PIJAR: Jurnal Pendidikan dan Pengajaran
Vol.1, No 3 Agustus 2023, pp.371-382
E-ISSN: 2964-7460, DOI: 10.58540/pijar.v1i3.385

Dificulties In Mathematics I Of The Pmma College Of Marine Engineering Fourth Class Midshipmen

Jackson C. Talosig[1]

[1] Philippine Merchant Marine Academy, San Narciso, Zambales

ARTICLE INFO

Article history:

Received 2023-06-01
Revised 2023-07-16
Accepted 2023-08-30

ABSTRAK

Tujuan utama dari penelitian ini adalah untuk mengidentifikasi kesulitan yang dihadapi dalam Matematika 1 dari Midshipmen/Wanita Kelas Empat dari Sekolah Tinggi Teknik Akademi Kelautan Pedagang Filipina. Kesulitan yang dihadapi dalam mata pelajaran Matematika 1 meliputi ekspresi aljabar, pecahan aljabar, eksponen, dan akar, linier, persamaan, dan sistem persamaan linier. Selain itu, penelitian ini mengidentifikasi faktor-faktor yang mempengaruhi kesulitan responden terhadap topik. Responden terdiri dari 50 siswa yang terdaftar pada tahun pelajaran 2013-2014. Temuan penelitian ini ada hubungan yang signifikan antara kinerja responden siswa dalam ujian dan persepsi mereka tentang faktor-faktor yang menyebabkan kesulitan dalam Matematika.
Kata Kunci: Matematika, kesulitan, tes diagnostik, kinerja siswa, persepsi

ABSTRACT

The main objective of this study was to identify the difficulties encountered in Mathematics 1 of Fourth Grade Midshipmen/Females of the Philippine Marine Academy of Merchant College of Engineering. The difficulties encountered in Mathematics 1 include algebraic expressions, algebraic fractions, exponents and roots, linear, equations, and systems of linear equations. In addition, this study identified the factors that influence the respondents' difficulties with the topic. Respondents consisted of 50 students enrolled in the 2013-2014 academic year. The finding of this study is that there is a significant relationship between student respondents' performance in exams and their perceptions of the factors that lead to difficulties in Mathematics.

Keyword: Mathematics, difficulties, diagnostic test, students' performance, perception

Corresponding Author:
Jackson C. Talosig
Philippine Merchant Marine Academy, San Narciso, Zambales

1. INTRODUCTION

Teachers of Mathematics are now faced with the problem of students' low achievement in Mathematics. Despite the assertion of progressive outlook and number of innovations in teaching Mathematics, there are still incidences of low achievement and failures. Students encounter mathematical deficiencies in their learning process, and they find it difficult to understand mathematics (Tripolca, 2023).

Several learning difficulties, however, came from unfortunate learning experiences, lack of learning readiness, and innocent habits and attitudes. Many teachers in elementary and secondary levels fail to recognize the skills, knowledge, attitudes, and techniques necessary in teaching Mathematics. It is the task of the Mathematics teachers to guide the students towards optimum achievement (Guimpayan, 2018). They should face the challenge of being able to gather essential information about their students so that at any time, they can determine whether or not each student is progressing according to expectations. Unfortunately, teachers, in general, are ordinarily at a loss when it comes to the assessment of their students' progress in terms of factors that predict students' achievement and learning difficulties in Mathematics. Because of this, most teachers fail to provide their intellectual needs; they teach the content of the curriculum without knowing the level of achievement that should be expected from each students (Mathebekase, 2018).

In other words, students' poor achievement in mathematics usually generated mixed reactions among the people concerned that often end in blaming one another. Needless to say, teachers, students, principals, supervisors and even parents do play significant roles in establishing an educational setting which promotes optimum students' performance. However, teachers are the main targets of criticisms whenever the school system fails to meet the objectives of education (Capiz, 2019).

