learning Delivery</b>					
Modular	3.8378				Not
Synchronous	3.7530	368	1.291	.198	Significant
<b>Grade Level</b>					
Grade 11	3.7460				Not
Grade 12	3.7923	368	-.806	.421	Significant

The table shows the difference in the level of Creativity Skills among Senior High School Learners when classified according to sex, school type, mode of learning delivery and grade level. There was no significant difference in the level of creativity skills among senior high school learners when classified according to sex, the T-test was -.819 and a p-value was 0.431. The p-value was greater than 0.05 level of significant meant that there was no significant difference in the level of creativity skills among senior high school learners when classified according to sex. This mean that sex is not a determinant of being capable learners. The level of creativity skills of the male learners does not vary significantly to that of the female learners. Therefore, the null hypothesis that there was no significant difference in the level of creativity skills among senior high school learners when classified according to sex is not rejected.

There was a significant difference in the level of Creativity Skills among Senior High School Learners when classified according to school type, the T-test was 3.191 and a p-value was 0.002. The p-value was greater than 0.05



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level of significant meant that there was a significant difference in the level of creativity skills among senior high school learners when classified according to school size. This mean that school size is a determinant of being capable learners. The level of creativity skills of the Medium School learners varies significantly to that of the Large School learners. Therefore, the null hypothesis that there was a significant difference in the level of creativity skills among senior high school learners when classified according to school size is rejected.

There was no significant difference in the level of Creativity Skills among Senior High School Learners when classified according to mode of learning delivery, the T-test was 1.291 and a p-value was 0.198. The p-value was greater than 0.05 level of significant meant that there was no significant difference in the level of creativity skills among senior high school learners when classified according to mode of learning delivery. This mean that mode of learning delivery is not a determinant of being capable learners. The level of creativity skills of the Modular learners does not vary significantly to that of the Synchronous learners. Therefore, the null hypothesis that there was no significant difference in the level of creativity skills among senior high school learners when classified according to mode of learning delivery is not rejected.

There was no significant difference in the level of Creativity Skills among Senior High School Learners when classified according to grade level, the T-test was -.806 and a p-value was 0.421. The p-value was greater than 0.05 level of significant meant that there was no significant difference in the level of creativity skills among senior high school learners when classified according to grade level. This mean that grade level is not a determinant of being capable learners. The level of creativity skills of the Grade 11 learners does not vary significantly to that of the Grade 12 learners. Therefore, the null hypothesis that there was no significant difference in the level of creativity skills among senior high school learners when classified according to grade level is not rejected.

**Table 7.** Difference in the Level of Creativity Skills among Senior High School Learners when Classified According Father Educational Attainment and Mother Educational Attainment.

Source of Variations	df	Sum of Squares	Mean Square	f-value	Sig.2(tailed )	Remarks
<b>Parents Educ. Attainment</b>						
Between Groups	2	.467	.233	.793	.453	Not Significant
Within Groups	367	108.074	.294			
Total	369	108.541				

p> .05 alpha

The table shows the difference in the level of Creativity Skills among Senior High School Learners when classified according to father educational attainment and mother educational attainment using the Analysis of Variance.

There was no significant difference in the level of creativity skills among senior high school learners when classified according to father's educational attainment, the F-test was .793 and a p-value was .453. The p-value was less than 0.05 level of significant meant that there was no significant difference in the level of creativity skills among senior high school learners when classified according to father's educational attainment. The level of creativity skills among senior high school learners that are elementary, secondary and college respondents. Therefore, the null hypothesis that there was no significant difference in the level of creativity skills among senior high school learners when classified according to father's educational attainment was not rejected.

There was no significant difference in the level of creativity skills among senior high school learners when classified according to mother's educational background, the F-test was .295 and a p-value was .745. The p-value was less than 0.05 level of significant meant that there was no significant difference in the level of creativity skills among senior high school learners when classified according to mother's educational attainment. The level of creativity skills among senior high school learners that are elementary, secondary and college respondents. Therefore, the null hypothesis that there was no significant difference in the level of creativity skills among senior high school learners when classified according to mother's educational attainment was not rejected.





