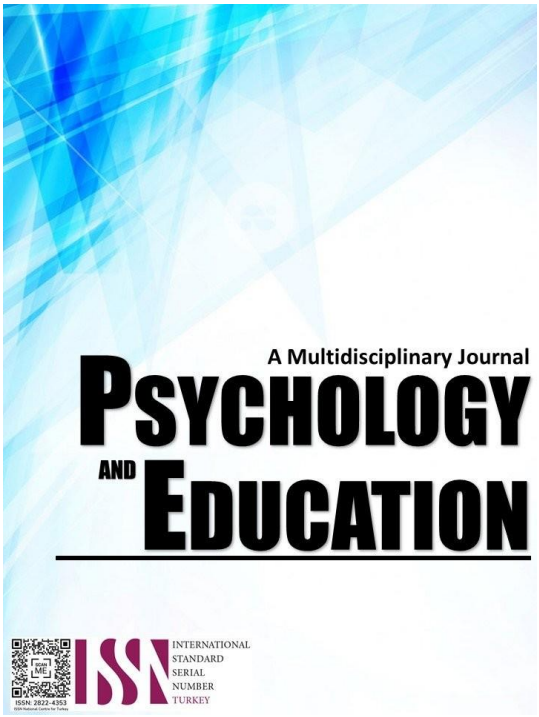
# THE INFLUENCE OF STUDENTS' PERCEPTION AND PRODUCTIVE DISPOSITION WITH MATHEMATICS ON GOAL ORIENTATION AMONG MATH MAJOR STUDENTS IN TEACHER EDUCATION PROGRAM




**PSYCHOLOGY AND EDUCATION: A MULTIDISCIPLINARY JOURNAL**

Volume: 28
Issue 10
Pages: 1068-1093
Document ID: 2024PEMJ2729
DOI: 10.5281/zenodo.14501163
Manuscript Accepted: 11-22-2024

*Psych Educ*, 2024, **28**(10): 1068-1093, Document ID:2024PEMJ2729, doi:10.5281/zenodo.14501163, ISSN 2822-4353



Research Article

# The Influence of Students' Perception and Productive Disposition with Mathematics on Goal Orientation among Math Major Students in Teacher Education Program

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## Abstract

The purpose of the study was to determine the influence of students' perception and productive disposition with mathematics on goal orientation among math major students in teacher education program. The study is quantitative research that utilizes descriptive-correlational approach. A sample of 150 randomly selected mathematics major students from first year to fourth year under teacher education program was identified using stratified random sampling who answered the surveys on the three variables. Results showed that the level of students' perception, productive disposition, and goal orientation were all high in level. Results also revealed that there was a positive and significant relationship between students' perception and goal orientation. Likewise, there was also a positive and significant relationship between productive disposition and goal orientation of the students. Moreover, results showed that domains of students' perception such as competence, effort, teacher quality, family encouragement, enjoyment of mathematics, difficulty of mathematics, and confidence can significantly influence goal orientation. Additionally, results revealed that domains of productive disposition such as affect, beliefs, identity, mathematical integrity, risk taking, goals, motivation, and self-efficacy can significantly predict goal orientation of the respondents. Results implied that the goal orientation has a positive and significant relationship between students' perception and productive disposition, it is recommended that the future researcher investigate other variables that could also have a positive and significant relationship between students' perception and productive disposition throughout the learning of mathematics.

**Keywords:** *students' perception, productive disposition, goal orientation, mathematics, Philippines*

## Introduction

Goal orientation is a sequence of processes that include task reflection, realistic goal-setting, maintaining positive self-motivation, personality integration, and autonomy throughout the goal-attainment process. The goal orientation is important in determining academic achievement at the undergraduate level, which in turn influences future academic and career ambitions. The majority of students at the undergraduate level, lack focus towards planning their future, lack determination in work towards achieving the goal, lack initiative to educate themselves and become aware of goal setting or goal orientation (Venkatesan & Shankar, 2022).

In Germany, goal setting or goal orientation stimulates risk-taking and unethical conduct. More probable negative impacts of goal orientation have been observed, such as goals focusing attention on goal-related tasks, causing other critical concerns to be overlooked. Only 10% of individuals are able to attain the high and specific goal, while the remaining 90% will fail the to do so. Additionally, an overemphasis on achieving goals may encourage people to overlook ethical difficulties and prioritize outcomes over ethical behavior. This emphasis on rigid goal-setting might foster a win-at-all-costs mentality, jeopardizing collaboration and long-term partnerships (Höpfner & Keith, 2021).

In the Philippines, specifically at Visayas State University in mathematics teaching and learning, the prevalence of poor goal orientation in classroom settings can greatly contribute to students' academic challenges and failures. Students who lack clear goals or goal-setting procedures are more likely to get disengaged and have a bad attitude about math. This negative perspective can compound the situation by instilling in kids the perception that they are intrinsically incapable of excelling in mathematics, repeating the cycle of failure. As a result, addressing poor goal orientation emerges as a critical problem for enhancing mathematics education and lowering the rising failure rates reported in college-level math courses (Casinillo, 2019).

