

STUDENTS' 21ST CENTURY SKILLS: LEVEL OF READINESS FOR LARGE- SCALE ASSESSMENTS

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Abstract

This study was conducted to identify the 21st-century skills of students in terms of critical thinking, collaboration, communication, and creativity; and to assess their readiness for large-scale assessments. It employed a descriptive-correlational research design utilizing a 4-Likert scale questionnaire checklist. The respondents were 350 Grade 10 students from a total population of 2,732 from six selected public schools in Zamboanga City, the School Year 2021–2022. It was revealed that the respondents were females between the ages of 16 and 17, with a monthly household income of PHP9,000 or less and one to three siblings. Most of the respondents were very skilled in terms of collaboration and communication. On the other hand, they were moderately skilled in critical thinking and creativity. Hence, respondents were very skilled. Moreover, it was found that there was a significant relationship between the respondents' 21st-century skills and their readiness for large-scale assessments. Respondents were ready for large-scale assessment regarding critical thinking, communication, and creativity and highly ready for collaboration. Respondents' readiness to participate in large-scale exams is related to their 21st-century skills. Thus, readiness in the large-scale assessments among respondents does not differ on age, sex, family monthly income, and the number of siblings. It is recommended that the Department of Education officials develop a plan to enhance 21st-century skills by providing teachers with the necessary training and high-quality student resources. Furthermore, school administrators collaborate with teachers and students to improve 21st-century skills for large-scale assessments. Finally, teachers must become more proactive and active in developing their teaching skills and strategies in the existing curriculum aligned to large-scale assessments.

Keywords: Assessment, 21st Century Skills, Readiness.

Introduction

The 21st century's rapid change and development make it essential for people to support themselves with specific competencies and skills. The information, skills, literacy, and competence that people need to succeed in their daily lives and at work are combined into what is known as 21st-century competencies. The core of 21st-century competencies is grounded in contemporary themes and fundamental school issues. The list also includes knowledge and abilities in information technology, learning and innovation, and life and career skills (Partnership for 21st Century Skills, 2009).

Competencies are not mutually exclusive because 21st-century competencies are a combination of the knowledge, abilities, literacy, and competence every student needs to succeed in his or her life and at work. The ability to comprehend and use information, to communicate clearly, to solve problems, to apply critical thinking to situations in the real world, and to make moral judgments are all part of an individual's total 21st-century competences.

For this reason, the state is under intense pressure to deliver a competitive education on the world stage. One example is the comparison of Philippine student development to that of other countries. The length of time required for K–12 curriculum implementation is a significant problem that can hamper the

interpretation of such benchmarking data (Beswick & Care, 2016).

For instance, by comparing educational environments and processes, the International Large-Scale Assessments (ILSAs) are intended to provide insight on them. Data gathered from sizable, representative samples of schools and students is what distinguishes these studies. The findings can be used to recommend methods for a variety of groups to enhance instruction and learning (Torney-Purta & Amadeo, 2012).

To evaluate student learning and academic success, the education industry employs data from in-depth evaluations. Depending on a country's interests and administration, data are used in a variety of ways. To demonstrate to the country that it is headed in the right way, the Philippines uses data from extensive evaluations.

The purpose of this study was to determine the students degree of preparation for large-scale exams as well as their 21st century skills via the lenses of the aforementioned viewpoints.

Theoretical Framework

Conceptual Framework

The conceptual framework of the study presents the students' 21st century skills and their level of readiness for a large-scale assessment

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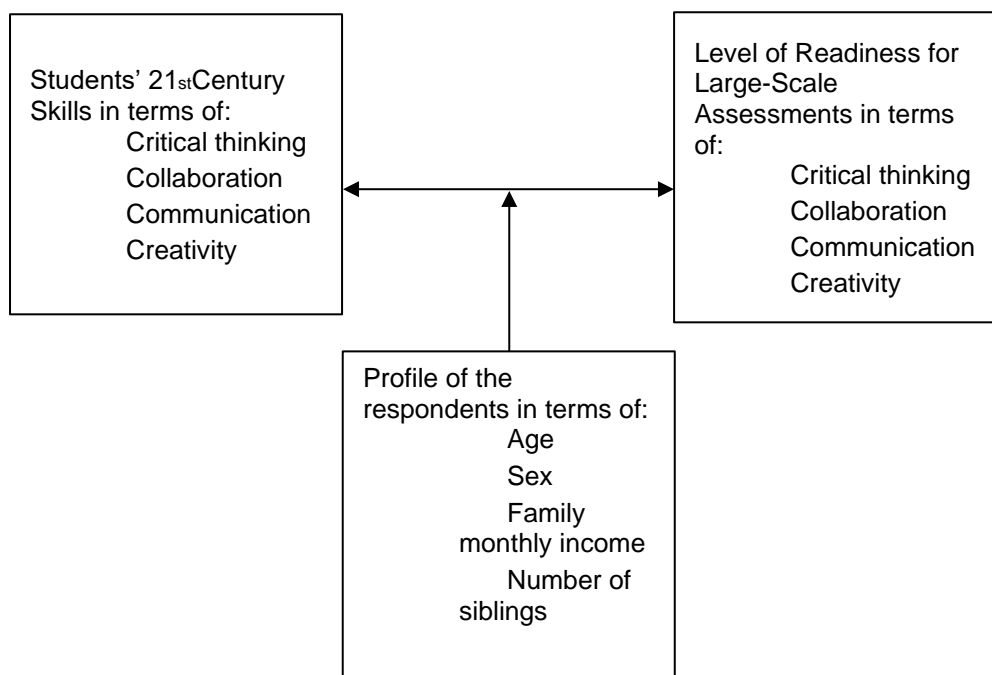


Figure 1: The Conceptual Paradigm of the Study

Figure 1 shows the interplay of the variables in this study. The independent variable in this study, the 21st century skills of the students in terms of critical thinking, collaboration, communication, and creativity. While the dependent variable on the level of readiness of the students for large-scale assessments in terms critical thinking, collaboration, communication, and creativity. Then, the intervening variables include respondents' profile such as in terms of age, sex, family monthly income, and number of siblings, which were used to indicate the hypothesized significant difference on respondents' level of readiness for large-scale assessments. Hence, the double arrowhead indicates the hypothesized significant relationship between the 21st century skills of the respondents and their readiness for large-scale assessments.