Teaching is something that takes place only when something is learned by the students. No matter what the teacher is doing in his class, if his students is not learning something significant, then he is not teaching. When students fail, the teacher fails more. For this reason, the teaching of Mathematics is considered to be a great challenge on then part of the teacher. Although, Mathematics can be mate interestingly and easy to learn if teachers handling it are efficient, competent, well-trained and interested, but still some students do not find learning as a rewarding experience, for they encounter a lot of difficulties in studying and will develop negative attitudes towards the subject (Casinillo & Aure, 2018).

Thus, it is the task of the teacher to understand the causes of the students' difficulties in Mathematics. The teacher must first determine the students' level of achievement. Knowing the achievement level of the students is fundamental to the remediation and its prevention (Wijaya, Retnawati, Setyaningrum, & Aoyama, 2019).

It is along this premise that the researcher, being a Mathematics teacher, felt the importance of conducting this study to identify the difficulties in Mathematics of the College of Marine Engineering Students of the Philippine Merchant marine Academy. Along with this, the

study will also gather possible remedies and alternatives that could be undertaken to appease the effects of the difficulties in Mathematics (Lin, 2019).

Research Objectives

The main objective of the study was to identify the difficulties encountered in Mathematics 1 of the Fourth-Class Midshipmen/Women of the College of Engineering of the Philippine Merchant Marine Academy. Difficulties encountered in Mathematics 1 topics include algebraic expressions, algebraic fractions, exponents, and radicals, linear, equations, and systems of linear equations (Schreiter, Vogel, Rehm, & Dörfler, 2021). Additionally, the study identified factors which affect the difficulties of the respondents towards the topics

Significance Of The Study

Realizing the need to improve the mathematical abilities of the learners, this study was conducted for the benefit of the following:

Mathematics Teacher/s. They would be completely aware of the difficulties of the students in Mathematics subject. This study would also help teachers in making adjustments and redirecting teaching strategies to effectively increase the students' achievement in mathematics. Students. They would be provided with different alternatives and remedies to possibly ease the difficulties encountered in Mathematics 1. These alternatives and remedies would help them to continuously grow and learn mathematics interestingly (Mazana, Montero, & Casmir, 2020).

PMMA Instruction/Academics. They would be provided with information and data on what hinders the students' intellectual growth and achievement in Mathematics 1. This study would also serve as the basis for diagnostic assessments of other subjects. The discovery and identification of difficulties of students in Mathematics 1, would eventually help other educators, learning institutions, future Mathematics teachers, parents, and the community in building and ensuring that society will sustain the supply of mathematically-equipped individuals who are ready and competent to face the challenges of globalization (García, Boom, Kroesbergen, Núñez, & Rodríguez, 2019).

In Education, diagnosis assumes different meanings and is frequently approached from different perspectives. Considerable variability exists with respect to the definition of diagnosis in education. From a clinical perspective, diagnosis may assume a medical definition in which assessment results are used to determine the likelihood of specific conditions (Al-Hroub & Whitebread, 2019). For example, in special education, a school psychologist or other licensed and qualified practitioner evaluates standardized educational and psychological assessments to classify a student as having a learning disability (Mayes, Frye, Breaux, & Calhoun, 2018).

Alternatively, diagnosis may assume an instructional definition in which assessment results provided information about students' mastery of relevant prior knowledge and skills within the domain as well as preconceptions or misconceptions about the material. Teachers use this information to adjust instruction by identifying which areas students have and have

not mastered. This results in varied instructional plans that are responsive to students' needs. (Fuchs, Hosp, and Hamlett)

Diagnosis is an integral part of instructional decision making. It provides valuable information about students' persistent misconceptions in the targeted domain serving as the bridge between identification of students who may be at-risk for failure and delivery of carefully designed supplemental interventions. In this paper, the researcher discussed diagnostic assessment in mathematics as an emerging solution for providing detailed and precise information about students' thinking that is needed to provide appropriate educational opportunities for students who are struggling in Mathematics (Wongwatkit, Panjaburee, Srisawasdi, & Seprum, 2020).

The following approach as shown below was used in the study. The study used diagnostic assessment embedded in an I-P-O (Input-Process-Output) approach. The first box (input) shows the dependent variables of the study. These include the students-respondent's performance in the annual entrance examination of PMMA, the level of interest in Mathematics subjects, the level of motivation in Mathematics subject, the difficulties of the students-respondents in Mathematics 1, the study-respondents perception on the factors which affects the difficulties in Mathematics 1 and the possible remedies and alternatives to appease the difficulties encountered by the student-respondents in Mathematics (Rakoczy et al., 2019).