Given that the goal orientation of students is a significant problem that must be addressed, research is necessary. This study aims to offer solutions to improve students' perceptions, productive dispositions, and goal orientation, particularly among math majors, in order to improve their academic performance, attitudes, and overall pursuit of education. Understanding goal orientation is critical for enhancing academic success, persistence, and retention rates among students. This issue is currently pervading our community and requires immediate attention. Furthermore, these findings are expected to lay a foundation for future initiatives focusing on students' perceptions and productive dispositions in mathematics, particularly among those enrolled in the Bachelor of Secondary Education Major in Mathematics program at Kapalong College of Agriculture, Sciences, and Technology. Such findings may encourage additional research in this field, resulting in a better knowledge of the topic's societal implications.

Many researchers have conducted studies on students' perception and productive disposition with mathematics and even the goal orientation of students in mathematics such as the study of Mariamah et al. (2021) entitled "Analysis of Students' Perceptions of Mathematics Subjects: Case Studies in Elementary Schools"; Awofala et al. (2020) entitled "Mathematics Productive Disposition as a Correlate of Senior Secondary School Students Achievement in Mathematics in Nigeria"; Venkatesan and Shankar (2022) entitled

"Goal Orientation as Determinant of Academic Performance of Under – Graduate Students"; and Federici et al. (2015) entitled "Students' Perceptions of Goal Structure in Mathematics Classrooms: Relations with Goal Orientations, Mathematics Anxiety, and Help – Seeking Behavior", but neither of these studies focused on the relationship between students' perception, productive disposition, and goal orientation. As a result, the researcher sees the need to conduct a study that determines the relationship between students' perception, productive disposition, and goal orientation.

This research aims to disseminate the findings on how students' perceptions and productive disposition towards mathematics influence goal orientation among math major students in teacher education program. The results will be shared through a combination of hardbound copies distributed strategically within our academic community and through formal presentations. In coordination with the research office, we will arrange a presentation event to share the study's insights, followed by the distribution of hardbound copies to faculty and staff, fostering direct engagement and meaningful discussions. Additionally, we will ensure that these copies are prominently available in the library, making the research easily accessible to students and researchers. Efforts will also be made to present and publish the study through academic channels, broadening its reach and impact beyond the institution.

**Research Objectives**

The purpose of this study was to determine the significant relationship between students' perceptions and productive disposition on goal orientation among BSEd major in Mathematics students in Kapalong College of Agriculture, Science and Technology. To be specific, this study sought to answer the following objectives:

1. To determine the level of students' perception of math major students in terms of:
    1.1. competence;
    1.2. effort;
    1.3. teacher quality;
    1.4. family encouragement;
    1.5. enjoyment of mathematics;
    1.6. difficulty of mathematics; and
    1.7. confidence.
2. To determine the level of productive disposition of math major students in terms of:
    2.1. affect;
    2.2. beliefs;
    2.3. identity;
    2.4. mathematical integrity;
    2.5. risk taking;
    2.6. goals;
    2.7. motivation; and
    2.8. self – efficacy.
3. To determine the level of goal orientation of math major students in terms of:
    3.1. task orientation;
    3.2. error frustration;
    3.3. self – enhancing ego orientation; and
    3.4. self – defeating ego orientation.
4. To determine the significant relationship between:
    4.1. students' perception and goal orientation; and
    4.2. productive disposition and goal orientation.
5. To determine which domain/s of students' perception and productive disposition that significantly predicts goal orientation.

## Methodology

**Research Design**

This study utilized a quantitative methodology that emphasize objective measurements and the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques. The primary objective of quantitative research is to provide comprehensive understanding of the factors that influence goal orientation and to determine how students' perception and productive disposition with mathematics may affect it. This approach enabled researcher to focus on gathering numerical data and generalizing it across groups of people or to explain a particular phenomenon (Mujis, 2010).

In context, a quantitative approach was employed, emphasizing the use of objective measurements and statistical analysis to examine factors influencing goal orientation. Data collection involved polls, questionnaires, surveys, and computational techniques applied to pre-existing statistical data. The primary aim was to gain a comprehensive understanding of how students' perceptions and productive dispositions towards mathematics influence their goal orientation. By focusing on numerical data, the researchers were able to

generalize findings across diverse groups of people or explain specific phenomena. This methodological framework, facilitated a rigorous examination of the interplay between mathematical disposition and goal orientation in educational settings.

Further, the quantitative descriptive-correlational research design is a quantitative method that focused on gathering and analyzing of numerical data to measure and evaluate variables. This study assessed the influence of students' perception and productive disposition with mathematics on goal orientation among math major students. This approach was described as the process of defining a problem or phenomenon by gathering numerical data and analyzing it with the use of mathematical tools, notably statistics. This technique enabled researcher to quantify and evaluate variables in order to draw conclusion about their interrelationships (Apuke, 2017).

