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CHARACTERIZING OUTCOMES-BASED MATHEMATICS TEACHING: MARK OF PAULINIAN EDUCATION

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Abstract:

The study determined outcomes-based mathematics teaching characteristics that mark Paulinian education in St. Paul University Surigao Junior High School. The instruments used were researcher-made questionnaires for the 6 Junior High School Mathematics teachers and 151 Science Class students who taught and enrolled respectively in St. Paul University Surigao during the school year 2019-2020. Data gathered were analyzed using the means, standard deviation, and t-test. Exploratory Factors Analysis was also employed to yield generally significant characteristics based on the data from the responses. The mathematics teachers perceived that the students under study achieved the mathematics learning outcomes and competencies, *to some extent*. The said students also perceived that they have achieved, *to some extent*. Hence, the teachers' instructional approaches and perception of their students' achieved mathematics learning outcomes and competencies are validated by the students' actual achievements. It was then revealed that there is no significant difference between the participants' perceptions on the extent of the mathematics learning outcomes and competencies achieved by the students, *except* for the *honesty and truthfulness* traits. Exploratory factor analysis revealed five (5) most significant Mathematics learning outcomes and competencies categories that characterize the outcomes-based mathematics teaching in SPU Surigao Junior High School.

Keywords: Education, Paulinian Education, Characterizing Mathematics Teaching, Outcome-based Teaching & Learning, Mathematics outcomes and competencies, Survey method, Exploratory Factor Analysis, Philippines

INTRODUCTION

In the modern world where globalization and the industrial revolution are evident, the global village housed by its global citizens is filled with contemporary life problems where such real-life adventures and challenges considerably become vital for human survival and holistic growth. The present modernized society requires everyone to acquire the 21st-century skills and capacity where critical thinking and decision-making skills are premium alongside the embodiment of spirituality to achieve sustainable development of human life in this world of inevitable technological advancement and unavoidable total development and upgrades. Thus, the modern world problems require modern world, upright,

and innovative solutions. One best way is by teaching the value of critical thinking for good decision making, spirituality, and morality for upright selection of life choices, problem-solving, and risk-taking to the minds and hearts of the growing people, our new generation learners. This is through the unique or distinct Mathematical discipline teaching, which may be assessed and evaluated through very efficient learning assessment ways that are outcome-based.

Mathematics is one of the most difficult subjects due to its challenging topics and sub-disciplines demanding higher critical, mental, and strategic competencies. Thus, people thinks that a person is logically and analytically intelligent or advanced once he or she is good in mathematics. It is the principle of Mastrangeli (2019) that intellectual superiority in the Mathematical discipline requires effective thinking and learning methods and that such are effectively transferred to all domains of the teaching-learning process including the spirituality and morality aspects to embody or achieve.

Mathematics requires not only a simple know-how about the subject but also more on the mastery and deeper grasp leading the learners to contextualize knowledge, applying concepts to real-life situations, realizing and self-evaluating realistic mathematical knowledge absorbed, and creating mathematical concepts in the contemporary world full of life-changing scenarios (Gu, et al., 2016).

The integration of Paulinian spirituality in all the institutions' processes and programs was always a challenge to all the Paulinian schools. The efforts of integration remain abstract and hence render the institutions and educators grappling as to what paradigm or scheme must be used to make "how" of integration a reality existentially (SPCEM, 2018).

The Outcome-based education bases each part of an educational system around 'outcomes'. By the end of the educational experience, every learner should have attained the outcomes intended. There is no specified style of teaching or assessment in OBE. Instead, classes, opportunities, and assessments should all help students achieve the specified outcomes. The teacher's role adapts into an instructor, trainer, facilitator, and mentor based on the outcomes targeted (Spady, 1994).

Characterizing mathematics teaching in the context of Paulinian learning outcomes is very beneficial and significant to Mathematics teachers in the university. This will surely equip both the teachers and students in this era of non-stop curriculum innovation becoming efficient critical thinkers and problem solvers, an idea of how a Paulinian school will have its unique or distinct way of teaching subject contents.

In the end, this study determined the characteristics of outcomes-based Mathematics teaching that mark Paulinian education in St. Paul University Surigao Junior High School by looking into the students' achievements in relation to the SPCEM Basic Education Graduate Outcomes and the Kto12 Mathematics Education Twin Competency Goals.

Moreover, the findings would support implementing policies or intervening initiatives designed to establish Paulinian Education Brand or Trademark, improving the students' achievement in mathematics. Lastly, this academic output presents ideas to suggest how, when teaching the subject, the mathematics community might pass on our core strength: our thinking and learning methodology, which is the main ingredient in teaching mathematics efficiently in the modern world, outcomes-based, the Paulinian way. This research proposal is a pioneering contribution to St. Paul University Surigao to achieve a premium educational trademark in terms of Mathematics Education.

CONCEPTUAL FRAMEWORK

The study determined outcome-based mathematics teaching characteristics that mark Paulinian education in St. Paul University Surigao Junior High School after looking into the students' mathematics learning outcomes and competencies achievements in relation to the SPCEM Basic Education Graduate Outcomes and the Kto12 Mathematics Education Twin Competency Goals. Such learning outcomes and competencies were derived from the Paulinian Core Values alongside the K to 12 Mathematics Education Framework of the Department of Education.

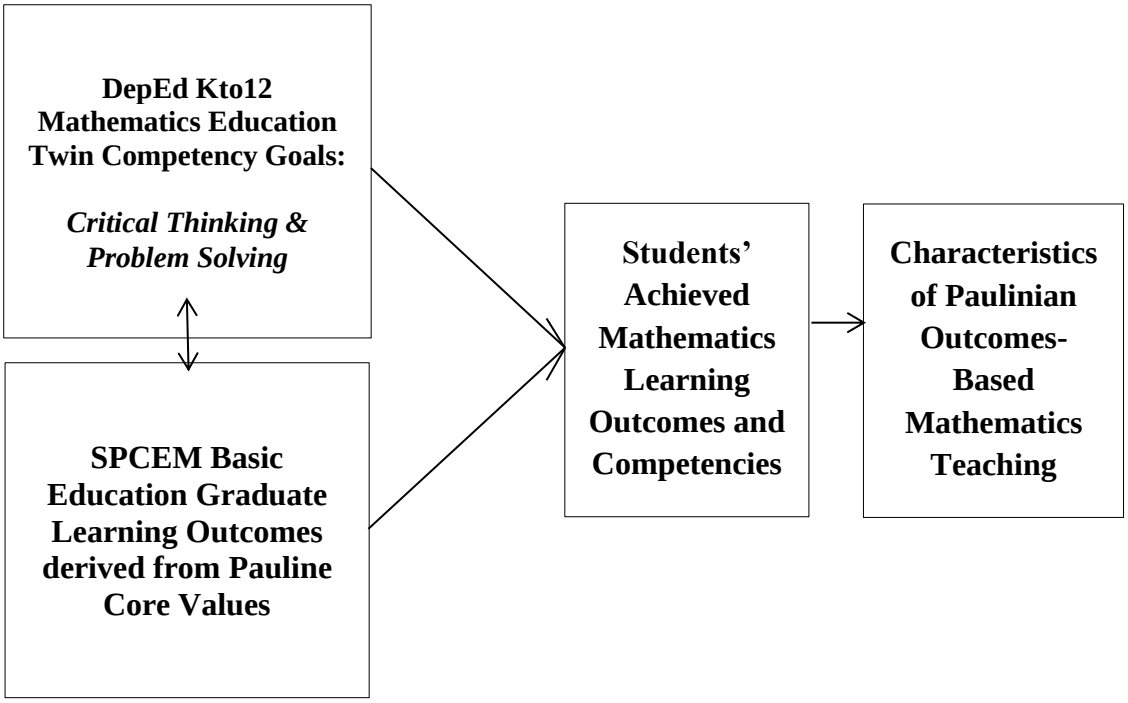

Figure 1. Schematic Diagram of the Study entitled
Characterizing Outcomes-based Mathematics Teaching: Mark of Paulinian Education

Figure 1 shows the schematic diagram of the study. As shown, the DepEd Kto12 Mathematics Education Twin Competency Goals is alongside and interconnected with the SPCEM Basic Education Graduate Outcomes derived from Paulinian Core Values which depicts that the study intended to join these two significant variables and then look into the students' achievements in relation to these joined outcomes and competencies to determine the characteristics of Paulinian outcomes-based mathematics teaching. Furthermore, the students' achieved mathematics learning outcomes and competencies became bases for characterizing new competencies and outcomes, which realized the goal of the study to characterize or determine the characteristics of outcomes-based Mathematics teaching that will mark Paulinian education.

A learning outcome is a clear statement of what a learner is expected to do, know about, and value at the end of schooling, which is measurable. It states both the substance of learning and how its attainment is to be demonstrated. For the Paulinian community, it refers to the SPCEM life performance behaviors intended for all Paulinian learners to achieve as a result of taking up Paulinian education. These outcomes were based on the Congregation's core values (SPCEM, 2018). On the other hand, learning competencies refer to the established set of intended skills, behaviors, and knowledge the learners are expected to master (Department of Education, 2016).

The Department of Education (2016) comprehensively structuralized the K to 12 Mathematics Curriculum for all Basic Education Schools in the Philippines. The structure shows each of the features of the framework of Mathematics education in the Philippines. It provides a complete depiction of the Department of Education's end competency goals for all learners under the Mathematics Curriculum upon exiting Grade 10 level – to yield citizens who are proficient in critical thinking and problem solving, through various surrounding efficient and higher-order strategies. Moreover, the K to 12 Mathematics Curriculum Guide of the Department of Education, its conceptual framework states that: "Mathematics is one subject that permeates life at any age and in any circumstance. Thus, its value goes beyond the classroom and the school. Mathematics as a school subject, therefore, must be learned comprehensively and with much depth." The twin goals of mathematics in the basic education levels, K-10, are Critical Thinking and Problem Solving.