The primary goal of this study was to identify the difficulties encountered by the Fourth-Class Midshipmen/women in Mathematics I of the College of Marine Engineering at the Philippine Merchant Marine Academy with the aid of diagnostic assessment. Specifically, this study sought to answer the following questions:

1. What is the profile of the students-respondents in terms of:
    1. Performance in annual entrance examination in Mathematics;
    2. Level of interest in Mathematics subject; and
    3. Level of motivation in Mathematics subject?
2. What is the performance of the student-respondents in the diagnostics test?
3. What is the performance of the students-respondents in the following areas:
    1. Algebraic Expressions;
    2. Algebraic Fractions;
    3. Exponents and Radicals;
    4. Linear Equations;
    5. Quadratic Equations; and
    6. System of Equations.
4. How do the student-respondents perceive the factors of difficulties in Mathematics I in terms of:
    1. Student-related factor;
    2. Teacher-related factor; and
    3. Other related factor?

5. How can the identified difficulties be remedied through measures based from the other factors?
6. Is there a significant relationship between the:
   1. Performance in the diagnostic test and performances in annual entrance examination of the student-respondents;
   2. 6Performance in the diagnostic test and student-respondents' level of interest in Mathematics;
   3. Performance in the diagnostic test and student-respondents' level of motivation in Mathematics
   4. Performance in the diagnostic test and student-respondents' perception on the factors which affect the difficulties in mathematics 1?.

2. METHOD

Taking into account about the objectives and problems to resolve, the researcher used the descriptive method of research. This method was employed in order to describe the nature of the situation as it exists at the time of the study and to explore the cause of a particular phenomenon. A descriptive study is method which information is collected without changing the environment (i.e., nothing is manipulated). Sometimes these are referred to as "correlational" or "observational" studies. The Office of Human Research Protections (OHRP, 2014) defines a descriptive study as "any study is not truly experimental". In human research, a descriptive study can provide information about the naturally accruing health status, behavior, attitudes or other characteristics of a particular group. Descriptive studies are also conducted to demonstrate associations or relationship between things in the world.

Aside from identifying the difficulties encountered in mathematics I of the Fourth Class Midshipmen/Women of the College of Marine Engineering at PMMA, the descriptive approach was utilized to determine factors which affects these difficulties. At the same time, it acknowledged possible measures and remedies which the students believed that can lessen the difficulties (Devine, Hill, Carey, & Szűcs, 2018).

The instrument was in a form of a Summative test. Mathematics books were used as references to formulate the items. The first part determine the profile background of the of the respondents, while the second part covers the questions on the following areas: Algebraic Expressions; Algebraic Fractions; Exponents and Radicals; Linear Equations; Quadratic Equations; and System of Equations. The questions were designed to identify the difficulties encountered in Mathematics I of the Fourth Class Midshipmen/Women of the College of Marine Engineering at the Philippine Merchant Marine Academy (Pinger, Rakoczy, Besser, & Klieme, 2018).

Instrumentation

To draw pertinent data and information needed for the study, the researcher utilized the following data gathering instruments and methods:

a. Diagnostic Test. A diagnostic test was constructed by the researcher for the purpose of the study since there is no locally-made test yet intended to determine the respondents' difficulties in Mathematics 1.
b. Survey Questionnaire. A questionnaire checklist was constructed to gather information and data on the factors that affect the difficulties of students in Mathematics 1. The survey questionnaire was designed for the students to identify the extent of effects of each factor.
c. Unstructured Interviews. Prior to the conduct of the study, the researcher employed unstructured interview in the construction of the diagnostic examination and survey questionnaire. This unstructured interview helped the researcher to come up with an instrument that will measure other information and gather supplemental data which the diagnostic examination cannot provide.
d. Observation. The observation method was utilized throughout the study. Other issues and concerns were answered through the use of this method.