In connection, the used of descriptive correlation research design is appropriate when aiming to illustrate the present status of a situation and explore the underlying causes of a particular phenomenon. This research design is concerned with establishing the relationship between variables within a given population and measures the statistical relationship among math major students.

Moreover, this study utilized regression that allows investigating the relationship between variables. Regression is a powerful statistical method that allows researchers to examine how one or more independent variable are related to dependent variable. The use of regression research design was appropriate when aiming to illustrate the present status of a situation and explore the underlying causes of a particular phenomenon. This research design was concerned with establishing the relationship between variables within a given population and measures the statistical relationship among math major students (Morrissey & Ruston, 2018).

In context, a regression analysis was employed, investigating the relationship between key variables. As a powerful statistical method, regression enables researchers to examine how one or more independent variables influence a dependent variable, providing valuable insights into underlying patterns. Its use was particularly appropriate for this research, as it aimed not only to describe the current status of students' perceptions and productive disposition towards mathematics but also to explore the underlying causes of these attitudes. By focusing on the relationship between variables within a specific population, this design allowed for a detailed examination of the statistical relationships among math major students.

**Respondents**

A population is the larger group to which the generalization applies. A population was defined as all members of a well-defined group of people, events, or objects. So, a population is made up of objects and subjects that have a specific region, quantity, and characteristic that the researcher chooses to analyze and conclude on. According to this remark, population includes not only the quantity of subjects and objects under investigation, but also their qualities. This study's respondents are math major students in teacher education program (Ary et al., 2010).

In probability sampling, a representative sample from a population allows for generalization to the entire population. The four types of probability sampling are simple random sampling, proportionate stratified random sampling, disproportionate random sampling, and cluster sampling stratified random sampling (Creswell, 2002).

In a process known as stratified random sampling is used to pick a sample from a population after separating it into smaller groups or strata based on criteria such as age, gender, or academic ability. This helps to guarantee that the sample size is adequate for each subgroup and appropriately represents the population as a whole, maximizing the results' generalizability. However, in order to use this technique effectively, the population and stratification criteria must be well defined (Etikan & Bala, 2017).

Table 1. *Distribution of Respondents*

| *Year Level* | *Population* | *Sample* | *Percentage* |
|---|---|---|---|
| 1st Year | 119 | 73 | 30% |
| 2nd Year | 50 | 31 | 13% |
| 3rd Year | 43 | 26 | 11% |
| 4th Year | 33 | 20 | 8% |
| Total | 245 | 150 | 62% |

The research was conducted at Kapalong College of Agriculture, Sciences and Technology. When recruiting participants, the researcher used stratified random sampling method. The data is collected in the academic year of 2023-2024 1st semester and the study's respondents was 150 samples drawn from a population of 245 Mathematics students who were enrolled in the program Bachelor of Secondary Education Major in Mathematics (BSEd). There were 5 sections which were BSEd – Math 1A, BSEd – Math 1B, BSEd – Math 2A, BSEd – Math 3A, and BSEd – Math 4A. Stratified random sampling is well-suited for this study as the participants were selected randomly based on their strata. In this case, the strata are the BSEd mathematics students from all year levels. To determine the sample size, the researcher collected first the data on the population of participants.

Furthermore, employing a stratified random sampling method aligns well with this study, as participants will be chosen randomly from distinct groups, or strata. In this instance, these strata consist of BSEd mathematics students across all academic years. To derive the sample, the researcher initially collected data on the population of potential respondents. After gathering the data, the researcher shared this data with her statistician for the computation of the study sample. As a result, the statistician provided the computed data, including an appropriate sample for the study. The participants included in the study are the students who express willingness to respond to the

survey questionnaire, while those who decline participation are excluded.

**Instrument**

The researcher utilized adapted questionnaires for the independent variable and dependent variable which were appropriate for the study's environment. The first set of questions include mathematics students' perceptions of mathematics with its indicators: competence, effort, teacher quality, family encouragement, enjoyment of mathematics, difficulty of mathematics, and confidence. The second set of questions focused on the productive disposition with mathematics, with its indicators: affect, beliefs, identity, mathematical integrity, risk taking, goals, motivation, and self – efficacy while the third set of question focused on the goal orientation with its indicators: task orientation, error frustration, self – enhancing ego orientation, and self – defeating ego orientation.

A survey questionnaire was used to gather the desired data on this study, which consists of three parts. The first part is the questionnaire of students' perception that was adapted from Hannula et al. (2007). To ensure the reliability of the instrument, it underwent examination using the Cronbach – Alpha method. The reliability factor for the seven dimensions were as follows: competence (.91), indicating excellent reliability; effort (.83), indicating good reliability; teacher quality (.81), indicating good reliability; family encouragement (.80), indicating good reliability; enjoyment of mathematics (.91), indicating excellent reliability; difficulty of mathematics (.82), indicating good reliability; and confidence (.87), indicating good reliability.