The SPC Education Ministry for its Basic Education learners is to let them achieve the intended learning outcomes aligned to the Congregation's core values – "producing young Paulinian citizens who embody the values of: CHRIST-CENTEREDNESS, the value where one devotes all endeavors, actions, and life learnings with Jesus Christ in the center of the heart exhibited through the CONSCIOUSness of the heart, mind, and the spirit thus becoming MINDFUL, SELF-DIRECTED LEARNERS & ROLE MODELS; CHARISM, the value in which a person is endowed with spiritual talents and giftedness by the Holy Spirit exhibited by being CREATIVE thus becoming CREATIVE, RESOURCEFUL EXPLORER & PROBLEM SOLVER; COMMUNITY, the value in which a person, through the Pauline spiritual teachings and discipleship, acknowledges and embodies the essence of having harmonious communal relationships with one another exhibited by being COLLABORATIVE with fellow members of the community thus becoming CREDIBLE, RESPONSIVE COMMUNICATORS, & TEAM PLAYERS; COMMISSION, the value in which one becomes a an excellent committed steward and advocate having the need to fulfill the mission of the Church exhibited by being a COMPETENT individual thus becoming CONSCIENTIOUS, ADEPT PERFORMERS & ACHIEVERS; CHARITY, the value in which one lives a life of care,

kindness, generosity, and love for the others especially those who are underprivileged by being COMPASSIONATE to one another thus becoming COMMITTED ADVOCATES FOR PEACE AND UNIVERSAL WELL-BEING."

STATEMENT OF THE PROBLEM

This study determined the characteristics of outcomes-based Mathematics teaching that mark Paulinian education in St. Paul University Surigao Junior High School. Specifically, this study sought to answer the following questions:

1. To what extent have the mathematics learning outcomes and competencies been achieved by the students as perceived by the participants?
2. What is the significant difference between the participants' perceptions on the students' achieved mathematics learning outcomes and competencies?
3. What are the characteristics of Outcomes-based mathematics teaching in SPU Surigao Junior High School?

METHODOLOGY

The study used a quantitative research design employing a descriptive research survey approach which allowed the researchers to gather more precise and quantifiable information needed. Specifically, mean and standard deviation were used to determine the extent of mathematics learning outcomes and competencies achieved by the students as perceived by their mathematics teachers and the students themselves. Moreover, the design also helped the researchers determine the significant difference between the participants' perceptions on the extent of mathematics learning outcomes and competencies achieved by the students under study, through the t-test. Finally, the Exploratory Factor Analysis was employed in this study to characterize or determine the characteristics of outcomes-based Mathematics teaching that marks Paulinian education in St. Paul University Surigao Junior High School.

The participants of this study were the 6 Junior High school Mathematics teachers and 151 Science Class students who taught and enrolled respectively in St. Paul University Surigao during the school year 2019-2020. Purposive sampling, also known as judgmental, selective, or subjective selection, as a non-probability sampling technique that does not need underlying theories or a set number of participants, was used in this study. The main instruments used to solicit information were separate sets of researcher-made questionnaires for the mathematics teachers and the Junior High School students, respectively. The questionnaires contained items or indicators that asked primarily for the participants' perceptions on the mathematics learning outcomes and competencies achieved by the students under study. Data gathering started with sending letter to the Principal asking for the approval to conduct the study to the participants. After the approval, the researchers administered the questionnaires to the participants. The data were tallied, treated, and interpreted for analysis and discussion.

In this study, the researchers strictly observed research ethics wherein confidentiality, privacy rights, and safety of the participants and the researchers' ethical practices were strongly observed. The researchers ensured that individuals voluntarily participated in the research with full knowledge of relevant risks and benefits (informed consent). The researchers in this study also respected the feelings and personal information property rights of the informants. Hence, the confidentiality of information was ensured (maintenance of privacy).

RESULTS AND DISCUSSION

This section presents the extent of mathematics learning outcomes and competencies achieved by the students as perceived by both teachers and students themselves, the significant difference between the participants' perceptions on the students' achieved mathematics learning outcomes and competencies, and the characteristics of Outcomes-based mathematics teaching in SPU Surigao Junior High School.

Table 1. The *CONS* mathematics learning outcomes and competencies achieved by the students as perceived by the participants

Indicators	Teachers' Responses			Students' Responses			t-test
	M	SD	VI	M	SD	VI	*p-value*
1. exhibit religious faith sense as students fulfill and relate tasks to real-life situations.	3.00	0.632	To Some Extent	2.86	0.809	To Some Extent	0.678
2. exhibit religious morality as students fulfill and relate tasks to real-life situations.	3.33	0.516	To Very Much Extent	2.81	0.781	To Some Extent	0.105
3. exhibit life discipleship	3.00	0.632	To Some Extent	2.86	0.792	To Some Extent	0.672
4. exhibit honesty.	**3.67**	**0.516**	**To Very Much Extent**	**2.81**	**0.718**	**To Some Extent**	**0.004**
5. exhibit a sense of truthfulness	**3.67**	**0.516**	**To Very Much Extent**	**2.95**	**0.724**	**To Some Extent**	**0.018**
6. exhibit reliability.	3.17	0.753	To Some Extent	2.99	0.693	To Some Extent	0.535

7.	exhibit integrity in doing the learning activities and assessments	3.33	0.516	To Very Much Extent	3.02	0.744	To Some Extent	0.309
8.	value dignity in doing the learning activities and assessments	3.33	0.516	To Very Much Extent	3.07	0.801	To Some Extent	0.431
9.	show sensibility or mindfulness, leading students to proactively respond to the challenges of the changing times.	3.17	0.408	To Some Extent	2.95	0.794	To Some Extent	0.515
10.	demonstrate the traits of a role model as students accomplish their tasks.	3.17	0.753	To Some Extent	2.70	0.800	To Some Extent	0.158
11.	demonstrate the traits of a self-directed person as students accomplish their tasks.	2.83	0.753	To Some Extent	2.89	0.753	To Some Extent	0.863
12.	demonstrate the traits of an upright person as students accomplish their tasks.	3.33	0.516	To Very Much Extent	2.93	0.731	To Some Extent	0.180
13.	exhibit good decision-making capabilities considering religious motivation and uprightness as the core of the human heart and mind.	3.00	0.632	To Some Extent	2.84	0.767	To Some Extent	0.617
14.	easily find solutions when solving problems.	2.83	0.408	To Some Extent	2.54	0.885	To Some Extent	0.426
15.	easily identify possible causes and consequences of certain actions when solving problems.	2.83	0.408	To Some Extent	2.74	0.812	To Some Extent	0.784
16.	take risks in finding solutions to problems and answer such problems in a given time duration.	2.67	0.516	To Some Extent	2.80	0.841	To Some Extent	0.698
Average		3.33	0.516	To Very Much Extent	2.87	0.636	To Some Extent	0.083

**CONS=Conscious, Mindful Self-Directed Learners & Role Models / Christ-centeredness Core Value*

Rating Scale:	***Mean***	***Qualitative Description***	***Verbal Interpretation***
	3.26-4.00	*Always*	*To Very Much Extent*
	2.51-3.25	*Sometimes*	*To Some Extent*
	1.76-2.50	*Rarely*	*To Little Extent*
	1.00-1.75	*Never*	*No Extent At All*

Independent samples t-test significance: if p<0.05

Table 1 shows the CONS mathematics learning outcomes and competencies achieved by the students as perceived by their mathematics teachers and the students themselves. For teachers, the students are *Conscious, mindful self-directed learners & role models embodying Christ-centeredness to very much extent* (average Mean=3.33; average SD=0.516) as they engaged in their mathematics classes. For students, they are *Conscious, mindful self-directed learners & role models embodying Christ-centeredness* only *to some extent* as they engaged in their mathematics classes. (average Mean=2.87; average SD=0.636).

In terms of the specific traits under CONS with highest or best results, it can be inferred that for teachers, their students best *exhibit honesty* (Mean=3.67; SD=0.516) and a *sense of truthfulness* (Mean=3.67; SD=0.516) *to very much extent* as they engaged in their mathematics classes. However, the students' believed differently. For them, they best *value dignity in doing the learning activities and assessments* but only *to some extent* (Mean=3.07; SD=0.801) than the rest of the outcomes and competencies which are all exhibited as well only to some extent. Honesty, accuracy, and reliability are significant values and positive attitude traits a young Filipino must demonstrate as they encounter mathematical knowledge and skills learning inside and outside the classroom setting. When consistently integrated with the mathematics class and knowledge engagements as strongly promoted by the teachers' approaches and strategies, these values surely yield a meaningful and valuable learning experience for Filipino learners that will last longer than the mathematical content knowledge itself. Moreover, *valuing dignity*, which also pertains to self-respect, esteem, pride, and self-worth, is one of the components of becoming a self-directed and role model person (DepEd, 2016; SPCEM, 2018).

In terms of the lowest results, the teachers believed that their students *take risks in finding solutions to problems and answer such problems in a given time duration* only *to some extent* and the least compared to other behaviors as they engaged in their mathematics classes (Mean= 2.67; SD=0.516*)*. Relative to the teachers' perception, the students believed that they *easily find solutions when solving problems* only *to some extent* (Mean= 2.54; SD=0.885) as they engaged in their mathematics classes. A Paulinian learner must take the risk of trying out combinations of data, materials, methods, and techniques to derive and test potential solutions to existing problems even at the risk of

criticisms (SPCEM, 2018). In the aspect of the affective domain of learning, risk-taking is one of the components of becoming a self-directed and role model person, and this value is affected by the level of attitude and anxiety one experience (Pa, N. A. N., & Tapsir, R., 2013). Therefore, for both teachers and students, the students under study are indeed likely to have difficulty in *taking risks when finding solutions to problems in a given time duration* when they do not find it easy to *solve mathematical problems*.