Validation Of The Instrument

After correcting the revision of draft instrument based on the suggestions given by the Department of Research and Development, a dry run was given to a group of Fourth Class Midshipmen/Women of the College of Marine Transportation for validation purposes. The students employed in the validation of instrument were not a part the actual respondents who were the subjects of the study.

The survey instrument which covered the factors that affect the difficulties of the students in Mathematics were classified as teacher-related, student-related, and other related factors. It was validated through unstructured interviews conducted with other Mathematics teachers and students who were currently involved in the Academy within the duration of the study. The assumptions were collectively tabulated and grouped to come up with the factors. "Teacher-related factors" were gathered from the teachers, "student-related factors" were gathered from the students who were randomly interviewed prior to the study; and "other-related factors" were created through brainstorming conducted by the researcher and his colleagues.

Data Gathering Procedure

After the validation of instrument and reproduction of copies, a permission to administer the diagnostic test was secured from the office of the College Dean. Upon approval, the researcher administered the test to the respondents with the help of Mathematics Instructors. Each respondents was given mimeographed test and another sheet of paper was given for the answer sheet. The administration of the test was conducted very smoothly, and the respondents finished the test at exactly one hour

After the diagnostic test, the survey questionnaire was administered to the same respondents. The researcher explained the need to gather trustworthy and reliable data and

information and asked the respondents to cooperatively do so. The survey questionnaire was accomplished within 15 minutes.

The diagnostic test was carefully checked by the researcher, taking note the weaknesses and strengths of the respondents in the diagnostic test. Scores were tabulated, classified according to topics and analyzed. The survey questionnaires were tallied through the assistance of other students. Results were summarized and arrange for future use.

3. RESULT AND DISCUSSION

Summary Of The Findings

The mean score of the student-respondents' performance in the annual entrance examination is 18.74. The median and modal score is 28. The distribution scores is (sk=0.61) and score were spread around the mean (kurt=1.23)

Level of Interest in Mathematics Subject

Nine (9) or 18 percent of the student-respondents were very interested in Mathematics, twenty (20) or 40 percent were usually not interested and twenty-one (21) or 42 percent were interested.

Level of Motivation in Mathematics

Fifteen (15) or 30 percent of the student-respondents were very motivated in Mathematics, twenty-six (26) or 52 percent were motivated and nine (9) or 18 percent were usually not motivated.

Performance of the Students in the Diagnostic Test

The mean score of the student-respondents' performance in annual entrance examination is 26.96. The median and modal score is 28. The distribution of the scores was negative (sk=-0.30) and scores were flatter than normal (kurt = -0.66) Based from the performance of the student-respondents in the diagnostic examination, the research also evidently showed the following: Algebraic Expressions, Algebraic Fractions and Linear Equations were easy for the student-respondents. Exponents and Radicals, Quadratic Equations, and Systems of Linear Equations were moderately difficult for the student-respondents. Overall, the topics in Mathematics I, as presented by the test items and test scores of the students in the diagnostic test, are moderately difficult (Loibl, Leuders, & Dörfler, 2020).

Performance of the Students in the Diagnostic Test According to Area/Topic

Algebraic Expressions

Of the 9 items under algebraic expressions, the average correct answer is 35 or 70 percent of the student-respondents got the correct answer. Overall, algebraic expressions were interpreted as easy.

Algebraic Fractions

Of the 8 items under algebraic fractions, the average correct answer is 39 or 70 percent of the students got the correct answer. Based from the data, the algebraic fractions was easy for the students (Hasumi & Chiu, 2022).

Exponents and Radicals

The table shows that average of correct answer is 27 or 54 percent of the students got the correct answer in exponents and radicals which is interpreted as moderately difficult.

Linear Equations

It has been observed that the computed average of the correct answer of the 8 item-test in linear equations is 31 or 62 percent of the students got the correct answer and it was found to be easy (Rahman, Rosli, Rambely, & Halim, 2021).

Quadratic Equations

In the 8-item test on quadratic equations, the computed average score is 21, that is 42 percent of the student-respondents got the correct answer and were found to be moderately difficult for the student-respondents (Zhong & Xia, 2020).