Statement of the Problem

This study aimed to identify the 21st-century skills of the Grade 10 students and their level of readiness for large-scale assessments in the selected public secondary schools in Zamboanga City, the School Year 2021–2022. Specifically, it sought to answer the following questions:

1. What is the profile of the respondents in terms of:
 - 1.1. age
 - 1.2. sex
 - 1.3. family monthly income
 - 1.4. number of siblings
2. What are the 21st century skills among respondents in terms of:
 - 2.1. critical thinking
 - 2.2. collaboration

- 2.3. communication
- 2.4. creativity

3. What is the level of readiness of the respondents for the large-scale assessments in terms of:

- 3.1. critical thinking
- 3.2. collaboration
- 3.3. communication
- 3.4. creativity

4. Is there a significant relationship between the 21st century skills and the level of readiness of the respondents in large scale assessment?

5. Is there a significant difference on the level of readiness of the respondents for the large-scale assessments when grouped according to profile?

Scope and Delimitation

This study aimed to identify the 21st century skills of the Grade 10 students and their level of readiness for large scale assessments in the selected public secondary schools in Zamboanga City, School Year 2021-2022.

The profile of the respondents in terms of age, sex, family monthly income, and the number of siblings were determined in this study. This study also identified the 21st-century skills of students in terms of critical thinking, collaboration, communication, and creativity. Further, the readiness of the students for large-scale assessments was also assessed.

Further, the respondents were from Talisayan National High School and Tulungatung National High School on the West Coast; Sangali National

High School and Manicahan National High School on the East Coast; Southcom National High School and Pasonanca National High School from the central area of Zamboanga City. These schools were coded as School A, B, C, D, E, and F, respectively.

Methodology

● Research Design

This study employed a descriptive-quantitative through a correlational research design. The goal of descriptive research is to describe a phenomenon and its characteristics. This research is more concerned with what rather than how or why something has happened. Therefore, observation and survey tools are often used to gather data (Gall, Gall, & Borg, 2007).

Moreover, this study used this type of research design to identify the 21st century skills of the respondents in terms of critical thinking, collaboration, communication, and creativity. It also determined the level of readiness of the respondents for large-scale assessments.

Furthermore, the quantitative research focused on gathering numerical data through adapting the questionnaires and generalizing it across the respondents. The collected numerical data was described and explained through the earlier form of research design.

Correlation research design was used in this study to determine the significant relationship between the respondents' 21st century skills and their level of readiness for large-scale assessments.

● Participants/Respondents of the Study

The respondents for this study were Grade 10 students from the selected secondary schools in Zamboanga City.

Table 1: Population and Respondents by Schools

School	Respondents	
	N	n
A	312	40
B	302	39
C	558	71
D	505	65
E	635	81
F	420	54
TOTAL	2732	350

● Instrument/s of the Study

This study utilized an adapted survey checklist with 4 point- Likert Scale from Kelly et.al (2019) on Creating a 21st Century Skills Survey Instrument for High School Students. The instrument consisted of three parts.

Part I includes the profile of the respondents consisting of age, sex, family monthly income, and number of siblings.

Part II was focusing on the 21st century skills of the respondents. This comprised of eleven statements for critical thinking, twenty two statements, for collaboration, nine statements for communication and eight statements for creativity. The respondents rated each statement with 4-Strongly agree, 3 - Agree, 2-Disagree, and 1 -Strongly disagree.

Part III consisted of statements focusing on the readiness of the respondents for large-scale assessments. Critical thinking composed of eleven statements, Collaboration has twenty-two statements, Communication has nine statements and Creativity composed of eight statements. The respondents rated each statement according to its extent with 4-Highly ready, 3-Ready, 2 -Moderately ready, and 1 - Not ready.

● Data Collection and Analysis

A letter of permission to conduct the study was submitted to the office of the Schools Division Superintendent. Upon approval, the letter was subjected by the Office of the School Head for the scheduling of the administration and retrieval of the research questionnaires. The researcher personally distributed the questionnaires while some were through the use of google forms to correctly gather the data and to fully achieve the intent of the study.

The responses from the questionnaires were encoded and downloaded using the Excel Program. Then, these data were processed using the Statistical Package for Social Sciences (SPSS).

To facilitate the analysis of data, the following statistical measures were employed:

Frequency and Percentage. This measure was used to determine the proportion of the respondents in relation to the samples when categorized according to profile such as age, sex, family monthly income, and number of siblings.

Mean. This measure was used to identify the 21st century skills of the respondents in terms of critical thinking, collaboration, communication, and creativity. This was also used to determine the readiness of the respondents for large-scale assessments.

Spearman's Rho. This measure was used to determine the relationship of the 21st century skills of the respondents to their readiness for the large-scale assessments.

Mann-Whitney Test. This measure was used to determine the difference on the readiness of the respondents for the large-scale assessments when grouped according to sex.

Kruskal-Wallis Test. This measure was used to determine the difference on the readiness of the respondents for the large-scale assessments when grouped according to age, family monthly income and number of siblings.

Shapiro-Wilk Test. This measure was used to examine if a variable is normally distributed in a population.

Results and Discussion

Problem Number 1: What is the profile of the respondents in terms of age, sex, family monthly income and number of siblings?

Table 2: Profile of Respondents in Terms of Age

Age	F	%
15 years old and below	84	24.0
16 to 17 years old	217	62.0
18 years old and above	49	14.0

Table 2 shows that the majority of the respondents were 217, or 62%, whose age ranged from 16 to 17 years, followed by 84, or 24%, who were 15 years old and below, and 49, or 14%, who were 18 years old and above. This implies that from 16 to 17 years old, the students are in Grade 10.

Besides, it serves as an age requirement in this grade level. As per DepEd's "Basic Education Enrollment Policy" or DO No. 3 s. of 2018, the age requirement is 15–16 years of age. Grade 10 is the fourth and last year of the junior high school educational stage. Students enrolled in Grade 10 are usually 15–16 years old. Thus, students begin their senior high school preparations here.