With all these, it is then revealed that there is a significant difference between the teachers and students' perceptions on the traits *4.exhibit honesty* (p=0.004) and *5.exhibit a sense of truthfulness* (*p*=0.018) under the CONS mathematics learning outcomes and competencies achieved by the students under study. However, by looking into the rest of the traits and the overall results, it can be inferred that there is no significant difference between the teachers' and students' perceptions on the extent of the CONS mathematics learning outcomes and competencies achieved by the students (*p*=0.083).

Values integration and even spirituality promotion are not always the easiest to integrate with mathematical knowledge learning. Unfortunately, values seem to receive the least attention, although it is one of the most stable affective domains. Thus, the teachers and students differently believed in the concepts of *honesty* and *truthfulness* intended for the students under study to embody. By these findings, the teachers believed that the students under study achieve *to very much extent* and the highest in these indicators under CONS category, but for the students, they believed that these indicators are one of those which are achieved only *to some extent* and lower compared to other indicators under CONS category. Significant differences between the teachers and students on *honesty* and *truthfulness* behavioral indicators may imply that mathematics teachers should further deepen, clarify, and transparently interject values integration across all mathematics topics where *honesty* and *truthfulness* are consistently emphasized. By this, the learners will fully embody the said behaviors the way teachers and the topic outcomes expect them to exhibit.

Table 2. The *COM* mathematics learning outcomes and competencies achieved by the students as perceived by the participants

Indicators	Teachers' Responses			Students' Responses			t-test
	M	SD	VI	M	SD	VI	*p-value*
1. express compassion towards one another as students fulfill their tasks.	3.00	.632	To Some Extent	2.91	.779	To Some Extent	0.806
2. express empathy as students fulfill their tasks.	3.17	.753	To Some Extent	2.93	.770	To Some Extent	0.444
3. exhibit generosity as students fulfill their tasks.	3.00	.632	To Some Extent	3.03	.828	To Some Extent	0.923
4. take responsibility in thoughts and actions objectively.	3.17	.408	To Some Extent	2.95	.769	To Some Extent	0.502
5. respect one's uniqueness and giftedness	3.83	.408	To Very Much Extent	3.37	.763	To Very Much Extent	0.143
6. relate to all warmly and graciously without biases.	3.17	.408	To Some Extent	3.09	.819	To Some Extent	0.827
7. demonstrate kindness or sensitivity to the needs and feelings of others.	3.50	.548	To Very Much Extent	3.22	.774	To Some Extent	0.380
8. associate mathematical problems to certain scenarios that promote the Love of Christ.	3.00	.000	To Some Extent	3.02	.948	To Some Extent	0.959
9. willingly share their time, resources, and energy for the accomplishment of a particular task.	3.17	.753	To Some Extent	3.11	.735	To Some Extent	0.860
Average	3.17	.408	To Some Extent	3.04	.672	To Some Extent	0.647

**COM = Compassionate, Committed Advocates for Peace and Universal Well-being / Charity Core Value*

Rating Scale:	***Mean***	***Qualitative Description***	***Verbal Interpretation***
	3.26-4.00	*Always*	*To Very Much Extent*

2.51-3.25	*Sometimes*	*To Some Extent*
1.76-2.50	*Rarely*	*To Little Extent*
1.00-1.75	*Never*	*No Extent At All*

Independent samples t-test significance: if p<0.05

Table 2 presents the COM mathematics learning outcomes and competencies achieved by the students as perceived by their mathematics teachers and the students themselves. For teachers, the students are *compassionate, committed advocates for peace and universal well-being impelled by the Charity of Christ to some extent* (Mean=3.17; average SD=0.408) as they engaged in their mathematics classes. Likewise, the students also perceived that they are *compassionate, committed advocates for peace and universal well-being impelled by the Charity of Christ to some extent* (Mean=3.04; average SD=0.672). This means that both teachers and students perceived similarly.

In terms of the specific indicators or traits with the highest or best results under COM, the teachers believed that the students best *respect one's uniqueness and giftedness to very much extent* (Mean=3.83; SD=0.408) as they engaged in their mathematics classes. This is consistent with the students' perceptions (Mean=3.37; SD=0.763) implying that both teachers and students believed that a Paulinian who is expected to embody the *"Compassionate, Committed Advocate for Peace and Universal Well-being"* learning outcome, which coexists with the Charity core value, demonstrates one's compassion respecting dignity and equality of humankind and actions that show one's care for all of God's creation and so inspire others to do the same. He or she commits oneself to be an advocate for universal well-being. He or she also *relates to all warmly and graciously without biases*, and so takes time to listen or reach out to others. Likewise, he or she must generally work hard to develop his or her God-given talents for God's love in the service of the Church, family, and community and so becomes open to new inputs, suggestions, and knows how to adjust performances and welcomes new learning in different situations. Lastly, a Paulinian stands out for his or her uniqueness and originality and that he or she accomplishes tasks with determination, has good time management and self-discipline (SPCEM, 2018).

Looking into the lowest mean results, it was noticed that *expressing compassion towards one another as students fulfill their tasks* (Mean=3.00; SD=0.632), *exhibiting generosity as students fulfill their tasks* (Mean=3.00, SD=0.632), and *associating mathematical problems to certain scenarios that promote the Love of Christ* (Mean=3.00; SD=0.000) are not much of a great achievement for the mathematics teachers. Not surprisingly, the students also believed that they *express compassion towards one another as students fulfill their tasks* only *to some extent* (Mean=2.91, SD=0.779) and the lowest compared to the other traits under COM. Nonetheless, despite the truth depicted by the lowest results under COM, it is still accepted that the students have satisfactorily achieved all COM outcomes and exhibited all behavioral indicators at least to some extent.

It is generalized that a Paulinian mathematics student *demonstrates gestures that show kindness and sensitivity to others' needs and feelings*. Expressing compassion, exhibiting generosity, and consequently associating mathematical concepts promotion comes as mentioned earlier, fall under the affective domain of learning (SPCEM, 2018). Moreover, the Department of Education (2016) emphasized that when the affective values are consistently integrated with the mathematics class and knowledge engagements as strongly promoted by the teachers' approaches and strategies, it is likely to yield a meaningful and valuable learning experience for Filipino learners that will last longer than the mathematical content knowledge itself. But as shown, it implies that both teachers and students have slight difficulty in terms of emphasis and promotion of compassion, generosity, and Love of Christ as they all engaged in the mathematics classes.

Considering all these findings, it was revealed that there is no significant difference between the teachers' and students' perceptions on the extent of the COM mathematics learning outcomes and competencies achieved by the students under study as to the individual indicators and the average (p=0.647). Thus generally, the teachers and students perceived similarly the extent of the COM mathematics learning outcomes and competencies achieved by the students under study.

Table 3. The *CRE* mathematics learning outcomes and competencies achieved by the students as perceived by the participants

Indicators	Teachers'Responses			Students'Responses			t-test
	M	SD	VI	M	SD	VI	*p-value*
1. creatively demonstrate resourcefulness upon fulfilling mathematical tasks.	3.17	.408	To Some Extent	2.84	.731	To Some Extent	0.281
2. exhibit giftedness as students translate mathematical knowledge into meaningful contexts.	3.00	.000	To Some Extent	2.70	.781	To Some Extent	0.353
3. relate prior knowledge to the new concepts and openly accept it as students apply knowledge in real-life experiences.	3.00	.000	To Some Extent	2.91	.827	To Some Extent	0.785

4.	find an alternative or substitute for a learning material/activity to visualize a concept.	3.33	.516	To Very Much Extent	2.99	.770	To Some Extent	0.286
5.	accomplish tasks with competence and determination.	3.17	.408	To Some Extent	2.93	.784	To Some Extent	0.459
6.	exhibit craftsmanship in fulfilling tasks by being skillful, practical, and innovative.	3.00	.000	To Some Extent	2.89	.818	To Some Extent	0.752
7.	show proficiency in understanding mathematical problems	2.83	.408	To Some Extent	2.81	.778	To Some Extent	0.953
8.	explore patterns in finding solutions to problems.	3.17	.408	To Some Extent	2.96	.832	To Some Extent	0.547
9.	illustrate ideas and make decisions when solving problems.	3.00	.000	To Some Extent	2.95	.815	To Some Extent	0.874
10.	acknowledge points for improvement when solving problems	3.33	.516	To Very Much Extent	3.01	.796	To Some Extent	0.321
11.	use imagination to solve problems.	3.00	.632	To Some Extent	2.94	.881	To Some Extent	0.870
12.	simplify complex tasks by breaking it down into orderly manageable parts.	3.00	.632	To Some Extent	2.86	.783	To Some Extent	0.669
13.	can exhibit proficiency in solving real-world problems using appropriate learning tools or resources	2.83	.408	To Some Extent	2.81	.761	To Some Extent	0.952
14.	create options in facing and solving problems.	3.00	.632	To Some Extent	2.88	.832	To Some Extent	0.729
15.	evaluate relevant and creative options in facing and solving problems.	3.17	.408	To Some Extent	2.86	.783	To Some Extent	0.344
16.	define issues, problems, and opportunities to generate possible solutions to a problem.	2.83	.408	To Some Extent	2.93	.758	To Some Extent	0.764
17.	evaluate students' solutions to problems whether such are best appropriate and applicable or not.	3.17	.408	To Some Extent	2.99	.774	To Some Extent	0.573
18.	illustrate ideas and scenarios by translating mathematical knowledge from numerical statements into real-world contexts.	3.50	.548	To Very Much Extent	2.91	.819	To Some Extent	0.081
19.	can construct new insights from their own experiences and realizations after solving mathematical problems.	3.17	.753	To Some Extent	2.93	.767	To Some Extent	0.454
Average		3.00	.000	To Some Extent	2.93	.618	To Some Extent	0.794

** CRE = Creative, Resourceful Explorer & Problem Solver / Charism Core Value*

Rating Scale:	***Mean***	***Qualitative Description***	***Verbal Interpretation***
	3.26-4.00	*Always*	*To Very Much Extent*
	2.51-3.25	*Sometimes*	*To Some Extent*
	1.76-2.50	*Rarely*	*To Little Extent*
	1.00-1.75	*Never*	*No Extent At All*

Independent samples t-test significance: if p<0.05

Table 3 shows the CRE mathematics learning outcomes and competencies achieved by the students as perceived by their mathematics teachers and the students themselves. For both the participants, the students under study are

creative, resourceful explorers & problem solvers exhibiting the charism core value to some extent as they engaged in their mathematics classes (Teachers' average Mean=3.00; average SD=0.000, and the Students' average Mean=2.93 and average SD=0.618).