Furthermore, second part was the productive disposition questionnaire which was adapted from Awofala et al. (2020). The Mathematics Productive Disposition Scale (MPDS) was constructed by the suggestion of Siegfried (2012) that mathematical disposition is a multifactorial concept consisting of eight factors. The factors are self-efficacy, risk-taking, affect, mathematical integrity, beliefs, identity, motivation, and goals. Each factor of the mathematics productive disposition scale has three items except identity, which has four items. The reliability coefficient of the

mathematics productive disposition scale was calculated with 80 senior secondary school year three students not part of the study sample and from a different education district in Lagos State using the Cronbach alpha statistic. The following reliability coefficients were worked out for the entire MPDS and its subscales: Mathematics productive disposition scale ($\alpha = 0.88$) indicating good reliability; affect subscale ($\alpha = 0.78$) indicating good reliability; beliefs subscale ($\alpha = 0.82$) indicating good reliability; goals subscale ($\alpha = 0.76$) indicating good reliability; identity subscale ($\alpha = 0.81$) indicating high reliability; mathematical integrity subscale ($\alpha = 0.82$) indicating good reliability; motivation subscale ($\alpha = 076$) indicating good reliability; risk-taking subscale ($\alpha = 0.80$) indicating good reliability; and self-efficacy subscale ($\alpha = 0.74$) indicating good reliability.

Moreover, the third part was the goal orientation questionnaire consisted 21 statements about experiences and behavior in math class. This questionnaire was adopted from Seegers et al. (2002). Internal consistencies (Cronbach's alpha) were as follows: .81 for self-enhancing ego orientation, indicating good reliability; .76 for self-defeating ego orientation, also indicating good reliability; .77 for task orientation, signifying good reliability; and .78 for error frustration, indicating good reliability.

The Likert scale usually offers five alternative responses to a statement or question, allowing respondents to express their level of agreement or sentiment from positive to negative regarding the question or statement (Mcleod, 2023).

The study used a Five-point Likert Scale to assess the participants' students' perception, productive disposition, and goal orientation. The scores given by the participants to each statement were added up to calculate a total score, which represented their attitude score. This method allowed a quantitative analysis of the participants' opinions on their perception, productive disposition, and goal orientation. The results obtained from the Likert Scale could be used to draw conclusions about the influence of students' perception and productive disposition with mathematics on goal orientation.

**Procedure**

The researcher utilized adapted questionnaires for the independent variable and dependent variable which were appropriate for the study's environment. The first set of questions include mathematics students' perceptions of mathematics with its indicators: competence, effort, teacher quality, family encouragement, enjoyment of mathematics, difficulty of mathematics, and confidence. The second set of questions focused on the productive disposition with mathematics, with its indicators: affect, beliefs, identity, mathematical integrity, risk taking, goals, motivation, and self – efficacy while the third set of question focused on the goal orientation with its indicators: task orientation, error frustration, self – enhancing ego orientation, and self – defeating ego orientation.

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**Data Analysis**

The following statistical tools was utilized to calculate the data in this study. These tools were used to help identify patterns and relationships in the data that could shed light on the study's objectives. The findings of this research was then used to develop conclusions and provide recommendations.

Mean. Used to calculate the average or central tendency of a set of data points, providing a single representative value that summarizes the distribution of the data (Frost, 2023). This was used to determine the level of students' perception, productive disposition with mathematics and goal orientation among the respondents.

Pearson-r. Pearson's correlation coefficient is a measure of the strength and direction of the linear relationship between two continuous variables. It quantifies how well the variation in one variable can be predicted by the variation in another variable (Schober et al., 2018). This was used to determine the significant relationship between students' perception, productive disposition with mathematics and goal orientation among the respondents.

Regression. Regression is a statistical tool that helps identify and quantify the relationships between variables, allowing researchers to understand the specific domain or area where these relationships exist and make predictions based on them (Bewick et al., 2003). This was used to determine the indicator(s) of students' perception, and productive disposition with mathematics that can significantly influence students goal orientation.

**Ethical Considerations**

The respondents of this study were mathematics students from Kapalong College of Agriculture, Sciences, and Technology in the research locale. In this instance, the researcher ensured that the respondents' safety, rights, and reliance on the researcher, as well as the study's goals, would be treated with fairness and righteous action.

Furthermore, when conducting research with humans as respondents, researchers must adhere to the highest ethical standards. The primary goal of this quantitative investigation was to ensure that the study was ethically sound in order to protect the human respondent's comfort. The researcher discussed how the study adhered to the following Denzin and Lincoln (2011) guidelines, which focused on three key principles: informed consent; risk of harm; anonymity and confidentiality; and conflict of interest.

Informed Consent. It was the first essential ethical principle to take into account. The obligations, the intended use of the data, and any potential consequences must be adequately disclosed to the respondents. The respondents must provide their explicit, active, and written consent in order to participate in the study. They must also state that they were aware of their right to access their information and that they were free to change their minds at any time. An agreement between the researcher and the respondents may be taken into account during the process of obtaining informed permission (Denzin & Lincoln, 2011).