Table 3: Profile of Respondents in terms of Sex

Sex	F	%
Male	98	28.0
Female	252	72.0

Table 3 shows that there were 252 or 72% female and 98 or 28% male respondents in the study. This means that majority of the respondents were female which implies that there were more female than male students enrolled in these schools. As supported by Philippine Statistics Authority reported that in 2017, 55.6% of the enrollees were females and 44.4% were males (Buenaventura, 2019). This is also confirmed in recent study which indicated that there were more female than male students enrolled in junior high school (Surmieda, 2018).

Table 4: Profile of Respondents in Terms of Family Monthly Income

Family Monthly Income	F	%
Php 9,000 and below	259	74.0
Php 9,001-14,000	53	15.1
Php 14,001-19,000	20	5.7
Php 19,001 and above	18	5.1

Table 4 shows, there were 259 or 74% of the respondents whose family monthly income ranged to Php 9,000 and below; 53 or 15% of the respondents with Php 9,001 to 14,000; 20 or 5.7% of the respondents with Php 14,001 to 19,000; and 18 or 5.1% with Php 19,001 and above. This means that majority of the respondents got a family monthly income of Php 9,000 and below which implies that a good number of parents were receiving meager salary or has no stable job. This is confirmed in the study which showed that most of the high school students in public schools were in the low-income bracket (Gonzales, 2018).

Table 5: Profile of Respondents in Terms of Number of Siblings

Number of Siblings	F	%
None	34	9.7
1-3	144	41.1
4-6	131	37.4
7-9	28	8.0
10 and above	13	3.7

Table 5 shows, there were 144 or 41.1% respondents who have 1 to 3 siblings; 131 or 37.4% respondents with 4 to 6 siblings; 34 or 9.7% respondents with no sibling; 28 or 8% respondents with 7 to 9 siblings; and 13 or 3.7% respondents with 10 siblings and above. This means that most of the respondents have 1 to 3 siblings in the family. It implies that as parents having this number of children gives them the greater chance to provide for their children and lesser the number of siblings the greater opportunity of educational attainment.

As corroborated by Wu (2015), sibling size is recognized as one of the most important predictors of determining a child's educational attainment and intellectual development. One of the most important relationships in a person's life is their bond with their siblings (Cools & Patacchini, 2017). Therefore, it is reasonable to anticipate that the number of siblings in a family will significantly affect the educational performance of children.

Problem Number 2: What are the 21st century skills among respondents in terms of critical thinking, collaboration, communication, and creativity?

Table 6: Over-all Summary on the 21st Century Skills among Respondents

Statements	Mean	Descriptive Rating	Verbal Interpretation
Collaboration	3.36	Strongly Agree	Very Skilled
Communication	3.32	Strongly Agree	Very Skilled
Critical Thinking	3.19	Agree	Moderately Skilled
Creativity	3.19	Agree	Moderately Skilled
Average Mean	3.27	Strongly Agree	Very Skilled

Table 6 illustrates the over-all summary on the 21st century skills among respondents. It revealed that respondents obtained a mean of 3.36 which is described as “strongly agree” and interpreted as “very skilled” on their 21st century.

Skill in terms of collaboration: Similarly, a mean of 3.32 which is described as “strongly agree” and interpreted as “very skilled” on their 21st century skills in terms of communication. This means that majority of the respondents were very skilled in terms of collaboration and communication. It implies that students communicate and collaborate effectively since this is what they do every day. They create means and ways on how to communicate to their peers through creating group chats and other online communication. With the modes of online communication, collaboration is there since they also share information and other difficulties in answering the self-learning modules, with this they come up with different strategies and with the help of their academically inclined peers. Thus, students improve their oral and writing communication abilities through group learning activities. It not only allows students to work in small groups, but it also allows them to share and exchange their points of view and collaborate toward a common goal in accomplishing the task given to them.

As corroborated by Burnage (2018) that communication and collaboration taught effectively across the curriculum (rather than just expecting them to happen) could transform learning opportunities for students to participate in lively conversations, express their opinions, build upon other ideas, present information, and evaluate another speaker’s point of view.

On the other hand, respondents got a mean of 3.19 which is described as “agree” and interpreted as “moderately skilled” in terms of critical thinking and creativity. This means that most of the respondents were moderately skilled both in critical thinking and creativity. It implies that learners lack the resources that would help them add another information to such tasks given to them. Therefore, they develop an average critical and creative thinking as they imagine possibilities, consider alternatives, and create innovative solutions.

As substantiated by Burnage (2018), critical thinking and creative thinking skills provide

opportunities for students to ignite higher order thinking, like analysis, evaluation, or synthesis through judgements or decisions based upon evidence, arguments, claims or beliefs. While, creative learning grounded in finding both conventional and creative solutions to unfamiliar problems.

In sum, it shows that respondents obtained an over-all mean of 3.27 with its descriptive rating of “strongly agree” and interpreted as “very skilled” This means that majority of the respondents were very skilled. It implies that students already have the different learning skills where they can find solutions to problems and think outside the box by empowering them to see concepts in a different side and find alternatives for a solution. Working with their peers helps them achieve and consider compromises, get the best possible results from solving a problem, talking to others for them to learn how to effectively convey ideas since they have different personalities.

As a support, Wrahatnolo and Munoto (2018) affirmed that students with communication skill, collaboration, critical thinking, and problem-solving, and creativity and innovation related to their knowledge content will tend to be more successful, both at college, at work and as part of society.

Problem Number 3: What is the level of readiness of the respondents for the large-scale assessments in terms of critical thinking, collaboration, communication and creativity?

Table 7: Over-all Summary on Level of Readiness among Respondents for Large-Scale Assessments

Statements	Mean	Descriptive Rating
Collaboration	3.30	Highly Ready
Communication	3.22	Ready
Creativity	3.19	Ready
Critical Thinking	3.13	Ready
Average Mean	3.21	Ready

Table 7 exhibits the over-all summary on the level of readiness among respondents for large-scale assessments. It revealed that respondents obtained a highest mean of 3.30 with its descriptive rating of “highly ready” on collaboration. While, a mean of

3.22 with its descriptive rating of “ready” on communication, a mean of 3.19 with its descriptive rating of “ready” on creativity and a mean of 3.13 with its descriptive rating of “ready” on critical thinking. This means that majority of the respondents were highly ready on collaboration. On the other hand, respondents were ready on communication, creativity and critical thinking. It implies that collaboration encourages students to work together, discuss content concepts, and enhance their knowledge. Furthermore, collaborative assessments lessened students' anxiety over testing, enabling them to focus on the questions and demonstrate their knowledge.