Furthermore, the result shows that for teachers, the students best *illustrate ideas and scenarios by translating mathematical knowledge from numerical statements into the real-world contexts to very much extent* (highest Mean=3.50; SD=0.548). For the students, they best believed that they *acknowledge points for improvement when solving problems* but only *to some extent* (highest Mean=3.01; SD=0.796). The teachers' and students' highest perception results may have differed but they are somewhat related. It can be understood that learners who can *illustrate ideas and scenarios after translating mathematical knowledge* can also *acknowledge points for improvement when solving problems* since they can understand mathematical problems evident in their ability to translate mathematical knowledge. A Paulinian learner must search voluntarily beyond readily available resources of information, resources, and standard techniques to generate new understanding towards workable solutions to existing problems. A Paulinian who is expected to embody the *creative, resourceful explorer & problem solver learning outcome* exhibiting the *charism core value* uses original ideas to create solutions to existing problems (SPCEM, 2018). Moreover, there is an importance of transfer of learning principle by emphasizing that educators, the curriculum, and the content must always include and ascertain transfer of learning to sustain and apply knowledge in the real world or context and so provide meaningful learning for learners across all levels in all subjects by effective means of assessment (Cree & Macaulay, 2000). To ensure this, one of the basic and primary competencies the mathematics education framework intends to all Kto12 learners is that apart from the problem-solving skills, learners must demonstrate the capacity and skill to illustrate mathematical problems and *to translate numerical statements into real-world problems* and vice versa. Learners can pose and solve problems and validate and review their solutions, whether such are accurate or otherwise (DepEd, 2016). Considering all these concepts our educators have considered in implementing the mathematics curriculum, it is indeed acceptable and likely that the students will positively *acknowledge points for improvement when solving problems*.

Looking closely to the lowest results under the CRE category, the teachers believed that the students least *show proficiency in understanding mathematical problems* (Mean=2.83; SD=0.408), *exhibit proficiency in solving real-world problems using appropriate learning tools or resources* (Mean=2.83; SD=0.408), and *define issues, problems, and opportunities to generate possible solutions to a problem* (Mean=2.83; SD=0.408). For the students, they believed that they least *exhibit giftedness as students translate mathematical knowledge into meaningful contexts* (Mean=2.70; SD=0.781). What makes mathematics a commonly difficult subject to most learners is because of its problem solving, reasoning, and critical thinking aspects that most of the learners cannot easily possess or develop (Singh & Yu, 2018). Furthermore, most of the mathematics learners are limited only to how the problems are solved, as demonstrated by the teacher, who may not demonstrate ample mastery of solving the problem. Consequently, the students cannot cope with the teacher's techniques, thus leaving them unable to find solutions or solving processes on their own. Students suffering from mathematics difficulties at all levels are evident. The students cannot easily come out with problem solutions because of related problems with reasoning and the ability to translate mathematical problems into solvable equations.

The term *giftedness* may refer to students having gifts and talents to perform or execute at higher levels than others of the same age, sex, experience, and environment in one or more domains (Steinmeyer, 2020). Intellectual giftedness is an intellectual ability significantly higher than average (Mackintosh, 2011). Focusing on the giftedness itself, a Paulinian student must generally work hard to develop his or her God-given talents for God's love in the service of the Church, family, and community. He or she also is open to new inputs, suggestions and knows how to adjust performances, and welcomes new learning in different situations. Moreover, a creative Paulinian stands out for his or her uniqueness and originality and accomplishes tasks with determination. As advocates of Charism core value, he or she shares his or her talents and resources most especially to the most needed and inspires others to do their best, using their highest potential in any performances. In relation, a gifted Paulinian performs excellently in his or her studies, projects, and assigned tasks and further assists in developing and empowering others (SPCEM, 2018).

For both teachers and students, fulfilling these tasks can also help discover and display students' uniqueness and giftedness as they engaged in the mathematics class. In the aspect of intellectual giftedness, however, where mathematical capabilities are given, Khair & Khairani (2012) stated that the learners commonly experience difficulties at all levels, resulting in some students' negative bias and sometimes expressed dislike for the subject.

Furthermore, it was revealed that there is no significant difference between the teachers' and students' perceptions on the extent of the CRE mathematics learning outcomes and competencies achieved by the students under study as to the individual indicators and the average (p=0.794). Thus generally, the teachers and students perceived similarly as to the extent of the CRE mathematics learning outcomes and competencies achieved by the students under study. The data also implies that the students have achieved the CRE mathematics learning outcomes and competencies as their mathematics teachers anticipated. As SPC Education Ministry (2018) defined, *a creative, resourceful explorer & problem solver* Paulinian works hard to develop his or her God-given talents for God's love in the service of the Church, family, and community. He or she also is open to new inputs, suggestions and knows how to adjust performances, and welcomes new learning in different situations. Moreover, a creative Paulinian stands out for his or her uniqueness and originality and that he or she accomplishes tasks with determination, has good time management and self-discipline. A problem solver and critical thinker, Paulinian makes the good and right decision in his or her choices and solving

problems. Being a critical thinker too, a Paulinian stands for the truth regardless of criticism or non-acceptance of others. Additionally, a resourceful explorer Paulinian uses original ideas to create solutions to existing problems. As advocates of Charism core value, he or she shares his or her talents and resources most especially to the most needed and inspires others to do their best, using their highest potential in any performances. In relation, a gifted Paulinian performs excellently in his or her studies, projects, and assigned tasks and further assists in developing and empowering others. Lastly, a creative and talented resourceful Paulinian shares openly and generously at the service of his or her class, family, Church, and Community every project and endeavor even in small or humble tasks.

The Department of Education's (2016) Mathematics Education Curriculum Framework in the Philippines desires to yield citizens proficient in critical thinking and problem solving through various surrounding efficient and higher-order strategies. To improve the mathematics teaching and raise students' achievement level in mathematics, rehabilitate the teacher of mathematics, provide him/her with educational training programs, and upgrade his/her level academically and professionally through educational supervision services. Schools and academicians should consider focusing on detecting mathematics teaching difficulties and examining the mathematics teaching strategies and evaluation methods employed in teaching mathematics.

Table 4. The *COL* mathematics learning outcomes and competencies achieved by the students as perceived by the participants

Indicators	Teachers' Responses			Students' Responses			t-test
	M	SD	VI	M	SD	VI	*p-value*
1. show credibility as students fulfill their mathematical tasks.	3.17	.753	To Some Extent	2.95	.759	To Some Extent	.475
2. show accountability as students fulfill their mathematical tasks.	3.17	.753	To Some Extent	2.95	.769	To Some Extent	.506
3. demonstrate good interpersonal communications and teamwork during collaborative tasks.	3.33	.516	To Very Much Extent	3.00	.783	To Some Extent	.304
4. demonstrate leadership skills as students fulfill their mathematical tasks.	3.50	.548	To Very Much Extent	2.67	.914	To Some Extent	.209
5. recognize weaknesses, strengths, needs, and wants of fellow group members during learning activities.	3.17	.753	To Some Extent	3.08	.779	To Some Extent	.788
6. demonstrate a sense of pride when a task is completed successfully.	3.50	.548	To Very Much Extent	2.95	.777	To Some Extent	.091
7. observe conscientiously the guidelines needed in the accomplishment of tasks.	3.17	.408	To Some Extent	3.09	.706	To Some Extent	.799
8. exert effort to promote unity and collaboration in doing group tasks.	3.33	.516	To Very Much Extent	3.17	.737	To Some Extent	.597
9. act decisively as students choose the options when solving problems.	3.00	.632	To Some Extent	2.94	.741	To Some Extent	.846
Average	3.50	.548	To Very Much Extent	3.01	.605	To Some Extent	.051

**COL = Collaborative, Credible, Responsive Communicators & Team Players / Community Core Value,*

Rating Scale:	***Mean***	***Qualitative Description***	***Verbal Interpretation***
	3.26-4.00	*Always*	*To Very Much Extent*
	2.51-3.25	*Sometimes*	*To Some Extent*
	1.76-2.50	*Rarely*	*To Little Extent*
	1.00-1.75	*Never*	*No Extent At All*

Independent samples t-test significance: if p<0.05

Table 4 contains the COL mathematics learning outcomes and competencies achieved by the students as perceived by their mathematics teachers and the students themselves. It was noted that for the teachers, the students are *collaborative, credible, responsive communicators & team players exhibiting the community core value to very much*

extent (average Mean=3.50; average SD=0.548) as they engaged in their mathematics classes. For the students, they believed that they are *collaborative, credible, responsive communicators & team players exhibiting the community core value* only *to some extent* (average Mean=3.01; average SD=0.605) as they engaged in their mathematics classes.

As to the specific indicators with the highest results, it was observed that for the teachers, the students best *demonstrate a sense of pride when a task is completed successfully to very much extent* (Mean=3.50; SD=0.548). For the students, they believed that they best *exert effort to promote unity and collaboration in doing group tasks* but only *to some extent* (Mean=3.17; SD=0.737).