In this study, the researcher includes an informed consent question in a printed survey form, asking the respondents of the study if they were still willing to participate despite the risks. When the respondents were unsured about the agreement, they may choose to decline.

Making informed decisions and participating in the study voluntarily were strongly encouraged. The researcher ensures that all the respondents in the study were enthusiastic about it and eager to participate. It was critical to base their responses on the available surveys while gathering data.

During the informed consent process, the respondents were oriented on the following rights that they have. The respondents were informed that they have the right to terminate participation without any need of explanation. They also have the right to refuse to answer sensitive questions. Another right that they have was the entitlement to ask questions about the study. Lastly, they also have the right to be informed of the study results after this research was accomplished.

Risk of Harm, Anonymity and Confidentiality. The respondents information must always be kept confidential or hidden and promises to have to go further than just keeping their names private, including refraining from using identity remarks and material. Anonymity and secrecy were important steps in safeguarding people from possible harm (Denzin & Lincoln, 2011).

In accordance with the Data Privacy Act of 2012, a law that aims to protect the privacy of individuals while ensuring the free flow of information. With the Data Privacy Act of 2012, rigorous measures were put in place to safeguard the security and privacy of the gathered data. Personal identifiers, such as names or addresses, were systematically removed from the dataset to create a sanitized and anonymized collection. Adhering to data protection principles, all data collected was securely stored throughout the duration of the study. This meticulous approach demonstrates a commitment to preserving confidentiality and upholding ethical standards in the handling and storage of data. By aligning the research practices with the Data Privacy Act, the researcher safeguards the rights of respondents and ensures the integrity and ethical standards of the study are maintained.

When data was carefully disclosed, there was a possible risk of harm in terms of social liabilities. As such, data of the study were maintained private and secured to avoid this incident, in accordance with the provision of the data privacy act, which ensures the protection of individual's personal information. The researcher emphasized to the respondents that their safety, identity, and personal information would be protected and that their participation in the study would be important to them. For the purpose of creating an error-free collection, the researcher removed identities from the data. A clean data collection does not contain any data that could be used to identify the respondents, such as names or addresses (such identifying data could be stored in separate, secure files elsewhere). Data will be stored and destroyed three years after the study was accomplished.

Conflict of Interest. Present connections or prior actions of the researcher may result in a conflict of interest, which needs to be reported transparently in an ethical committee application so that the committee may advise on how to address the conflict (Fleming & Zegwaard, 2018).

In this context, the researcher affirms that the study was conducted without any business or financial affiliations that could be perceived as potential conflicts of interest. The researcher maintains that the integrity of the findings remained uncompromised by external influences, as the respondents were students, and there were no competing interests at play. A conflict of interest typically arises when a researcher has the authority to employ coercive tactics to compel participation—such as threats of benefit loss, blackmail, or other forms of punishment (for example, principals threatening to fire teachers, or teachers coercing students with the threat of academic failure if they do not comply with the study). In this case, such power dynamics were absent, ensuring that participation was voluntary and unbiased.

## Results and Discussion

### Level of Students' Perception in terms of Competence

The level of students' perception among math major students in teacher education program was measured through the survey questionnaire with the indicator competence. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below. Presented in Table 2 is the level of students' perception of math major students in teacher education program in terms of competence. The data revealed that the students' perception in terms of competence had a total mean of 4.16 with a descriptive equivalent as high. This indicated that the level of students' perception in terms of competence is oftentimes manifested.

Table 2. *Level of Students' Perception in terms of Competence*

| | *Competence* | *Mean* | *Description* |
|---|---|---|---|
| 1. | Dedicating myself to ongoing growth in mathematics. | 4.31 | Very High |
| 2. | Committing to building a solid foundation in math. | 4.20 | High |
| 3. | Excited about the idea of being a confident math | 4.12 | High |
| 4. | Learner. | | |
| 5. | Doing well in mathematics. | 3.93 | High |
| 6. | Valuing the importance of ongoing practice mathematics. | 4.22 | High |
| | Overall | 4.16 | High |

The highest mean is 4.31 with a descriptive equivalent as very high. This means that the said item was always manifested by the Math major students. This is obtained from item no. 1 – Dedicating myself to ongoing growth in mathematics.

In contrast, the lowest mean of 3.93 with a descriptive equivalent of high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 4 – Doing will in mathematics.

**Level of Students' Perception in terms of Effort**

The level of students' perception among math major students in teacher education program was measured through the survey questionnaire with the indicator effort. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below.

Presented in Table 3 is the level of students' perception of math major students in teacher education program in terms of effort. The data revealed that the students' perception in terms of effort had a total mean of 4.18 with a descriptive equivalent as high. This indicated that the level of students' perception in terms of effort is oftentimes manifested.