As a support from one of the studies done at the undergraduate level, it was verified that collaborative assessments improve students' depth of understanding, critical thinking skills, and exam performance (Gilley and Clarkston 2014). As a result of students engaging with their peers to discuss questions and answers, thereby filling in knowledge gaps (Vogler & Robinson 2016). Moreover, Bremert, Stoff and Boesdorfer (2020) found that the results for low-achieving students ($\leq 84\%$ on individual multiple-choice part of the assessment) and high-achieving students ($\geq 85\%$). It appears that low achievers benefited more from the collaborative portion of the exam than high achievers.

In sum, it shows that respondents obtained an overall mean of 3.21 with its descriptive rating of “ready.” This means that most of the respondents were ready for large-scale assessments. It implies that student has the overall ability to participate large scale exams as well to meet the basic requirements and to succeed in higher education within the recommended timeframe required.

In the study of Sampang and Moseros (2005), difficulty can then be experienced if students are lacking the needed prerequisite skills for a particular lesson. Redesigning diagnostic tests as developmental assessment instruments when they found out that mastery of prerequisite skills at a certain level prepares the learner to cope with the demands of more difficult concepts and applications in the succeeding level. Because of this, reviewing the learners of the prerequisites could largely contribute on the learning of the students. Once these skills are already familiarized to the learners, building up the new concepts and skills on the prerequisites and on what they already knew would lead to total learning. This process is called scaffolding. When students are given the support, they need while learning something new, they stand a better chance of using that knowledge independently and mastery and retention of the concepts and skills is assured.

Problem Number 4: Is there a significant relationship between the 21st century skill and the level of readiness of the respondents in large-scale assessments?

Table 8: Spearman’s Rho: Students’ 21st Century Skills and their Level of Readiness for Large-Scale Assessments

Variables	Coefficient r-value	p-value	Interpretation
21st Century Skills of Students and their level of readiness for large-scale assessments	.870**	.000	Significant

Table 8 presents the correlation between the students’ 21st century skill and their level of readiness of large-scale assessments. Data shows that the coefficient of correlation of .870 with the corresponding probability value of .000 is significant at $\alpha = 0.05$, hence, there is a significant relationship between the respondents’ 21st century skill and their level of readiness of large-scale assessments. This means that the relationship between the two variables is significant.

Therefore, the hypothesis which states that there is no significant relationship between the respondents’ 21st century skill and their level of readiness of large-scale assessments is rejected. The null hypothesis is rejected since the p-value of .000 is within the threshold of 0.05.

Moreover, Spearman’s Rho correlation coefficient of .870 suggests for a very high correlation between the respondents’ 21st century skill and their level of readiness of large-scale assessments. It means that the higher a 21st student's skills are, the better prepared they are for large-scale tests. It implies that the students with 21st century skills envelop proficiency in communication and skillful in technology which entails that the students are ready for large scale assessments.

This is supported by Wilson and Scalise (2014), among the 21st century learning goals is to produce students who are highly productive, proficient in communication, have higher order thinking skills (HOTS) and skillful in the use of information and communication technology. Therefore, the higher a 21st student's skills are, the better prepared they are for large-scale tests. It also implies that the process used by teachers and students during instruction provides feedback to adjust ongoing teaching and learning to improve students' achievement of intended instructional outcomes. Another important

aspect of the use of assessment is the need to promote public awareness and understanding of the essential role assessment plays in educational and workplace performance improvement. These wider public education, outreach, and public relations functions are critical in gaining the support needed from all education stakeholders to help move assessment and systems of education more toward 21st century goals and student success.

This is supported by Pellegrino, Chudowsky, and Glaser (2001) that assessment need to be coherent across levels of educational systems. Coherence

must start with agreement on the 21st century skills and their component knowledge and skills. Moreover, designs of international, national, state, classroom level tests must be clarified and aligned or assessment at different levels will not be balanced and inferences about student performance is compromised.

Problem Number 5: Is there a significant difference on the level of readiness of the respondents for the large-scale assessments when grouped according to profile?

Table 9: Results of the Kruskal-Wallis Test to Compare the Level of Readiness of Respondents for Large-Scale Assessment Based on Age

	N	Mean Rank	X ²	Df	p-value	Interpretation
15 years old and below	84	175.52	.980	2	.613	Not Significant
16 to 17 years old	217	172.58				
18 years old and above	49	188.41				

Table 9 revealed that there is no significant difference in the level of readiness for large-scale assessments among respondents when grouped according to age, $\chi^2(2)=.980$, $p=.613$. This means that the level of readiness of respondents for large-scale assessments are more or less the same. Thus, age is not a significant factor that affects the readiness for large-scale assessments among respondents in this study. Therefore, the hypothesis which states that there is no significant difference in the level of readiness for large-scale assessments among respondents when grouped according to age is accepted. The null hypothesis is accepted since the p-value of .613 is beyond the threshold of 0.05.

It implies that age is not a factor student's level of readiness for large scale assessment. Once the student reaches the age of teenager, he's critical thinking develops and start to discover and try things on their own. Same goes to the readiness of the students it will happen whenever and wherever it is necessary. It could happen inside the classroom or in everyday life activity, it needs to be nurture with the help of parents and teachers.

This is supported by an article Critical Thinking Development, that for the development of critical thinking continues to build from the skills acquired and the challenges faced in the first two developmental stages. These skills must continue to be reinforced as the child matures.