Looking closely at the said indicators, it is understood that *demonstrating a sense of pride* and *exerting effort to promote unity and collaboration* is likely to be associated with learner's attitudes towards the mathematics subject. Kishore & Ma (1997) stated a significant positive relationship between attitudes towards mathematics and mathematics achievement. Demir, Ozer, and Ferrari (2009) even mentioned that emotions such as confidence and esteem and student background in mathematics and learning strategies and school environment have significant effects on academic achievement. Hammouri (2004) also emphasized that learners and even their mothers' perception of success attribution to hard work, attitudes towards mathematics, and confidence in mathematics ability have strong positive total effects on mathematics achievement. Since mathematics is a difficult subject (Yu & Singh, 2018), it is indeed motivating and reinforcing to the learners when they can surpass and respond to problems and so generally achieve in mathematics. A Paulinian student also demonstrates positive interpersonal relationships and sensibility to the feelings of others. He communicates and works well with others to resolve conflicts fairly. He must also develop and exercise the capacity for moral leadership that contributes to the welfare and the common good of the family, classroom, school, and community. As responsive communicators, a Paulinian speaks prudently so as not to hurt others. Furthermore, as a credible and collaborative Paulinian, he or she exerts effort to promote unity and cooperation in the class, family, and community (SPCEM, 2018).

As to the lowest results under the COL category, the teachers perceived that the students least *act decisively as students choose the options when solving problems, to some extent* Mean=3.00; SD=0.632). For the students, they least *demonstrate leadership skills as students fulfill their mathematical tasks, to some extent* (Mean=2.67; SD=0.914). The learners may likely have difficulty demonstrating leadership skills and capabilities while fulfilling their mathematical tasks when they are experiencing difficulties with their peers and with the mathematics subject itself. Paulinians who are *collaborative, credible, responsive communicators & team players* generally demonstrate habits that promote the community's success and the skills needed to participate in the democratic process. He or she communicates and works well with others to resolve conflicts fairly (SPCEM, 2018).

Boston, et.al (2017) emphasized that learners are trained to develop or enhance interpersonal relationships, unity, and harmony through effective communications while doing their group tasks in collaborative tasks. These allow learners to practice and display decision-making capabilities in selecting or making their problem solutions beneficial for the team. Moreover, he also believes that implementing tasks that promote critical thinking for decision making, problem-solving, and conceptual understanding helps students see themselves as doers and sense makers of mathematics. Usually, learners are led to always come up with solutions to solve problems by either allowing them to craft their procedures or choosing the best solutions from various possibilities. Conversely, when the students are not properly knowledgeable of the problem solutions on the subject's procedural and contextual approaches, they are likely to have difficulties in solving the same.

Teaching and learning principles help educators achieve this outcome and competency. One is the Cooperative Learning principle, which puts a premium on active learning achievable by letting learners work with fellow students as they all engage in a shared task (DepEd, 2016).

The data finally reveals no significant difference between the teachers' and students' perceptions on the extent of the COL mathematics learning outcomes and competencies achieved by the students under study as to the individual indicators and the average (p=0.051). Thus, generally, the teachers and students perceived similarly as to the extent of the COL mathematics learning outcomes and competencies achieved by the students under study as they engaged in their mathematics classes.

Paulinians who are *collaborative, credible, responsive communicators & team players* generally demonstrate habits that promote the community's success and the skills needed to participate in the democratic process. They also show positive interpersonal relationships and sensibility to others' feelings, communicate, and work well with others to resolve conflicts fairly, and observe the rules, policies, and regulations at home, Church, school, and community. Furthermore, they develop and exercise the capacity for moral leadership that contributes to the welfare and the common good of the family, classroom, school, and community. They offer assistance and support whenever needed. As responsive communicators, they speak prudently not to hurt others and exert effort to promote unity and cooperation in the class, family, and community. Also, they take pride in his or her Filipino identity and heritage and show a deep sense of community in social commitment, and for being collaborative and community loving, Paulinian work for the promotion of life, human rights, unity, justice, peace, and care of the environment (SPCEM, 2018).

The Kto12 Mathematics education framework in the Philippines is supported by underlying learning principles and theories such as Cooperative Learning. This theory puts a premium on active learning achieved by working with fellow learners as they all engage in a shared task (DepEd, 2016). Discovery Learning and Inquiry-based Learning, according to Bruner (1961), support the idea that students learn when they make use of personal experiences to discover facts, relationships, and concepts. With all these strategies and approaches, the researchers believes that it is

inevitable that Paulinians will demonstrate the appropriate behaviors of collaborative, credible, responsive communicators and team players who exhibit the Community core value as they engage in their mathematics classes.

Table 5. The *CP* mathematics learning outcomes and competencies achieved by the students as perceived by the participants

Indicators	Teachers' Responses			Students' Responses			t-test
	M	SD	VI	M	SD	VI	*p-value*
1. express conscience as students fulfill their commitment to our Paulinian mission.	3.33	.516	To Very Much Extent	2.95	.746	To Some Extent	.212
2. express ethics as students fulfill their commitment to our Paulinian mission.	3.17	.753	To Some Extent	2.91	.739	To Some Extent	.413
3. demonstrate productivity.	3.33	.516	To Very Much Extent	2.91	.871	To Some Extent	.244
4. participate in activities and projects that promote Catholic formation, community service, and research.	3.33	.516	To Very Much Extent	2.95	.839	To Some Extent	.266
5. demonstrate optimism in accomplishing tasks amidst difficulties.	3.17	.753	To Some Extent	2.93	.767	To Some Extent	.454
6. show versatility in learning in order to attain greater outcomes.	3.33	.516	To Very Much Extent	2.97	.721	To Some Extent	.228
7. independently share the Paulinian Mission and the Good News to all for the greater Glory of God.	3.17	.408	To Some Extent	2.95	.803	To Some Extent	.52
8. willingly serve in every assigned task for the common good of everybody.	3.17	.408	To Some Extent	2.97	.787	To Some Extent	.538
9. demonstrate critical thinking in solving mathematical problems.	2.83	.408	To Some Extent	2.89	.741	To Some Extent	.842
10. demonstrate competence in understanding objectively complex situations.	3.00	.000	To Some Extent	2.91	.730	To Some Extent	.774
11. exhibit logical thinking in discerning solutions to mathematical problems.	3.00	.000	To Some Extent	2.99	.716	To Some Extent	.982
12. consider mistakes as opportunities for self-improvement and learning.	3.33	.516	To Very Much Extent	3.29	.788	To Very Much Extent	.898
Average	3.17	.408	To Some Extent	3.03	.657	To Some Extent	.623

**CP = Competent, Conscientious, Adept Performers & Achievers / Commission Core Value*

Rating Scale:	***Mean***	***Qualitative Description***	***Verbal Interpretation***
	3.26-4.00	*Always*	*To Very Much Extent*
	2.51-3.25	*Sometimes*	*To Some Extent*
	1.76-2.50	*Rarely*	*To Little Extent*
	1.00-1.75	*Never*	*No Extent At All*

Independent samples t-test significance: if p<0.05

Table 5 presents the CP mathematics learning outcomes and competencies achieved by the students as perceived by their mathematics teachers and the students themselves. For both participants, the students are *competent, conscientious, adept performers & achievers committed to one's mission in life to some extent* as they engaged in their mathematics classes (Teachers' average Mean=3.17; SD=0.408, Students' average Mean=3.03; SD=0.657).

As to the specific traits with highest or best results, the teachers believed that the mathematics students best *express conscience as students fulfill their commitment to our Paulinian mission to very much extent* (Mean=3.33; SD= 0.516), *demonstrate productivity to very much extent* (Mean=3.33; SD= 0.516), *participate in activities and projects that promote Catholic formation, community service, and research to very much extent* (Mean=3.33; SD= 0.516), *show versatility in learning to attain greater outcomes to very much extent* (Mean=3.33; SD= 0.516), and *consider mistakes as opportunities for self-improvement and learning to very much extent* (Mean=3.33; SD= 0.516). The result of students' responses also shows that they best *consider mistakes as opportunities for self-improvement and learning, to very much extent* (Mean=3.29; SD= 0.788) as they engaged in their mathematics classes.

A Paulinian who is a *conscientious, adept performer & achiever committed to one's mission in life* demonstrates initiatives to advance their skills and seek an expert's opinion and credible facts and evidence. He or she continues doing work despite difficult situations, and so he or she performs academic tasks the best way he or she can. An adept performing Paulinian stays focused on fully completing projects and tasks given. Being conscientious and committed to his or her mission, he or she proclaims Jesus Christ as the Good News to all and so gives his or her best in every assigned task for God's greater glory. As a competent, adept performer and achiever, he or she also accepts suggestions. He or she implements changes to improve one-self and takes mistakes as opportunities to change or improve himself or herself. Moreover, competent Paulinian works for excellence and initiates worthy projects to completion for the common good. He or she uses interpersonal and problem-solving skills to influence others. Being a conscientious achiever, he or she serves freely and generously without thought of reward or position. Finally, a conscientious, adept performer & achiever committed to one's mission in life participates in all activities and projects of the class, family, Church, or community, especially for the poor (SPCEM, 2018).

Additionally, the Kto12 Mathematics education framework in the Philippines is supported by underlying learning principles and theories such as the Constructivism approach. This approach emphasizes that knowledge is constructed when the learner can draw ideas from his/her own experiences and connect them to new ideas (Steffe & Gale, 2012).

Oppositely, the teachers believed that the students *demonstrate critical thinking in solving mathematical problems* only *to some extent* (Mean=2.83; SD=0.408). This data shows a similar outcome as to the students' perceptions (Mean=2.95, SD=0.803, *to some extent*). Considering these consistent results, it implies that for both teachers and students, the students under study can *demonstrate critical thinking in solving mathematical problems* only *to some extent* and the lowest among other indicators under the CP category, as they engaged to their mathematics classes.