Systems of Linear Equations

There were 8 problems under this area, and the computed average score is 24 or 48 percent of the student-respondents got the correct answer and considered to be moderately difficult (Delgado-Rebolledo & Zakaryan, 2020).

Perception of the Students on the Factors of the Difficulties in Mathematics I

Student-related Factor

The student-respondents agreed (with a weighted mean of 2.40) that student-related factors affect the difficulties in Mathematics I.

Teacher-related Factors

The student-respondents agreed (with a weighted mean of 2.43) that teacher-related factors affect the difficulties in Mathematics I.

Other Related Factor

The student-respondents agreed (with a weighted mean of 2.20) that other-related factors affect the difficulties in Mathematics I.

Measures and Remedies to Solve the Difficulties of the Students in Mathematics I

The following are the different measures and remedies to be considered based on the findings of the diagnostic test and survey questionnaire on the identified factors which affect the difficulties of the students in learning Mathematics I (Alam, 2020).

1. Students should be given more exercises on quadratic equations especially in factoring and completing the square.
2. Students should be trained very well in solving systems of equations using the elimination method.
3. Teachers should give more exercises on simplifying radicals and the derivation of formulas in preparation for higher Mathematics subjects.
4. Mathematical problems should be given from the simplest to the most complicated areas.
5. Good study habits should be developed among the students.
6. Teachers should work hard to eliminate the negative notion of the students towards the subject.

7. Mathematics teachers should keep themselves abreast with the innovations in teaching Mathematics.
8. A good working relationship should exist between the teachers and the students.
9. Mathematics teachers should sustain the interest and attention of their students.
10. Each student should set his mind towards learning the subject.

Significant Relationship of the Variables of the Study

Significant Relationship Between the Performance of the Student-Respondents in Diagnostic Test and Performance in Annual Entrance Examination The null hypothesis which states that there is no significant relationship between the performance in diagnostic examination and performance in the annual entrance examination of the student-respondents was rejected (Cevikbas & Kaiser, 2020).

Significant Relationship Between the Performance of the Student-Respondents in Diagnostic Test and their Level of Interest in Mathematics

The null hypothesis which states that there is no significant relationship between the performance in diagnostic examination and the level of interest of the student-respondents was rejected.

Significant Relationship Between the Performance of the Student-Respondents in Diagnostic Test and their Level of Motivation in Mathematics

The null hypothesis which states that there is no significant relationship between the performance in diagnostic examination and the level of motivation of the student-respondents was rejected.

Significant Relationship Between the Diagnostic Test and Student-respondents' Perception on the Factors which Affects the Difficulties in Mathematics I

There was a significant relationship between the student-respondents' performance in the diagnostic examination and the student-respondents' perception on the factors which affect the difficulties in Mathematics I. The significant relationship is indicated by the computed F-value (599.71) which is greater than the critical F-value (3.94) level of significance (Comarú, Lopes, Braga, Batista Mota, & Galvão, 2021).

4. Conclusion

The mean, median and mode of the performance of the student-respondents in annual entrance examination manifested a normal distribution of scores and the scores were concentrated around the means. The distribution is positively skewed. The student-respondents' level of interest in Mathematics was interested to usually not interested. The student-respondents' level of motivation in Mathematics was motivated to very motivated. The mean score of student-respondents' performance in annual entrance examination is lower than the median and the mode. The distribution was negatively skewed. Among the topics/areas, the algebraic expressions, algebraic fractions, and linear equations were easy for the students. Exponents and radicals, quadratic equations, and systems of linear equations were moderately difficult for the student-respondents. Overall, the topics in Mathematics I were moderately difficult for the student-respondents. Student-respondents agreed that

teacher-related, student-related, and other related factors affected their difficulties in Mathematics I. The student-respondents believed that to solve the difficulties in Mathematics I, students should be given more exercises on quadratic equations; develop good study habits; and set their minds towards learning Mathematics. Teacher should provide more exercises in radicals and derivation of formulas; should give simple to complex problems; should sustain the interest and attention of students in learning Mathematics.; should eliminate the students' negative notion towards then subject; keep themselves abreast with the innovations in teaching Mathematics and establish a good relationship among students. There is no significant relationship between the performance in diagnostic examination and performance in the annual entrance examination of the students. There is no significant relationship between the performance in diagnostic examination and level of interest of the students. There is no significant relationship between the student-respondents' students' performance in the diagnostic examination and their perception on the factors which affect the difficulties in Mathematics I.