Table 10: Results of Mann-Whitney U and Wilcoxon tests on the Level of Readiness for Large-Scale Assessment Based on Sex

	N	Mean Rank	U	W	Z	p-value	Interpretation
Male	98	172.29	12033.000	16884.000	-.371	.711	Not Significant
Female	252	176.75					

Table 10 shows that there is no significant difference on the level of readiness for large-scale assessment among the respondents when they are grouped according to sex ($U=12033.000$, $Z=-.371$, $p=.711 >.05$). This means that the level of readiness for large-scale assessment among respondents are more or less the same. Thus, sex is not a significant factor that affects the level of readiness for large-scale assessment among respondents in this study. Therefore, the hypothesis which states that there is no significant difference in the level of readiness for

large-scale assessments among respondents when grouped according to sex is accepted. The null hypothesis is accepted since the p-value of .711 is beyond the threshold of 0.05.

It implies that sex does not contribute to level of readiness of students for large scale assessment. This is supported by Wochenschrift (2021) on the study of observational study on ECG e-learning. Of the total study population 686 (52%) were female and 629 (48%) were male. This is the first report on

gender-related differences in examination behavior concerning an elaborate e-learning tool. Baseline characteristics of female and male students were mainly comparable. The time until the first attempt and number of attempts performed was comparable

between both sexes; however, female students spent more time on the first attempt compared to their male colleagues. There was no difference regarding ECG quiz scores or final ECG examination scores between female and male students.

Table 11: Results of the Kruskal-Wallis Test to Compare the Level of Readiness of Respondents for Large-Scale Assessment Based on Family Monthly Income

	N	Mean Rank	X ²	Df	p-value	Interpretation
Php 9,000 and below	259	171.76	4.109	3	.250	Not Significant
Php 9,001 – 14,000	53	200.95				
Php 14,001 – 19,000	20	163.05				
Php 19,001 and above	18	168.22				

Table 11 revealed that there is no significant difference in the level of readiness for large-scale assessments among respondents when grouped according to family monthly income, $\chi^2(3)=4.109$, $p=.250$. This means that the level of readiness of respondents for large-scale assessments are more or less the same. Thus, family monthly income is not a significant factor that affects the readiness for large-scale assessments among respondents in this study.

Therefore, the hypothesis which states that there is no significant difference in the level of readiness for large-scale assessments among respondents when grouped according to family monthly income is

accepted. The null hypothesis is accepted since the p-value of .250 is beyond the threshold of 0.05. It implies the family income is not a factor on the level of readiness of students for large scale assessments. Notably, a few studies have found little correlation between income and academic achievement (Lacour & Tissington, 2011).

Similarly, Oni (2007) and Omoegun (2007) found that there is a significant dissimilarity between conduct of students from high and low socio-economic statuses and this ultimately influence their learning process.

Table 12: Results of the Kruskal-Wallis Test to Compare the Level of Readiness of Respondents for Large-Scale Assessment Based on the Number of Siblings

	N	Mean Rank	X ²	Df	p-value	Interpretation
None	34	174.69	.893	4	.926	Not Significant
1-3 siblings	144	175.03				
4-6 siblings	131	173.53				
7-9 siblings	28	176.21				
10 siblings and above	13	201.15				

Table 12 revealed that there is no significant difference in the level of readiness for large-scale assessments among respondents when grouped according to the number of siblings, $\chi^2(4)=.893$, $p=.926$. This means that the level of readiness of respondents for large-scale assessments are more or less the same. Thus, number of siblings is not a significant factor that affects the readiness for large-scale assessments among respondents in this study.

Therefore, the hypothesis which states that there is no significant difference in the level of readiness for large-scale assessments among respondents when grouped according to number of siblings is accepted. The null hypothesis is accepted since the p-value of .926 is beyond the threshold of 0.05.

It implies the number of siblings does not affect the level of readiness of students for large scale assessments. According to Lee (2008), the size has

significantly negative impact on children's education.

Moreover this may be due to the fact that in developed countries, where education is well sponsored by public expenditure, variations in family size characteristics and private investment are less influential on children's schooling (Liu, 2015).

Conclusion

Based on the findings, the study concludes the following:

1. Female respondents were between the ages of 16 and 17 with a household monthly income of Php9,000 or less and one to three siblings.
2. Most of the respondents were very skilled in terms of collaboration and communication. On the other hand, they were moderately skilled in terms of critical thinking and creativity. To sum, respondents were very skilled
3. Respondents were ready for large-scale assessment in terms of critical thinking, communication, and creativity, while highly ready for collaboration.
4. Respondents' readiness to participate in large-scale exams is related to their 21st century skills.
5. Readiness in the large-scale assessments among respondents do not differ on age, sex, family monthly income and number of siblings.

Recommendations

Based on the findings and conclusions, the following recommendations are hereby presented:

1. Department of Education (DepEd) Officials may revisit and modify its educational platform by creating a program that would enhance the 21st century skills of the students in preparation for the readiness for large scale assessments. This can be implemented by equipping teachers with knowledge and skills on the 21st century skills.
2. Curriculum Implementation Division (CID) Supervisors may provide trainings to teachers in terms of enhancing on the teaching practices and strategies and importance of 21st century skills for large scale assessments.
3. School Heads may address concerns on teaching practices and strategies of teachers to enhance 21st century skills in preparation for large scale assessments.
4. Teachers may provide and integrate relevant activities in the lessons that foster the 21st century skills in preparation for large scale assessments.
5. Students may exert efforts to improve their 21st century skills. Students can carry out this by increasing their time to review their lessons and consistently attend their classes.
6. Researchers may conduct similar studies to validate the findings of the present investigation.

Conflict of Interest

There is no conflict of interest by the author in this manuscript.