The highest mean is 4.35 with a descriptive equivalent as very high. This means that the said item was always manifested by the Math major students. This is obtained from item no. 1 – Always preparing myself carefully for exams.

Table 3. *Level of Students' Perception in terms of Effort*

| | *Effort* | *Mean* | *Description* |
|---|---|---|---|
| 1. | Always preparing myself carefully for exams. | 4.35 | Very High |
| 2. | Valuing the role of practice and repetition in improving | 4.12 | High |
| 3. | math skills. | | |
| 4. | A hardworking math learner. | 3.97 | High |
| 5. | Dedicated to improving my mathematics skills. | 4.18 | High |
| 6. | Understanding the importance of putting effort in math, | 4.25 | High |
| 7. | which can lead to greater confidence. | | |
| | Overall | 4.18 | High |

On the other hand, the lowest mean is 3.97 with a descriptive equivalent of high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 3 – A hardworking math learner.

**Level of Students' Perception in terms of Teacher Quality**

The level of students' perception among math major students in teacher education program was measured through the survey questionnaire with the indicator teacher quality. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below.

Presented in Table 4 is the level of students' perception of math major students in teacher education program in terms of teacher quality. The data revealed that the students' perception in terms of teacher quality had a total mean of 4.39 with a descriptive equivalent as very high. This indicated that the level of students' perception in terms of teacher quality is always manifested.

The highest mean is 4.42 with a descriptive equivalent as very high. This means that the said item was always manifested by the Math major students. This is obtained from item no. 1 – Believing in my teacher being a positive example.

In contrast, the lowest mean is 4.35 with a descriptive equivalent as very high. This means that the said item is always manifested by the Math major students. This is obtained from item no. 5 – Believing that high-quality math teachers can provide valuable feedback for my improvement.

Table 4. *Level of Students' Perception in terms of Teacher Quality*

| | *Teacher Quality* | *Mean* | *Description* |
|---|---|---|---|
| 1. | Believing in my teacher being a positive example. | 4.42 | Very High |
| 2. | Believing that inspiring and effective math teachers can | 4.41 | Very High |
| 3. | make a significant impact on my learning. | | |
| 4. | Valuing effective teaching methods in math. | 4.38 | Very High |
| 5. | Appreciating the guidance and mentorship of my math | 4.39 | Very High |
| 6. | Teachers. | | |
| 7. | Believing that high-quality math teachers can provide | 4.35 | Very High |
| 8. | valuable feedback for my improvement. | | |
| | Overall | 4.39 | Very High |

**Level of Students' Perception in terms of Family Encouragement**

The level of students' perception among math major students in teacher education program was measured through the survey questionnaire with the indicator family encouragement. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below.

Presented in Table 5 is the level of students' perception of math major students in teacher education program in terms of family

encouragement. The data revealed that the students' perception in terms of family encouragement had a total mean of 4.17 with a descriptive equivalent as high. This indicated that the level of students' perception in terms of family encouragement is oftentimes manifested.

The highest mean is 4.25 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 2 – Believing in the importance of family support in influencing my math achievement.

On the other hand, the lowest mean is 4.03 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 1 – Believing that competence in math is emphasized at my home.

Table 5. *Level of Students' Perception in terms of Family Encouragement*

| *Family Encouragement* | *Mean* | *Description* |
|---|---|---|
| 1. Believing that competence in math is emphasized at my home. | 4.03 | High |
| 2. Believing in the importance of family support can have | 4.25 | High |
| 3. in influencing my math achievement. | | |
| 4. Valuing the role of my family in helping me overcome | 4.15 | High |
| 5. math challenges. | | |
| 6. Believing that family involvement can boost my self - confidence in math. | 4.21 | High |
| 7. Believing that family encouragement in mathematics can | 4.21 | High |
| 8. lead to a lifelong love for the subject. | | |
| Overall | 4.17 | High |

**Level of Students' Perception in terms of Enjoyment of Mathematics**

The level of students' perception among math major students in teacher education program was measured through the survey questionnaire with the indicator enjoyment of mathematics. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below.

Presented in Table 6 is the level of students' perception of math major students in teacher education program in terms of enjoyment of mathematics. The data revealed that the students' perception in terms of enjoyment of mathematics had a total mean of 4.28 with a descriptive equivalent as very high. This indicated that the level of students' perception in terms of enjoyment of mathematics is always manifested.

The highest mean is 4.38 with a descriptive equivalent as very high. This means that the said item was always manifested by the Math major students. This is obtained from item no. 1 – Valuing the joy of learning mathematics.

In contrast, the lowest mean is 4.22 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 2 – Believing that finding enjoyment in mathematics is essential for my achievements.