Critical thinking, according to Scriven and Paul (1987), is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. Moreover, there is a significant and positive relationship between attitudes towards mathematics and mathematics achievement (Ai, 2002; Kishore & Ma, 1997; Singh, Graville, & Dika, 2002). Department of Education (2016) stresses providing contextual learning in mathematics where educators should insert context in teaching mathematics. The department defined context as a locale, situation, or set of Filipino learners' conditions that may influence their study and use of mathematics to develop critical thinking and problem-solving skills. Contexts refer to beliefs, environment, language, and culture that include traditions and practices and the learner's prior knowledge and experiences.

Finally, it was revealed that there was no significant difference between the teachers' and students' perceptions on the extent of the CP mathematics learning outcomes and competencies achieved by the students under study as to the individual indicators and the average (p=0.623). Thus generally, the teachers and students perceived similarly as to the extent of the CP mathematics learning outcomes and competencies achieved by the students under study as they engage in their mathematics classes.

Table 6. The overall mathematics learning outcomes and competencies achieved by the students as perceived by the participants

Learning Outcomes & Competencies	Teachers' Responses			Students' Responses			t-test
	M	SD	VI	M	SD	VI	*p-value*
CONS (Conscious, Mindful Self-Directed Learners & Role Models / Christ-centeredness Core Value)	3.33	(0.516)	To Very Much Extent	2.87	(0.636)	To Some Extent	0.083
COM (Compassionate, Committed Advocates for Peace and Universal Well-being / Charity Core Value)	3.17	(0.408)	To Some Extent	3.04	(0.672)	To Some Extent	0.647
CRE (Creative, Resourceful Explorer & Problem Solver / Charism Core Value)	3.00	(0.000)	To Some Extent	2.93	(0.618)	To Some Extent	0.794

COL (Collaborative, Credible, Responsive Communicators & Team Players / Community Core Value)	3.50	(0.548)	To Very Much Extent	3.01	(0.605)	To Some Extent	0.051
CP (Competent, Conscientious, Adept Performers & Achievers / Commission Core Value)	3.17	(0.408)	To Some Extent	3.03	(0.657)	To Some Extent	0.623
Average	3.23	(0.376)	To Some Extent	2.98	(0.638)	To Some Extent	0.440

Rating Scale:	***Mean***	***Qualitative Description***	***Verbal Interpretation***
	3.26-4.00	*Always*	*To Very Much Extent*
	2.51-3.25	*Sometimes*	*To Some Extent*
	1.76-2.50	*Rarely*	*To Little Extent*
	1.00-1.75	*Never*	*No Extent At All*

Independent samples t-test significance: if p<0.05

Table 6 shows the overall mathematics learning outcomes and competencies achieved by the students under study as perceived by their mathematics teachers and the students themselves. It can be inferred from the data shown that for teachers, the overall mathematics learning outcomes and competencies were achieved by the students under study *to some extent* given the average Mean=3.23 and average SD=0.376. For the students, they also believed that they had achieved the overall mathematics learning outcomes and competencies *to some extent*, given the average Mean=2.98 and average SD=0.638. The overall p-value is 0.440, implying that there is no significant difference between the teachers' and students' perceptions on the extent of mathematics learning outcomes and competencies achieved by the students.

Furthermore, *"Collaborative, Credible, Responsive Communicators & Team Players/Community Core Value,"* referred to as the COL category, obtained the highest Mean among other categories according to the teachers' responses with M=3.50, SD=0.548 and verbally interpreted *To Very Much Extent*. Meanwhile, *"Compassionate, Committed Advocates for Peace and Universal Well-being / Charity Core Value"* referred to as the COM category had the highest Mean among other categories or groups under the students' responses column with 3.04, SD=0.672 and verbally interpreted *To Some Extent*.

Looking closely to the lowest results, it can be inferred from Table 6 that for the teachers, the "*Creative, Resourceful Explorer & Problem Solver/Charism Core Value"* referred to as the CRE category obtained the lowest mean rating of 3.00, SD=0.000 and verbally interpreted *To Some Extent*. For the students, "*Conscious, Mindful Self-Directed Learners & Role Models / Christ-centeredness Core Value"* referred to as the CONS category had the lowest Mean as to the students' responses with 2.87, SD=0.636 and verbally interpreted *To Some Extent*. Although these traits show the lowest results for teachers and students, they still obtained an acceptable mean rating. These imply that the students could still achieve in these areas commendably.

Table 7. Rotated factor matrix of the mathematics learning outcomes and competencies achieved by the students under study

Indicators	Perceptions of the students			Factor considered for Regrouping				
	Mean	SD	VI	CCC	CoR	CCR	CAR	CRG
CONS (Conscious, Mindful Self-Directed Learners & Role Models / Christ-centeredness Core Value)								
1. exhibit religious faith sense as I fulfill and relate tasks to real-life situations.	2.86	.809	To Some Extent	0.167	0.093	0.121	0.966	0.117
2. exhibit religious morality as I fulfill and relate tasks to real life situations.	2.81	.781	To Some Extent	0.062	0.462	0.156	0.709	0.162
3. exhibit life discipleship.	2.86	.792	To Some Extent	0.203	0.410	0.304	0.425	0.023
4. exhibit honesty.	2.81	.718	To Some Extent	0.056	0.531	0.307	0.235	0.065
5. exhibit sense of truthfulness	2.95	.724	To Some Extent	0.089	0.540	0.206	0.233	0.111

6. exhibit reliability.	2.99	.693	To Some Extent	0.096	0.566	0.216	0.091	0.239
7. exhibit integrity in doing the learning activities and assessments.	3.02	.744	To Some Extent	0.181	0.523	0.304	0.199	0.140
8. value dignity in doing the learning activities and assessments.	3.07	.801	To Some Extent	0.229	0.433	0.285	0.287	0.149
9. show sensibility or mindfulness leading me to proactively respond to the challenges of the changing times.	2.95	.794	To Some Extent	0.400	0.484	0.222	0.216	0.224
10. demonstrate the traits of a role model as I accomplish our tasks.	2.70	.800	To Some Extent	0.295	0.501	0.227	0.211	0.157
11. demonstrate the traits of a self-directed person as I accomplish our tasks.	2.89	.753	To Some Extent	0.284	0.346	0.261	0.279	0.170
12. demonstrate the traits of an upright person as I accomplish our tasks.	2.93	.731	To Some Extent	0.220	0.430	0.360	0.107	0.244
13. exhibit good decision-making capabilities considering religious motivation and uprightness as the core of the human heart and mind.	2.84	.767	To Some Extent	0.309	0.485	0.157	0.208	0.194
14. easily find solutions when solving problems.	2.54	.885	To Some Extent	0.428	0.516	0.079	0.172	0.203
15. easily identify possible causes and consequences of certain actions when solving problems.	2.74	.812	To Some Extent	0.375	0.500	0.026	0.188	0.306
16. take risks in finding solutions to problems and answer such problems in given time duration.	2.80	.841	To Some Extent	0.489	0.478	0.096	0.043	0.129
COM (Compassionate, Committed Advocates for Peace and Universal Well-being / Charity Core Value)								
17. express compassion towards one another as I fulfill our tasks.	2.92	.779	To Some Extent	0.301	0.196	0.272	0.265	0.517
18. express empathy as I fulfill our tasks.	2.92	.770	To Some Extent	0.192	0.253	0.265	0.222	0.571
19. exhibit generosity as I fulfill our tasks.	3.03	.828	To Some Extent	0.131	0.188	0.348	0.123	0.900
20. take responsibility in thoughts and actions objectively.	2.95	.769	To Some Extent	0.227	0.374	0.274	0.172	0.334
21. respect one's uniqueness and giftedness	3.37	.763	To Very Much Extent	0.094	0.218	0.599	0.053	0.186
22. relate to all warmly and graciously without biases.	3.09	.819	To Some Extent	0.093	0.256	0.677	0.114	0.178
23. demonstrate kindness or sensitivity to the needs and feelings of others.	3.22	.774	To Some Extent	0.061	0.025	0.855	0.171	0.280
24. associate mathematical problems to certain scenarios that promote the Love of Christ.	3.02	.948	To Some Extent	0.180	0.180	0.435	0.495	0.160
25.willingly share my time, resources, and energy for the accomplishment of a particular task.	3.11	.735	To Some Extent	0.498	0.067	0.311	0.244	0.192
CRE (Creative, Resourceful Explorer & Problem Solver / Charism Core Value)								

26. creatively demonstrate resourcefulness upon fulfilling mathematical tasks.	2.84	.731	To Some Extent	0.443	0.483	0.013	0.115	0.203
27. exhibit giftedness as I translate mathematical knowledge into meaningful contexts.	2.70	.781	To Some Extent	0.482	0.615	-0.049	0.182	0.133
28. relate prior knowledge to the new concepts and openly accept it as I apply knowledge in real-life experiences.	2.91	.827	To Some Extent	0.460	0.442	0.018	0.298	0.176
29. find an alternative or substitute for a learning material/activity to visualize a concept.	2.99	.770	To Some Extent	0.656	0.254	0.099	0.120	0.039
30. accomplish tasks with competence and determination.	2.93	.784	To Some Extent	0.516	0.362	0.163	0.180	0.153
31. exhibit craftsmanship in fulfilling tasks by being skillful, practical, and innovative.	2.89	.818	To Some Extent	0.479	0.430	0.152	0.169	0.071
32. show proficiency in understanding mathematical problems	2.81	.778	To Some Extent	0.611	0.295	0.000	0.197	0.177
33. explore patterns in finding solutions to problems.	2.96	.832	To Some Extent	0.504	0.465	0.133	0.088	0.165
34. illustrate ideas and make decisions when solving problems.	2.95	.815	To Some Extent	0.505	0.395	0.048	0.156	0.303
35. acknowledge points for improvement when solving problems	3.01	.796	To Some Extent	0.538	0.266	0.001	0.052	0.301
36. use imagination to solve problems.	2.94	.881	To Some Extent	0.434	0.324	-0.016	-0.016	0.287
37. simplify complex tasks by breaking it down into orderly manageable parts.	2.86	.783	To Some Extent	0.576	0.412	0.185	0.093	0.049
38. can exhibit proficiency in solving real-world problems using appropriate learning tools or resources	2.81	.761	To Some Extent	0.528	0.280	0.261	0.188	0.089
39. create options in facing and solving problems.	2.88	.832	To Some Extent	0.536	0.220	0.329	0.122	0.111
40. evaluate relevant and creative options in facing and solving problems.	2.86	.783	To Some Extent	0.597	0.242	0.319	0.048	0.127
41. define issues, problems, and opportunities to generate possible solutions to a problem.	2.93	.758	To Some Extent	0.549	0.318	0.102	0.219	0.163
42. evaluate their solutions to problems whether such are best appropriate and applicable or not.	2.99	.774	To Some Extent	0.372	0.247	0.330	0.147	0.141
43. illustrate ideas and scenarios by translating mathematical knowledge from numerical statements into real-world contexts.	2.91	.819	To Some Extent	0.360	0.390	0.134	0.137	0.237
44. can construct new insights from their own experiences and realizations after solving mathematical problems.	2.93	.767	To Some Extent	0.398	0.362	0.227	0.233	0.170
COL (Collaborative, Credible, Responsive Communicators & Team Players / Community Core Value)									