References

1. Adelman, C. (2010). The toolbox revisited: Paths to degree completion from high school through college. Washington, DC: U.S. Department of Education.
2. Alsaleh, N. J. (2020). Teaching Critical Thinking Skills: Literature Review. The Turkish Online Journal of Educational Technology, 19(1). <https://files.eric.ed.gov/fulltext/EJ1239945.pdf>.
3. Ahlstrom, W. (2014). Exploring the 21st Century Teaching and Learning Practice among Mathematics Secondary School Teachers. https://hrmars.com/papers_submitted/5990/exploring-the-21st-century-teaching-and-learning-practice-among-mathematics-secondary-school-teachers.pdf
4. Amabile, T.M. (2013) Componential Theory of Creativity. In: Kessler, E.H., Ed., Encyclopedia of Management Theory, Sage Publications, London, 134-139. <http://dx.doi.org/10.4135/9781452276090.n42>
5. Anazifa, R. D. (2017) Project- based learning and problem- based learning: are they effective to improve student's thinking skills? page 6. Assessing 21st-Century Skills and Competencies Around the World <https://asiasociety.org/global-cities-education-network/assessing-21st-century-skills-and-competencies-around-world>.
6. Balka, D. S. (2000). Creative ability in mathematics. *Arithmetic Teacher*, 21(7), 633-636.
7. Baron, JB, (2004) Group Collaboration in Assessment: Multiple Objectives, Processes, and Outcomes.
8. Bender, W. N. (2012). *Project-Based Learning: Differentiating Instruction for The 21St Century*. California: Corwin
9. Beswick, B. & Care, E. (2016) The SAGE Handbook of Curriculum, Pedagogy and Assessment Chapter 57.
10. Bremert, H., Stoff, A. & Boesdorfer, S. (2020). Collaborative Assessments, 87.
11. Briggs, M., & Davis, S. (2008). *Creative Mathematics in Early Years and Primary Classroom* published by Routledge.
12. Brody, L. E., & Mills, C. J. (2012). Gifted children with learning disabilities: a review of the issues. *Journal of Learning Disabilities*, 30(3), 282-286. <https://files.eric.ed.gov/fulltext/EJ750778.pdf>
13. Buenaventura, P. A. R. S. (2019). Education Equality in the Philippines International Workshop on Data Disaggregation for the Sustainable Development Goals.

14. Burnage, S. (2018). Benefits of Collaboration <https://www.nea.org/professional-excellence/student-engagement/tools-tips/benefits-collaboration>
15. Care, E., Griffin, P. & Wilson, M. (2018). Assessment and Teaching of 21st Century Skills: Research and Applications.
16. Cheng, D. (2015). Developing Critical Thinking Skills from Dispositions to Abilities: Mathematics Education from Early Childhood to High School. https://www.researchgate.net/publication/274007465_Developing_Critical_Thinking_Skills_from_Dispositions_to_Abilities_Mathematics_Education_from_Early_Childhood_to_High_School
17. Chiu, M. M. (2004). Adapting teacher interventions to student needs during cooperative learning: How to improve student problem solving and time on-task. *American Educational Research Journal*, 41, 365-399.
18. Collaborative Learning. Center for Teaching Innovation, <https://teaching.cornell.edu/teaching-resources/active-collaborative-learning/collaborative-learning>
19. Conger, D. (2009). Explaining race, poverty, and gender disparities in advanced course taking. *Journal of Policy Analysis and Management*,
20. Contributor, C. (2021). Importance of Organization for Students, <https://work.chron.com/importance-organization-students-5588.html>
21. Cools, A. and Patacchini, E. (2017). Sibling gender composition and women's wages. IZA Discussion Papers, No. 11001, Institute of Labor Economics (IZA), Bonn.
22. Craft, A. (2005). *Creativity in Schools: Tensions and Dilemmas*. Routledge, Abingdon, UK. Critical Thinking Development://reboot-foundation.org/en/parent-guide/ages-13-plus/
23. Davies, D. D. Jindal-Snape, R. Digby, A. Howe, C. Collier and P. Hay, (2014). "The roles and development needs of teachers to promote creativity: A systematic review of literature". *Teaching and Teacher Education*, 41, 34-41.
24. Davis, L. C. (2019). Why schools need to prioritize creativity *Creative Teaching and Teaching Creativity: How To Foster Creativity In The Classroom*
25. Dede, C. (2009). Comparing Frameworks for "21st Century Skills." In J. Bellance & J. R. Brandt
26. Depdiknas. (2007). *Standar Kompetensi Mata Pelajaran Matematika SD dan MI*. Jakarta: Depdiknas.
27. DepEd "Basic Education Enrollment Policy" or DO No. 3 s. of 2018.
28. Doorman, M. (2013). A model for a widespread implementation of inquiry-based learning.
29. Ennis, R. (2011). *The Nature of Critical Thinking: An Outline of Critical Thinking Dispositions and Abilities*. https://education.illinois.edu/docs/default-source/faculty-documents/robert-ennis/thenatureofcriticalthinking_51711_000.pdf
30. Facione, P. (2011). *Think Critically*, Pearson Education: Englewood Cliffs, NJ.
31. Felder, R., & Brent, R. (2007). *Cooperative Learning*.
32. Fisher, R. (2005). *Teaching children to think* (2nd ed.). Cheltenham, GL: Nelson-Thornes
33. Gerlach, J. M. (2004). Is this collaboration? New directions for teaching and learning. https://www.researchgate.net/publication/229949477_Is_this_collaboratio
34. Gilley, B. & Clarkston, B. (2014). Collaborative testing: Evidence of learning in a controlled in-class study of undergraduate students. *Journal Of College Science Teaching*, 43(3), 83-91. https://doi.org/10.2505/4/jcst14_043_03_83
35. Guilford, P. (2004). *The Effects of Divergent Production Activities with Math Inquiry and Think Aloud of Students with Math Difficulty*. Disertasi Pada Texas A & M University. [Online] Tersedia: <http://txspace.tamu.edu/bitstream/handle/1969.1/2228/etd-tamu-2004;sequence=1>. [15 Oktober 2012]
36. Hackman, J.R. (2000). Group influences on individuals in organizations. In Dunnette, M.D., Hough, L.M. (Eds.), *Handbook of industrial and organizational psychology* (Vol. 3, pp. 199-267). Palo Alto, CA: Consulting Psychologist Press.
37. Haidema, C. & Mitchell, A. (2005). *Reading and writing to learn mathematics: Ten strategies to improve problem solving*. Denver: RMC. Research Company.
38. Halagao, P.E. (2004). Teaching Filipino-American students. *Multicultural Review*, 13(1), 42-48. Retrieved from http://filameducation.com/wpcontent/uploads/Teaching_Filipino_American_Students.pdf.
39. Hamalik, O. (2003). *Learning and Teaching Process*. Bumi Aksara.
40. Harris, R. (2000). *Introduction to Creative Thinking*. [Online] Tersedia: <http://www.virtualsalt.com/crebook1.htm>. [7 Agustus 2012]
41. Haylock, D. (2010). *Recognizing Mathematical Creativity in School Children*.
42. Haylock, D. (2003). *Mathematics explained for primary teachers* 2nd edition. London-Paul Chapman.