Table 6. *Level of Students' Perception in terms of Enjoyment of Mathematics*

| *Enjoyment of Mathematics* | *Mean* | *Description* |
|---|---|---|
| 1. Valuing the joy of learning mathematics. | 4.38 | Very High |
| 2. Believing that finding enjoyment in mathematics is | 4.22 | High |
| 3. essential for my achievements. | | |
| 4. Believing that finding enjoyment in math can enhance my | 4.31 | Very High |
| 5. performance. | | |
| 6. Excited about the idea of sharing my love for mathematics with my peers. | 4.23 | High |
| 7. Appreciating the impact of inspiring educators in making | 4.24 | High |
| 8. math an enjoyable experience. | | |
| Overall | 4.28 | Very High |

**Level of Students' Perception in terms of Difficulty of Mathematics**

The level of students' perception among math major students in teacher education program was measured through the survey questionnaire with the indicator difficulty of mathematics. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below.

Presented in Table 7 is the level of students' perception of math major students in teacher education program in terms of difficulty of mathematics. The data revealed that the students' perception in terms of difficulty of mathematics had a total mean of 4.30 with a descriptive equivalent as very high. This indicated that the level of students' perception in terms of difficulty of mathematics is always manifested.

The highest mean is 4.37 with a descriptive equivalent as very high. This means that the said item was always manifested by the Math major students. This is obtained from item no. 1 – Believing that facing difficult math problems can lead to deeper understanding.

On the other hand, the lowest mean is 4.25 with a descriptive equivalent as high. This means that the said items were oftentimes manifested by the Math major students. This are obtained from item no. 2 – Eager about seeking help when I encounter difficulty in math; and item no. 4 – Valuing the role of practice and persistence in overcoming mathematical difficulty.

Table 7. *Level of Students' Perception in terms of Difficulty of Mathematics*

| *Difficulty of Mathematics* | *Mean* | *Description* |
|---|---|---|
| 1. Believing that facing difficult math problems can lead to deeper understanding. | 4.37 | Very High |
| 2. Eager about seeking help when I encounter difficulty<br>3. in math. | 4.25 | Very High |
| 4. Believing that working through difficulty in math can lead<br>5. to greater self-confidence. | 4.31 | Very High |
| 6. Valuing the role of practice and persistence in overcoming mathematical difficulty. | 4.25 | Very High |
| 7. Aware that experiencing difficulty in mathematics is<br>8. a common part of the learning process. | 4.31 | Very High |
| Overall | 4.30 | Very High |

**Level of Students' Perception in terms of Confidence**

The level of students' perception among math major students in teacher education program was measured through the survey questionnaire with the indicator confidence. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below.

Presented in Table 8 is the level of students' perception of math major students in teacher education program in terms of confidence. The data revealed that the students' perception in terms of confidence had a total mean of 3.99 with a descriptive equivalent as high. This indicated that the level of students' perception in terms of confidence is oftentimes manifested.

The highest mean is 4.25 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 2 – Sure that learning math is achievable for me.

In contrast, the lowest mean is 3.87 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 4 – Managing more difficult math.

Table 8. *Level of Students' Perception in terms of Confidence*

| *Confidence* | *Mean* | *Description* |
|---|---|---|
| 1. Confident in achieving good grades in math. | 3.95 | High |
| 2. Sure that learning math is achievable for me. | 4.25 | High |
| 3. Succeeding in math. | 3.95 | High |
| 4. Managing more difficult math. | 3.87 | High |
| 5. Sure about doing advanced work in math. | 3.95 | High |
| Overall | 3.99 | High |

**Summary of the Level of Students' Perception**

Presented in Table 9 was the overall level of students' perception in terms of competence, effort, teacher quality, family encouragement, enjoyment of mathematics, difficulty of mathematics, and confidence. The data revealed that the level of students' perception as perceived by first year to fourth year math major students has a total mean of 4.22 with a descriptive equivalent of high. This indicates that the level of students' perception as perceived by the Math major students was oftentimes manifested by Mathematics major students.

Table 9. *Level of Students' Perception*

| *Indicators* | *Mean* | *Description* |
|---|---|---|
| Competence | 4.16 | High |
| Effort | 4.18 | High |
| Teacher Quality | 4.39 | Very High |
| Family Encouragement | 4.23 | High |
| Enjoyment of Mathematics | 4.28 | Very High |
| Difficulty of Mathematics | 4.30 | Very High |
| Confidence | 3.99 | High |
| Overall | 4.22 | High |

Further, the highest mean is of 4.39 with the descriptive equivalent as very high. This indicates that the level of students' perception in terms of teacher quality was always manifested by Mathematics major students.

On the other hand, the lowest indicator is confidence which obtained a mean of 3.99 with a descriptive equivalent as high. This indicates that the level of students' perception in terms of confidence was oftentimes manifested by Mathematics major students.

The indicator competence obtained a mean of 4.16 with a descriptive equivalent as high. This indicates that the level of students' perception in terms of competence was oftentimes manifested by Mathematics major students.

In addition, effort obtained a mean of 4.18 with a descriptive equivalent as high. This indicates that the level of students' perception in terms of effort was oftentimes manifested by Mathematics major students.

Furthermore, family encouragement obtained a mean of 4.23 with a descriptive equivalent as high. This indicates that the level of students' perception in terms of family encouragement was oftentimes manifested by Mathematics major students.