Recommendations

1. The academic department should provide trainings and seminars in teaching methodologies among Mathematics teachers.
2. The constant evaluation of the teaching-learning process should be implemented in order to instantly determine the problems and difficulties encountered by the students.
3. The use of textbooks in mathematics subject is encouraged to facilitate effective learning.
4. Factors which aggravate the difficulties of students in Mathematics should be deliberately discussed and acted upon.
5. Mathematics teachers should give remedial teaching to individual students who lack the skill in analyzing word problems.
6. Measures and remedies to solve the difficulties of students in Mathematics I as perceived by the students should be given attention

REFERENCES

Al-Hroub, A., & Whitebread, D. (2019). Dynamic Assessment For Identification Of Twice-Exceptional Learners Exhibiting Mathematical Giftedness And Specific Learning Disabilities. *Roeper Review*, *41*(2), 129–142. Https://Doi.Org/10.1080/02783193.2019.1585396

Alam, A. (2020). Pedagogy Of Calculus In India: An Empirical Investigation. *Alam, A.(2020). Pedagogy Of Calculus In India: An Emperical Investigation. Periódico Tchê Química*, *17*(34), 164–180.

Capiz, F. D. R. C. (2019). State University Productivity: Input To Performance Enhancementstrategies. *Global Researchers*, 79.

Casinillo, L., & Aure, M. R. K. (2018). Econometric Evidence On Academic Performance In Basic Calculus Of Science, Technology, Engineering And Mathematics (Stem) Senior High Students. *Journal Of Educational And Human Resource Development (Jehrd)*, *6*, 238–249.

Cevikbas, M., & Kaiser, G. (2020). Flipped Classroom As A Reform-Oriented Approach To Teaching Mathematics. *Zdm*, *52*(7), 1291–1305. Https://Doi.Org/10.1007/S11858-020-01191-5

Comarú, M. W., Lopes, R. M., Braga, L. A. M., Batista Mota, F., & Galvão, C. (2021). A Bibliometric And Descriptive Analysis Of Inclusive Education In Science Education. *Studies In Science Education*, *57*(2), 241–263. Https://Doi.Org/10.1080/03057267.2021.1897930

Delgado-Rebolledo, R., & Zakaryan, D. (2020). Relationships Between The Knowledge Of Practices In Mathematics And The Pedagogical Content Knowledge Of A Mathematics Lecturer. *International Journal Of Science And Mathematics Education*, *18*(3), 567–587. Https://Doi.Org/10.1007/S10763-019-09977-0

Devine, A., Hill, F., Carey, E., & Szűcs, D. (2018). Cognitive And Emotional Math Problems Largely Dissociate: Prevalence Of Developmental Dyscalculia And Mathematics Anxiety. *Journal Of Educational Psychology*, *110*(3), 431–444. Https://Doi.Org/10.1037/Edu0000222

García, T., Boom, J., Kroesbergen, E. H., Núñez, J. C., & Rodríguez, C. (2019). Planning, Execution, And Revision In Mathematics Problem Solving: Does The Order Of The Phases Matter? *Studies In Educational Evaluation*, *61*, 83–93. Https://Doi.Org/10.1016/J.Stueduc.2019.03.001

Guimpayan, N. (2018). *Modelling Hybrid Renewable Energy System For Philippine Merchant Marine Academy: A Feasibility Study*.