43. Hong, E. & Aqai, Y. (2004). Cognitive and motivational characteristics of adolescents gifted in mathematics: Comparisons among students with different types of giftedness. *Gifted Child Quarterly*, 48, 191-201. https://www.researchgate.net/publication/230881863_Creativity_The_Essence_of_Mathematics
44. Howell, J. S., Kurlaender, M. & Grodsky, E. (2010). *Journal of Policy Analysis and Management*, 29(4), 726-748.
45. Hwang, W.Y. H., Chen, N.S., & Dong, J.J. (2007). Multiple Representation Skills and Creativity Effects on Mathematical Problem Solving using a Multimedia Whiteboard System.
46. Impey, C. (2020) Clear, concise, consistent - The three Cs of effective communication. *Journal of Education and Practice*, www.iiste.org, ISSN 2222-1735 (Paper), ISSN 2222-288X (Online), 6(12).
47. Kabasakalian, R. (2007). Language and thought in mathematics staff developments: A problem probing protocol. *Teachers College Record*, 109(4), 837-876.
48. Kennedy, L. M. & Tipps, S. (2007). *Guiding children learning of mathematics (9th Ausg.)*. Wadsworth Thomson Learning.
49. Key Findings from PISA (2015) <https://www.oecd.org/unitedstates/PISA-2015-United-States.pdf>
50. Khalidzuoud (2018). The effects of communication skills in developing preparatory year students' performance page 41.
51. Kim, H., Cho, S. and Ahn, D. (2003). Development of mathematical creative problem solving ability test for identification of gifted in math. *Gifted Education International*, 18, 184-174.
52. Kubic, C. (2021). A Question Teachers Should Ask as Often as Possible.
53. Kuhn, D. (2000). *Metacognitive Development*.
54. Lacour, M. & Tissington, L.D. (2011). The effects of poverty on academic achievement. *Educational Research and Reviews*, 6(7), 522-527.
55. Lai, E. R. (2011). *Critical Thinking: A Literature Review Research Report*. London: Parsons Publishing.
56. Lavasani, M. G. & Khandan, F. (2011). The Effect of Cooperative Learning on Mathematics Anxiety and Help-Seeking Behavior.
57. Lee, J. (2008). Sibling size and investment in children's education: An Asian instrument. *Journal of Population Economics*, 21(4), 855-875.
58. Lee, V. & Burkam, D. (2011). Inequality at the starting gate: Social background differences in achievement as children begin school. New York: Economic Policy Institute.
59. Leikin, R. & Lev, M. (2013). Mathematical creativity in generally gifted and mathematically excelling adolescents: What makes the difference? *ZDM - The International Journal on Mathematics Education*, 45(2), 183-197.
60. Liu, H. (2015). The quantity-quality fertility-education trade-off. *IZA World of Labor*.
61. Mall-Amiri, B. (2015). The difference between extrovert and introvert EFL teachers' classroom management.
62. Mathis, W. (2013). Two paths of 21st century learning.
63. Maurissen, L., Barber, C. & Claes, E. (2020). Classroom discussions and political tolerance towards immigrants: the importance of mutual respect and responsiveness. *Acta Politica: International Journal of Political Science*, 55(2), 242. <https://doi.org/10.1057/s41269-018-0114-0>
64. McGinty, M. (2019). *Imagination and Creativity, and how to add it to your classroom*.
65. Mehrotra, P. (2018). *How to boost your creativity by combining ideas*.
66. Mergendoller, J. (n.d.). *Does project based learning teach critical thinking?*
67. Metri Group and NCREL. (2013). *EnGauge 21st Century Skills: Literacy in the Digital Age*. Chicago, IL, North Central Regional Educational Laboratory.
68. Meyer, K. (2009). *Student Classroom Participation: Exploring Student Definitions of, Motivations for, and Recommendations Regarding Participation*. Paper on the Instructional Development Division, 2009 National Communication Association Convention, Chicago: Ohio University
69. Nartani, C. I., Hidayat, R. A. & Sumiyati, Y. (2015). Communication in Mathematics Contextual. *IJIREs*, 4(2), 284-287.
70. National Association of Colleges and Employers (2016). *Job Outlook* <http://www.nacweb.org>
71. National Center for Education Statistics (2015). *The Condition of Education* <https://nces.ed.gov/pubs2015/2015144.pdf>
72. National Research Council (2010). *Assessing 21st century skills*. Washington, DC: National Academies Press.
73. NCTM (2020). *Communication: A Vital Skill of Mathematics*. <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1075&context=mathmidactionresearch>
74. Nikolakaki, S.M., Pitoura, E., Terzi, E. & Tsaparas, P. (2020). *Finding Teams of Maximum Mutual Respect*. 2020 IEEE International Conference on Data Mining