45. show credibility as I fulfill our mathematical tasks.	2.94	.759	To Some Extent	0.524	0.173	0.209	0.153	0.131
46. show accountability as I fulfill our mathematical tasks.	2.95	.769	To Some Extent	0.548	0.189	0.186	0.125	0.131
47. demonstrate good interpersonal communications and teamwork during collaborative tasks.	3.00	.783	To Some Extent	0.356	0.120	0.433	0.042	0.310
48. demonstrate leadership skills as I fulfill our mathematical tasks.	2.67	.914	To Some Extent	0.445	0.346	0.194	0.189	0.180
49. recognize weaknesses, strengths, needs, and wants of fellow group members during learning activities.	3.08	.779	To Some Extent	0.437	0.071	0.235	0.018	0.193
50. demonstrate a sense of pride when a task is completed successfully.	2.95	.777	To Some Extent	0.693	-0.107	-0.060	0.078	0.275
51. observe conscientiously the guidelines needed in the accomplishment of tasks.	3.09	.706	To Some Extent	0.602	0.056	0.245	0.126	0.087
52. exert effort to promote unity and collaboration in doing group tasks.	3.17	.737	To Some Extent	0.275	0.032	0.429	0.051	0.317
53. act decisively as I choose the options when solving problems.	2.94	.741	To Some Extent	0.527	0.150	0.324	0.151	0.100
CP (Competent, Conscientious, Adept Performers & Achievers / Commission Core Value)								
54. express conscience as I fulfill our commitment to our Paulinian mission.	2.95	.746	To Some Extent	0.354	0.249	0.442	0.326	0.127
55. express ethics as I fulfill our commitment to our Paulinian mission.	2.91	.739	To Some Extent	0.383	0.015	0.339	0.288	0.175
56. demonstrate productivity.	2.91	.871	To Some Extent	0.512	0.319	0.207	0.110	0.085
57. participate in activities and projects that promote Catholic formation, community service, and research.	2.95	.839	To Some Extent	0.303	0.166	0.418	0.298	0.083
58. demonstrate optimism in accomplishing tasks amidst difficulties.	2.93	.767	To Some Extent	0.449	0.390	0.169	0.329	-0.032
59. show versatility in learning in order to attain greater outcomes.	2.97	.721	To Some Extent	0.413	0.364	0.301	0.248	0.136
60. independently share the Paulinian Mission and the Good News to all for the greater Glory of God.	2.95	.803	To Some Extent	0.260	0.147	0.475	0.262	0.047
61.willingly serve in every assigned task for the common good of everybody.	2.97	.787	To Some Extent	0.442	0.215	0.296	0.158	0.129
62. demonstrate critical thinking in solving mathematical problems.	2.89	.741	To Some Extent	0.630	0.228	0.207	0.160	0.017
63. demonstrate competence in understanding objectively complex situations.	2.91	.730	To Some Extent	0.503	0.256	0.081	0.157	0.105

64. exhibit logical thinking in discerning solutions to mathematical problems.	2.99	.716	To Some Extent	0.541	0.348	0.231	0.124	0.128
65. consider mistakes as opportunities for self-improvement and learning.	3.29	.788	To Very Much Extent	0.163	-0.016	0.433	0.182	0.180

Extraction Method: Generalized Least Squares
Rotation Method: Varimax with Kaiser Normalization.[a]
a. Rotation converged in 11 iterations.

Since the indicators of the mathematics learning outcomes and competencies were too many, factor analysis was conducted to reduce the indicators to a smaller set and explore the underlying theoretical structure of this phenomenon. Exploratory Factors Analysis was employed, enabling the researchers to regroup and factorize all the mathematics outcomes and competencies indicators to yield a generally significant element or characteristics based on the data outcomes from the responses of the participants implying that there exist newly characterized mathematics learning outcomes and competencies besides the existing or identified ones.

Hence, Table 7 shows the rotated factor matrix of the mathematics learning outcomes and competencies achieved by the students under study which regrouped the indicators revealing the characteristics of outcomes-based mathematics teaching in St. Paul University Surigao Junior High School. The indicators which have the greatest loadings in the factors suggest that those indicators were attributable to the factor. Looking closely at these data, all indicators show positive loadings, which means that the indicators are directly or positively correlated to their respective factors.

Table 8. Characterized Basic Education Mathematics Learning Outcomes and Competencies

Indicators	Origin Trait	New Characteristic or Classification
Factor 1		
16. take risks in finding solutions to problems and answer such problems in given time duration.	CONS	"*CCC*" *Creative, Competent, Collaborative Problem Solvers*
25.willingly share my time, resources, and energy for the accomplishment of a particular task.	COM	
28. relate prior knowledge to the new concepts and openly accept it as I apply knowledge in real-life experiences.	CRE	
29. find an alternative or substitute for a learning material/activity to visualize a concept.	CRE	
30. accomplish tasks with competence and determination.	CRE	
31. exhibit craftsmanship in fulfilling tasks by being skillful, practical, and innovative.	CRE	
32. show proficiency in understanding mathematical problems	CRE	
33. explore patterns in finding solutions to problems.	CRE	
34. illustrate ideas and make decisions when solving problems.	CRE	
35. acknowledge points for improvement when solving problems	CRE	
36. use imagination to solve problems.	CRE	
37. simplify complex tasks by breaking it down into orderly manageable parts.	CRE	
38. can exhibit proficiency in solving real-world problems using appropriate learning tools or resources	CRE	
39. create options in facing and solving problems.	CRE	
40. evaluate relevant and creative options in facing and solving problems.	CRE	
41. define issues, problems, and opportunities to generate possible solutions to a problem.	CRE	
42. evaluate their solutions to problems whether such are best appropriate and applicable or not.	CRE	
44. can construct new insights from their own experiences and realizations after solving mathematical problems.	CRE	
45. show credibility as I fulfill our mathematical tasks.	COL	
46. show accountability as I fulfill our mathematical tasks.	COL	

48. demonstrate leadership skills as I fulfill our mathematical tasks.	COL	
49. recognize weaknesses, strengths, needs, and wants of fellow group members during learning activities.	COL	
50. demonstrate a sense of pride when a task is completed successfully.	COL	
51. observe conscientiously the guidelines needed in the accomplishment of tasks.	COL	
53. act decisively as I choose the options when solving problems.	COL	
55. express ethics as I fulfill our commitment to our Paulinian mission.	CP	
56. demonstrate productivity.	CP	
58. demonstrate optimism in accomplishing tasks amidst difficulties.	CP	
59. show versatility in learning in order to attain greater outcomes.	CP	
61.willingly serve in every assigned task for the common good of everybody.	CP	
62. demonstrate critical thinking in solving mathematical problems.	CP	
63. demonstrate competence in understanding objectively complex situations.	CP	
64. exhibit logical thinking in discerning solutions to mathematical problems.	CP	
Factor 2		
4. exhibit honesty.	CONS	"*CoR*"
5. exhibit a sense of truthfulness	CONS	*Conscious, Mindful Self-directed Models, and Resourceful Explorers*
6. exhibit reliability.	CONS	
7. exhibit integrity in doing learning activities and assessments.	CONS	
8. value dignity in doing learning activities and assessments.	CONS	
9. show sensibility or mindfulness leading me to proactively respond to the challenges of the changing times.	CONS	
10. demonstrate the traits of a role model as I accomplish our tasks.	CONS	
11. demonstrate the traits of a self-directed person as I accomplish our tasks.	CONS	
12. demonstrate the traits of an upright person as I accomplish our tasks.	CONS	
13. exhibit good decision-making capabilities considering religious motivation and uprightness as the core of the human heart and mind.	CONS	
14. easily find solutions when solving problems.	CONS	
15. easily identify possible causes and consequences of certain actions when solving problems.	CONS	
20. take responsibility in thoughts and actions objectively.	COM	
26. creatively demonstrate resourcefulness upon fulfilling mathematical tasks.	CRE	
27. exhibit giftedness as I translate mathematical knowledge into meaningful contexts.	CRE	
43. illustrate ideas and scenarios by translating mathematical knowledge from numerical statements into real-world contexts.	CRE	
Factor 3		
21. respect one's uniqueness and giftedness	COM	"*CCR*"
22. relate to all warmly and graciously without biases.	COM	*Conscientious, Responsive Communicators for*
23. demonstrate kindness or sensitivity to the needs and feelings of others.	COM	