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**Table 8.** Relationships Among the level of Problem-Solving Skills, Level Critical Thinking Skills and Level of Creativity Skills

Pearson-r		Level of Problem Solving Skills	Level of Critical Thinking Skills	Level of Creativity Skills	Remarks
Level of Problem Solving Skills	Correlation Coefficient	1.000	<b>0.544**</b>	0.499**	Significant
	Sig. (2-tailed)	<b>0.000</b>	0.000		
	N	370	<b>370</b>	370	
Level of Critical Thinking Skills	Correlation Coefficient	0.544**	1.000	<b>0.562**</b>	Significant
	Sig. (2-tailed)	0.000	<b>0.000</b>		
	N	370	370	<b>370</b>	
Level of Problem Solving Skills	Correlation Coefficient	<b>0.499**</b>	0.562**	1.000	Significant
	Sig. (2-tailed)	<b>0.000</b>	0.000		
	N	370	<b>370</b>	370	

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

The table shows that the relationship among the level of problem solving skills, level of critical thinking skills and creativity skills. The researcher used the Pearson R. There was a significant relationship between the level of problem solving skills and the level of critical thinking skills of the Senior High School learners, the Correlation Coefficient was 0.544 and Sig. (2-tailed) was 0.000. The Sig. (2-tailed) or p-value was less than 0.01 level of significance which means that there was a significant relationship in the level of problem solving skills and the level of critical thinking skills. Correlation Coefficient of 0.544 denotes a very high relationship. Therefore, the null hypothesis which states that there was no significant relationship between the problem solving skills and the level of critical thinking skills of the Senior High School learners was rejected.

There was a significant relationship between the level of critical thinking skills and the level of creativity skills of the Senior High School learners, the Correlation Coefficient was 0.562 and Sig. (2-tailed) was 0.000. The Sig. (2-tailed) or p-value was less than 0.01 level of significance which means that there was a significant relationship in the level of critical thinking skills and the level of creativity skills. Correlation Coefficient of 0.562 denotes a very high relationship. Therefore, the null hypothesis which states that there was no significant relationship between the critical thinking skills and the level of creativity skills of the Senior High School learners was rejected.

There was a significant relationship between the level of problem solving skills and the level of creativity skills of the Senior High School learners, the Correlation Coefficient was 0.499 and Sig. (2-tailed) was 0.000. The Sig. (2-tailed) or p-value was less than 0.01 level of significance which means that there was a significant relationship in the level of problem solving skills and the level of critical thinking skills. Correlation Coefficient of 0.499 denotes a very high relationship. Therefore, the null hypothesis which states that there was no significant relationship between the problem solving skills and the level of critical thinking skills of the Senior High School learners was rejected.

The significant relationship between problem solving skills, critical thinking skills and creativity demonstrate sequencing results, a cumulative effect produced when one event sets off a reaction that directly affects the other.

The results of the study are confirmed by the study of Diamante, & Banca, (2021) on learning styles and skills in general mathematics using alternative delivery mode among Grade 11 students. Data were gathered using VAK Learning Style, Researcher-made Mathematical Skills Test, and Mathematics Performance reflected on participants' form 9 or report card. Frequency count, percentage and mean were used for descriptive analysis while



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the t-test, One-Way ANOVA, Mann Whitney U, Kruskal Wallis and Pearson's r were used for inferential analysis. Results showed that there were significant differences were found in students' mathematics performance when classified according to their parents' highest educational attainment. Moreover, there was a significant relationship between students' level of mathematical skills and mathematics performance.

Findings of the study are supported by Brynsaas (2017), Salendab (2021) and Sanchez (2023b), stating that teachers must provide students with strategies to obtain the skills that they need for current and future learning. With the said skills intact, students will be able to apply their knowledge to many different situations and be successful on the path that they choose after receiving their high school diploma (Sanchez & Sarmiento, 2020; Sanchez, et al., 2022). Education must provide students an opportunity to learn things outside of the four walls of the classroom.

The world is fast- changing (Minero, 2017; Sanchez, 2022). As educators, we need to sync it in mind, that we need to be responsive on this call. Students are coming into the classrooms with more social and emotional needs. When students feel empowered, they are more apt to gain a deep understanding of the content being taught. The sense of empowerment can be felt when students are provided choices to learn in environments and ways that are the best for each individual student (Kerian, 2017). Hence, 21<sup>st</sup> century skills integration is vital in the development and enhancement of students not only in Mathematics but in all subject areas.

## CONCLUSION

Based on the findings of the study, the researcher concluded that the twenty- first century skills of senior high school students were high. However, the researcher believed that the DepEd authorities with its workforce can still improve the 21<sup>st</sup> century skills of senior high school learners.