- (ICDM), 1202-1207. <https://doi.org/10.1109/ICDM50108.2020.00149>
75. Oluwole, D. A and Muraina, K. O. (2016). Effectiveness of Motivational Enhancement Therapy in Enhancing Mathematics Learning Gains among School-Going Adolescents in Oyo State, Nigeria. *The Pacific Journal of Science and Technology*, 17(1), 140-151. Available at <http://www.akamaiuniversity.us/PJST.html>
 76. Omogun, M. (2007). Effect of parental socio-economic status on parental care and social adjustment in the UBE programme in Lagos State: Implication for counselling. *International Journal of Educational Research*, 3(2), 81-87.
 77. O'Neil, H. F., Chuang, S. and Chung, G. K. (2004). Issues in the computer-based assessment of collaborative problem-solving. *Assessment in Education*, 10, 361-373.
 78. Oni A. (2007). Socio-economic status as predictor of deviant behaviours among Nigeria Secondary School Students. *International Journal of Educational Research*, 3(2), 225-236.
 79. Ontario, M. (2010). Modeling Effective Communication.
 80. Ormrod, J.E (2014) *Educational Psychology: Developing Learners*, 8th Edition University of Northern Colorado (Emerita)
 81. Park, H. (2004). The Effects of Divergent Production Activities with Math Inquiry and Think Aloud of Students with Math Difficulty.
 82. Partnership for 21st Century Skills (2009). *A Framework for Twenty-First Century Learning*. <http://www.p21.org/>
 83. Patel, D. S. (2014) *Body Language: An Effective Communication Tool*, page 94.
 84. Pellegrino J, Chudowsky, N & Glaser R (2001). *Knowing what students know. The science and design of educational assessment*. Washington, Dc. National Academy Press.
 85. Pengmanee, S. (2016). Developing students mathematical reasoning ability based on constructivist approach. *Journal of Advances in Humanities and Social Sciences*, 2(4), 221-231.
 86. Perkins, C., and Murphy E. (2006). Identifying and measuring individual engagement in critical thinking in online discussions: An exploratory study. *Educational Technology & Society*, 9(9), 298-307.
 87. Pehkonen, E. (2002). The state-of-art in mathematical creativity. *ZDM-The International Journal on Mathematics Education*, 29(3), 63-67. <https://doi.org/10.1007/s11858-997-0001-z>
 88. Quieng, M. C., Lim, P. P. & Lucas, M. R. D. (2015). 21st Century-Based Soft Skills: Spotlight on Non-Cognitive Skills in a Cognitive-Laden Dentistry Program. *European Journal of Contemporary Education*, 11(1), 72-81. <https://doi.org/10.13187/ejced.2015.11.72>
 89. Rajendran, N.S. (2010). *Teaching and Acquiring Higher Order Thinking Skills: Theory and Practice*. Tanjong Malim, Perak: Penerbit Universiti Pendidikan Sultan Idris.
 90. Robinson, K. (2001). *Unlocking creativity: A strategy for development*. Belfast: Department of Culture Arts and Leisure.
 91. Sampang, Ma. Angeles A. and Jason Moseros. (2005) *Redesigning the CEM Mathematics Diagnostic Tests as Developmental Assessment Instruments*. <http://www.iaea.info>. Date Retrieved: April 29, 2016.
 92. Sherin, M. G. (2000). Facilitating Meaningful Discussion of Mathematics. *Mathematics Teaching in the Middle School*, 6(2), 122-125.
 93. Slameto. (2003). *Learning and Factors Affecting It*. Jakarta: Rineka Cipta.
 94. Soland, J., Stecher, B. & Hamilton, L. (2013.). *Measuring 21st-century competencies: Guidance for educators Asia Society*.
 95. Sriraman, B. (2005). Are giftedness and creativity synonyms in mathematics? *The Journal of Secondary Gifted Education*, 17, 20-36.
 96. Surya, M. (2004). *Psychology of learning and teaching*. Pustaka Bani Quraisy, Bandung.
 97. The National Advisory Panel (2008) https://www.academia.edu/39930328/21st_Century_Instruction_Accelerating_Students_Outcomes_in_Mathematics
 98. Thompson, J. (2020). *Instructing & Assessing 21st Century Skills: A Focus on Complex Communication*.
 99. Torney-Purta, J. & Amadeo, J. (2012) *The Contribution of International Large-scale Studies in Civic Education and Engagement*, in von Davier, M., Gonzalez, E., Kirsch, I. & Yamamoto, K. (Eds) *The Role of International Large Scale Assessments: perspectives from technology, economy, and educational research*, pp. 87-114. Dordrecht: Springer.
 100. Treffinger, D.J., Young, G.C., Selby, E.C. & Shepardson, C. (2002). *Assessing Creativity: A Guide for Educators*. The National Research Center on The Gifted and Talented. Center for Creative Learning Sarasota, Florida.
 101. Trilling, B. & Fadel, C. (2009). *21st Century Skills: Learning for Life in Our Times*. San Francisco, CA: John Wiley & Sons.
 102. Van Boxtel, C., Van der Linden, J. & Kanselaar, G. (2000). Collaborative learning tasks and the elaboration of conceptual knowledge. *Learning and Instruction*, 10(4), 311-330.
 103. Vogler, J.S. and Robinson, D.H. (2016). Team-based testing improves individual learning. *Journal of Experimental Education*, 84(4),

- 787-803. <https://doi.org/10.1080/00220973.2015.1134420>
104. Voogt, J. and Roblin, N. P. (2012). A Comparative Analysis of International Frameworks for 21st Century Competences: Implications for National Curriculum Policies. *Journal of Curriculum Studies*, 44, 299-321. <https://doi.org/10.1080/00220272.2012.668938>
 105. Watsons, S.M.R & Gable, R.A. (2012). Using knowledge of student cognition to differentiate instruction. Published online at <http://www.learnne.org/lp/editions/every-learner/6693>
 106. Wochenschrift, W. (2021) Gender differences in examination behavior of 4th grade medical students Results from an observational study on ECG e-learning <https://link.springer.com/article/10.1007/s00508-021-01959-z#Sec2>.
 107. Wijayti, N., Sumarni, W. & Supanti, S. (2019). Improving Student Creative Thinking Skills Through Project Based Learning.
 108. Willingham, D. T. (2007). Critical Thinking: Why Is It So Hard to Teach? *American Educator*, 31, 8-19. http://www.aft.org/sites/default/files/periodicals/Crit_Thinking.pdf
 109. Wilson, M. & Scalise, K. (2014). Assessment of Learning in Digital Networks. In Griffin, P., & Care, E. (Eds.), *Assessment and Teaching of 21st Century Skills, Volume 2 - Methods & Approaches*. Dordrecht: Springer.
 110. Wrahatnolo, T. and Munoto (2018). 21st centuries skill implication on educational system page 3.
 111. Wu, Q. (2015). Sibship size and children's family resources. *Journal of Early Adolescence*, 3, 1-20.
 112. Zevenbergen, R., Mousley, J. & Sullivan, P. (2004). Disrupting pedagogic relay in mathematics classrooms: Using open-ended tasks with Indigenous students. *International Journal of Inclusive Education*, 8(4), 391-405.
 113. Zohar, A. and Dori, Y.J. (2003). Higher Order Thinking Skills and Low Achieving Students: Are They Mutually Exclusive? *Journal of the Learning Sciences*, 12, 145-181.