Hasumi, T., & Chiu, M.-S. (2022). Online Mathematics Education As Bio-Eco-Techno Process: Bibliometric Analysis Using Co-Authorship And Bibliographic Coupling. *Scientometrics*, *127*(8), 4631–4654. Https://Doi.Org/10.1007/S11192-022-04441-3

Lin, Y.-T. (2019). Impacts Of A Flipped Classroom With A Smart Learning Diagnosis System On Students' Learning Performance, Perception, And Problem Solving Ability In A Software Engineering Course. *Computers In Human Behavior*, *95*, 187–196. Retrieved From Https://Doi.Org/10.1016/J.Chb.2018.11.036

Loibl, K., Leuders, T., & Dörfler, T. (2020). A Framework For Explaining Teachers' Diagnostic Judgements By Cognitive Modeling (Diacom). *Teaching And Teacher Education*, *91*, 103059. Https://Doi.Org/10.1016/J.Tate.2020.103059

Mathebekase, L. M. (2018). *Critical Analysis Of The Attraction And Retention Of Seafarers: A Case Study Of South Africa*.

Mayes, S. D., Frye, S. S., Breaux, R. P., & Calhoun, S. L. (2018). Diagnostic, Demographic, And Neurocognitive Correlates Of Dysgraphia In Students With Adhd, Autism, Learning Disabilities, And Neurotypical Development. *Journal Of Developmental And Physical Disabilities*, *30*(4), 489–507. Https://Doi.Org/10.1007/S10882-018-9598-9

Mazana, M. Y., Montero, C. S., & Casmir, R. O. (2020). Assessing Students' Performance In Mathematics In Tanzania: The Teacher's Perspective. *International Electronic Journal Of Mathematics Education*, *15*(3), Em0589. Https://Doi.Org/10.29333/Iejme/7994

Pinger, P., Rakoczy, K., Besser, M., & Klieme, E. (2018). Implementation Of Formative

Assessment – Effects Of Quality Of Programme Delivery On Students' Mathematics Achievement And Interest. *Assessment In Education: Principles, Policy & Practice*, *25*(2), 160–182. Https://Doi.Org/10.1080/0969594x.2016.1170665

Rahman, N. A., Rosli, R., Rambely, A. S., & Halim, L. (2021). Mathematics Teachers' Practices Of Stem Education: A Systematic Literature Review. *European Journal Of Educational Research*, *10*(3), 1541–1559. Retrieved From Https://Www.Eu-Jer.Com/

Rakoczy, K., Pinger, P., Hochweber, J., Klieme, E., Schütze, B., & Besser, M. (2019). Formative Assessment In Mathematics: Mediated By Feedback's Perceived Usefulness And Students' Self-Efficacy. *Learning And Instruction*, *60*, 154–165. Https://Doi.Org/10.1016/J.Learninstruc.2018.01.004

Schreiter, S., Vogel, M., Rehm, M., & Dörfler, T. (2021). Teachers' Diagnostic Judgment Regarding The Difficulty Of Fraction Tasks: A Reconstruction Of Perceived And Processed Task Characteristics. *Research In Subject-Matter Teaching And Learning (Ristal)*, *4*(1), 127–145.

Tripolca, C. O. (2023). Student Readiness On The Blended Learning Modalities Of The Philippine Merchant Marine Academy: An Assessment. *International Journal Of Multidisciplinary: Applied Business And Education Research*, *4*(7), 2223–2242. Https://Doi.Org/10.11594/Ijmaber.04.07.07

Wijaya, A., Retnawati, H., Setyaningrum, W., & Aoyama, K. (2019). Diagnosing Students' Learning Difficulties In The Eyes Of Indonesian Mathematics Teachers. *Journal On Mathematics Education*, *10*(3), 357–364. Retrieved From Http://Ejournal.Unsri.Ac.Id/Index.Php/Jme/Issue/View/408

Wongwatkit, C., Panjaburee, P., Srisawasdi, N., & Seprum, P. (2020). Moderating Effects Of Gender Differences On The Relationships Between Perceived Learning Support, Intention To Use, And Learning Performance In A Personalized E-Learning. *Journal Of Computers In Education*, *7*(2), 229–255. Https://Doi.Org/10.1007/S40692-020-00154-9

Zhong, B., & Xia, L. (2020). A Systematic Review On Exploring The Potential Of Educational Robotics In Mathematics Education. *International Journal Of Science And Mathematics Education*, *18*(1), 79–101. Https://Doi.Org/10.1007/S10763-018-09939-Y