47. demonstrate good interpersonal communications and teamwork during collaborative tasks.	COL	*Peace and Universal Well-being*
52. exert effort to promote unity and collaboration in doing group tasks.	COL	
54. express conscience as I fulfill our commitment to our Paulinian mission.	CP	
57. participate in activities and projects that promote Catholic formation, community service, and research.	CP	
60. independently share the Paulinian Mission and the Good News to all for the greater Glory of God.	CP	
65. consider mistakes as opportunities for self-improvement and learning.	CP	
Factor 4		
1. exhibit religious faith sense as I fulfill and relate tasks to real-life situations.	CONS	"*CAR*" *Committed Advocates and Role Models*
2. exhibit religious morality as I fulfill and relate tasks to real-life situations.	CONS	
3. exhibit life discipleship.	CONS	
24. associate mathematical problems to certain scenarios that promote the Love of Christ.		
Factor 5		
17. express compassion towards one another as I fulfill our tasks.	COM	"*CRG*" *Compassionate, Responsive, and Generous Learners*
18. express empathy as I fulfill our tasks.	COM	
19. exhibit generosity as I fulfill our tasks.	COM	

Inferring from the factors analysis, most of the CRE, COL, and CP indicators that fall under Factor 1 can be said to be closely related to each other since the data indicates a strong association between these indicators and the factor 1 itself. Moreover, it also reveals that these indicators are strongly cohesive or related to each other since these three were grouped under factor 1 only. In contrast, Factor 2 independently contains most of the CONS indicators, and Factor 5 independently contains COM indicators. It can also be observed that Factors 3 and 4 reveal the mixture of indicators from multiple categories, which may imply lesser visibility of cohesiveness of indicators. Observing further the significant meaning of the data, the identified strongest indicators and heavier or higher factor loadings, which hereafter referred to as the characteristics of Paulinian outcomes-based mathematics teaching, are all generally confirming or validating the existing Basic Education Mathematics Learning outcomes and competencies. Nonetheless, as defined, exploratory factor analysis assumes that any indicator or variable may be associated with any factor. Hence, it can be said that all indicators coexist with and influence one another most possibly because of a single emanating major factor or element which impacts the existence and achievement of all the indicators – the characteristics of mathematics learning outcomes and competencies.

CONCLUSION

The end competency goals of the Department of Education for all learners under the Mathematics Curriculum upon exiting Grade 10 level – to yield citizens who are proficient in critical thinking and problem-solving through various surrounding efficient and higher-order strategies. The said twin competency goals of Mathematics in the basic education levels are Critical Thinking and Problem Solving. Also, the Five (5) Paulinian Core Values are the following: (1) CHRIST-CENTEREDNESS, the value where one devotes all endeavors, actions, and life learnings with Jesus Christ in the center of the heart; (2) CHARISM, the value in which a person is endowed with spiritual talents and giftedness by the Holy Spirit; (3) COMMUNITY, the value in which a person, through the Pauline spiritual teachings and discipleship, acknowledges and embodies the essence of having harmonious communal relationships with one another; (4) COMMISSION, the value in which one becomes an excellent, committed steward and advocate needing to fulfill the mission of the Church; and (5) CHARITY, the value in which one lives a life of care, kindness, generosity, and love for the others, especially those underprivileged.

Consequently, the SPCEM Basic Education Graduate Outcomes obtained and rooted in the Paulinian Core Values are as follows: (1) Mindful, Self-Directed LEARNERS and ROLE MODELS (Conscious; Christ-centeredness); (2) Courageous, Resourceful EXPLORERS and PROBLEM SOLVERS (Creative; Charism); (3) Credible, Responsive COMMUNICATORS and TEAM PLAYERS (Collaborative; Community); (4) Conscientious, Adept PERFORMERS and ACHIEVERS (Competent; Commission); and (5) Caring, Committed ADVOCATES for Peace and Universal Well-Being. (Compassionate; Charity)

There is a significant difference between the teachers' and students' perceptions on indicators 4. exhibit honesty (p=0.004) and 5. exhibit a sense of truthfulness (p=0.018) under CONS. However, looking into the rest of the indicators and overall results, there is no significant difference between the teachers' and students' perceptions on the extent of the CONS achieved by the students (p=0.083). Furthermore, there is no significant difference between the teachers' and students' perceptions on the extent of the COM, CRE, COL, and CP mathematics learning outcomes and competencies achieved by the students under study, as shown by the individual indicators and the average (p>0.05).

The characterized outcomes-based mathematics teaching in SPU Surigao Junior High School are the following: (1) "CCC" or Creative, Competent, and Collaborative Problem Solvers; (2) "CoR" or Conscious, Mindful Self-directed Models and Resourceful Explorers; (3) "CCR" or Conscientious, Responsive Communicators for Peace and Universal Well-being; (4) "CAR" or Committed Advocates and Role Models; and (5) "CRG" or Compassionate, Caring, Responsive, and Generous Learners.

The characterized mathematics learning outcomes and competencies validates or verifies the existing SPC Education Ministry Basic Education Level Outcome-based Education Framework, which likewise contains the Life Performance Outcomes of the K-12 Paulinian learners. Hence, the mark of Paulinian Education in St. Paul University Surigao Junior High School is its commitment and consistent implementation of Paulinian Spirituality and Holistic Excellence as emphasized and characterized by outcomes-based mathematics teaching.

As this study's essence and results may give the students a glimpse of how they are achieving in the mathematics subject in a holistic approach, the study may also enlighten them about the generalized picture of the extent of their achievements in mathematics relative to their intended learning outcomes and subject competencies. Consequently, it is suggested that the academic heads and teachers of St. Paul University Surigao Junior High School will revisit the present level of their teaching capabilities matched with their content knowledge and also review their existing teaching capabilities side by side with the learners' intended content competencies, learning outcomes, and the learners' essential life elements to attain whether such are effective, aligned, and efficient.

It is further recommended that St. Paul University Surigao Academic heads or administrators consider the significant findings of this study in planning and crafting faculty training and development programs across all subject areas in the Basic Education Level, focusing on the Outcomes-based Education Curriculum for Basic Education emphasizing marks of Paulinian Education in every subject area.

REFERENCES

1. Boston, M., Melissa, D., Drillon, F., Smith, M., & Miller, S., (2017). *Taking Action: Implementing Effective Mathematics Teaching Practices in Grades 9–12. Reston.* VA: National Council of Teachers of Mathematics.
2. Bruner, J. S. (1961). *The act of discovery*. Harvard Educational Review, 31, 21–32.
3. Cree, V., & Macaulay, C. (Ed.) (2000). *Transfer of Learning in Professional and Vocational Education.* Routledge.
4. Department of Education (2016). *The Conceptual Framework of Mathematics Education in the Philippines*. Department of Education of the Republic of the Philippines. Retrieved from http://depedbohol.org/v2/wp-content/uploads/2016/03/Math-CG_with-tagged-math-equipment.pdf
5. Demir A, Ozer B.U., Ferrari J.R (2009). *Exploring academic procrastination among Turkish students: possible gender differences in prevalence and reasons.* J Soc Psychol. 2009 Apr;149(2):241-57. doi: 10.3200/SOCP.149.2.241-257. PMID: 19425360.
6. Gu, F., & Gu, L. (2016). *Characterizing mathematics teaching research specialists' mentoring in the context of Chinese lesson study*. ZDM - Mathematics Education, 48(4), 441–454. https://doi.org/10.1007/s11858-016-0756-1
7. Hammouri, H. (2004). *Attitudinal and motivational variables related to mathematics achievement in Jordan: Findings from the Third International Mathematics and Science Study (TIMSS).* Educational Research. 46. 241-257. 10.1080/0013188042000277313.
8. Kishore, N., & Ma, X. (1997). *Assessing the relationship between attitude toward mathematics and achievement in mathematics: A meta-analysis.* Journal for Research in Mathematics Education, 28(1), 26-47.
9. Khair, T.M.A.M., & Khairani, (2012). *Level of students' achievement in mathematics at the end of elementary education in Yemen.* Englewood Cliffs, N.J: Prentice-Hall.
10. Mackintosh, N. J. (2011). *IQ and Human Intelligence (second ed.). Oxford: Oxford University Press.* ISBN 978-0-19-958559-5. LCCN 2010941708. Retrieved 15 June 2014.
11. Mastrangeli, J., (2019). *Beyond the Classroom: Mathematics in Service.* Journal of Humanistic Mathematics. Jul2019, Vol. 9 Issue 2, p212-225. 14p.
12. Pa, N.A.N. and R. Tapsir, (2013). *Analysis of instruments measuring values of mathematics education.* Procedia-Social and Behavioral Sciences, 90: 449-457.Available at: https://doi.org/10.1016/j.sbspro.2013.07.114.
13. Polya, G. (1945). *How to solve it; a new aspect of mathematical method.* Princeton University Press.
14. Scriven, M. and Paul, R. (1987) *Defining Critical Thinking.* 8th Annual International Conference on Critical Thinking and Education Reform.
15. http://www.criticalthinking.org/pages/defining-critical-thinking/766
16. Singh, K., Granville, M., & Dika, S. (2002). *Mathematics and science achievement: Effects Vol. 5 No. 1 (June 2018) Pupils' Attitudes towards Mathematics 24 of motivation, interest and academic engagement.* The Journal of Educational Research, 95(6), 323–332.

17. Sisters of Paul of Chartres Education Ministry, P.P. (2018). *"Mainstreaming interculturality in paulinian education: paulinian formation program".* Pasig City, Philippines.
18. Spady, W. (1994). *Choosing Outcomes of Significance*. Educational Leadership 51, 5: 18–23.
19. Steffe, L.P., Gale, J. (2012). *Constructivism in Education*. Book Reviews. Hillsdale, NJ: Lawrence Erlbaum.
20. Steinmeyer, P. (2020). *Supporting Advanced Learners: New Roles for Parent Advocates During Times of Remote Learning*. National Association for Gifted Children. Retrieved from: https://www.nagc.org/blog/supporting-advanced-learners-new-roles-parent-advocates-during-times-remote-learning.
21. Yu, R., & Singh, K., (2018). *Teacher support, instructional practices, student motivation, and mathematics achievement in high school.* Journal of Educational Research. 2018, Vol. 111 Issue 1, p81-94. 14p.