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## REFERENCES

- Arora, R., & Chadha, P. A. B. (2020). Emotional Intelligence as Predictor of Academic Achievement in Mathematics among Senior Secondary School Students.
- Awofala, A. O., Lawani, A. O., & Adeyemi, O. A. (2020). Motivation to Learning Mathematics and Gender as Correlates of Senior Secondary School Students' Performance in Mathematics. *Journal of Educational Sciences*, 4(2) pp. 318-333.
- Dizon, E. C., & Sanchez, R. D. (2020). Improving select grade 7 Filipino students' reading performance using the eclectic model. *Journal of World Englishes and Educational Practices*, 2(2), 216-221.
- Eka Mahendra, I. W. (2020). Teachers' Formative Assessment: Accessing Students' High Order Thinking Skills (HOTS) 12(12), 180-202.
- Fitriani, N., & Arnawa, I. M. (2020). An initial observation of learning devices and mathematical problem solving ability of senior high school students. *Journal of Physics: Conference Series*, 1554, 012067.
- Fitriani, A., Zubaidah, S., Susilo, H., & Al Muhdhar, M. H. I. (2020). The Effects of Integrated Problem-Based Learning, Predict, Observe, Explain on Problem-Solving Skills and Self-Efficacy. *Eurasian Journal of Educational Research*, 85, 45-64.
- Leikin, R., & Lev, M. (2013). Mathematical creativity in generally gifted and mathematically excelling adolescents: What makes the difference?. *Zdm*, 45(2), 183-197.
- Muñoz, M. C., & Sanchez, R. D. (2023). Exploring Fernandino Teens TV as a supplementary learning delivery



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modality: Opportunities and challenges from the lens of select learners. *International Journal of Open-access, Interdisciplinary and New Educational Discoveries of ETCOR Educational Research Center (iJOINED ETCOR)*, 2(1), 358-374.

National Association of Colleges and Employers (2016).

Salendab, F. A., & Dapitan, Y. C. (2021). School Heads' Administrative Supervision: Its Relation to the Program Accreditation of Private Higher Education Institutions (PHEIs) in Region XII. *Turkish Journal of Computer and Mathematics Education*, 12(13), 194-202.

Salendab, F. A., & Dapitan, Y. C. (2021). Performance of Private Higher Education Institutions and the School Heads' Supervision in South Central Min-danao. *Psychology and Education*, 58(3), 3980-3997.

Salendab, F. A. (2021). Effectiveness of Performance-Based Assessment Tools (PBATs) and the Students' Academic Performance. *Turkish Journal of Computer and Mathematics Education (TURCOMAT)*, 12(10), 6919-6928.

Salendab, F. A., & Cogo, D. A. (2022). Implementation of Alternative Learning System: Basis for Policy Review and Recommendation. *Journal of Positive School Psychology*, 5457-5467.

Salendab, F. A., & Dapitan, Y. C. (2020). Accuracy of Use of Alternative Language Assessment (ALA) Tools and the Students' Performance. *Psychology And Education*, 57(9), 6679-6688.

Salendab, F. A. (2023). Proposed Instructional Scheme in the New Normal Education: Basis for Pedagogical Strategies/Practices. *Psychology and Education: A Multidisciplinary Journal*, 6(8), 712-719.  
<https://doi.org/10.5281/zenodo.7502764>

Sanchez, A. M. P. (2022). HR practitioners' perceptions on boosting employees' loyalty and commitment: Inputs for a 21st century-responsive human resource system. *International Journal of Open-access, Interdisciplinary and New Educational Discoveries of ETCOR Educational Research Center (iJOINED ETCOR)*, 1(4), 89-102.

Sanchez, R. (2023). Utilization of the daily lesson logs: An evaluation employing the CIPP model. *International Journal of Open-access, Interdisciplinary and New Educational Discoveries of ETCOR Educational Research Center (iJOINED ETCOR)*, 2(1), 199-215.

Sanchez, R. D. (2023). Unveiling the moral-theological foundations of the nullity of marriage due to psychological incapacity. *International Journal of Open-access, Interdisciplinary and New Educational Discoveries of ETCOR Educational Research Center (iJOINED ETCOR)*, 2(1), 397-404.

Sanchez, R., & Sarmiento, P. J. (2020). Learning together hand-in-hand: An assessment of students' immersion program in a schools division. *International Journal of Research Studies in Education*, 9(1), 85-97.

Sanchez, R., Sarmiento, P. J., Pangilinan, A., Guinto, N., Sanchez, A. M., & Sanchez, J. J. (2022). In the name of authentic public service: A descriptive phenomenological study on the lives of Filipino teachers in select coastal villages. *International Journal of Open-access, Interdisciplinary and New Educational Discoveries of ETCOR Educational Research Center (iJOINED ETCOR)*, 1(1), 35-44.

Sanchez, R. D., Sanchez, A. M. P., & Sanchez, J. J. D. (2023). Delving into the Integration of Research Subjects in the Junior High School Curriculum from the Learners' Point of View. *International Journal of Open-access, Interdisciplinary and New Educational Discoveries of ETCOR Educational Research Center (iJOINED ETCOR)*, 2(1), 432-442.