Moreover, enjoyment of mathematics obtained a mean of 4.28 with a descriptive equivalent as very high. This indicates that the level of students' perception in terms of enjoyment of mathematics was always manifested by Mathematics major students.

Lastly, difficulty of mathematics obtained a mean of 4.30 with a descriptive equivalent as very high. This indicates that the level of students' perception in terms of difficulty of mathematics was always manifested by Mathematics major students.

**Level of Productive Disposition in terms of Affect**

The level of productive disposition among math major students in teacher education program was measured through the survey questionnaire with the indicator affect. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below.

Presented in Table 10 is the level of productive disposition of math major students in teacher education program in terms of affect. The data revealed that the productive disposition in terms of affect had a total mean of 4.12 with a descriptive equivalent as high. This indicated that the level of productive disposition in terms of affect is oftentimes manifested.

Table 10. *Level of Productive Disposition in terms of Affect*

| | *Affect* | *Mean* | *Description* |
|---|---|---|---|
| 1. | Enjoying learning mathematics. | 4.33 | Very High |
| 2. | Enjoying problem solving in mathematics. | 4.06 | High |
| 3. | Feeling happy when completing a difficult mathematical | 4.02 | High |
| 4. | Task. | | |
| 5. | Aware that knowing math can boost self–confidence. | 4.10 | High |
| 6. | Believing that mathematics can lead to a sense | 4.07 | High |
| 7. | of empowerment and independence. | | |
| | Overall | 4.12 | High |

The highest mean is 4.33 with a descriptive equivalent as very high. This means that the said item was always manifested by the Math major students. This is obtained from item no. 1 – Enjoying learning math.

On the other hand, the lowest mean is 4.02 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 3 – Feeling happy when completing a difficult mathematical task.

**Level of Productive Disposition in terms of Beliefs**

The level of productive disposition among math major students in teacher education program was measured through the survey questionnaire with the indicator beliefs. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below.

Presented in Table 11 is the level of productive disposition of math major students in teacher education program in terms of beliefs. The data revealed that the productive disposition in terms of beliefs had a total mean of 4.13 with a descriptive equivalent as high. This indicated that the level of productive disposition in terms of beliefs is oftentimes manifested.

Table 11. *Level of Productive Disposition in terms of Beliefs*

| | *Beliefs* | *Mean* | *Description* |
|---|---|---|---|
| 1. | Believing that having a growth mindset can positively | 4.26 | Very High |
| 2. | Influence by math learning. | | |
| 3. | Capable of solving a mathematics problem within a | 3.95 | High |
| 4. | few minutes. | | |
| 5. | Aware that knowing the beliefs of my peers can | 4.07 | High |
| 6. | influence my own perceptions of math. | | |
| 7. | Believing that fostering a love for mathematics is | 4.21 | High |
| 8. | Important. | | |
| 9. | Appreciating the importance of teacher expectations on | 4.15 | High |
| 10. | my beliefs in mathematics. | | |
| | Overall | 4.13 | High |

The highest mean is 4.26 with a descriptive equivalent as very high. This means that the said item was always manifested by the Math major students. This is obtained from item no. 1 – Believing that having a growth mindset can positively influence my math learning.

In contrast, the lowest mean is 3.95 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 2 – Capable of solving a mathematics problem within a few minutes

**Level of Productive Disposition in terms of Identity**

The level of productive disposition among math major students in teacher education program was measured through the survey questionnaire with the indicator identity. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below.

Presented in Table 12 is the level of productive disposition of math major students in teacher education program in terms of identity. The data revealed that the productive disposition in terms of identity had a total mean of 4.00 with a descriptive equivalent as high. This indicated that the level of productive disposition in terms of identity is oftentimes manifested.

Table 12. *Level of Productive Disposition in terms of Identity*

| | *Identity* | *Mean* | *Description* |
|---|---|---|---|
| 1. | Recognizing there is a turning point in my life that made | 4.05 | High |
| 2. | me look at mathematics differently. | | |
| 3. | Feeling that my mathematical experiences are steady. | 3.89 | High |
| 4. | Valuing the impact of positive role models in | 4.07 | High |
| 5. | mathematics. | | |
| 6. | Believing that my cultural background can enrich | 3.91 | High |
| 7. | my mathematical identity. | | |
| 8. | Eager for exploring my identity as a math learner. | 4.10 | High |
| | Overall | 4.00 | High |

The highest mean is 4.10 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from the item no. 5 – Eager for exploring my identity as a math learner. On the other hand, the lowest mean is 3.89 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 2 – Feeling that my mathematical experiences are steady.

**Level of Productive Disposition in terms of Mathematical Integrity**

The level of productive disposition among math major students in teacher education program was measured through the survey questionnaire with the indicator mathematical integrity. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below.

Presented in Table 13 is the level of productive disposition of math major students in teacher education program in terms of mathematical integrity. The data revealed that the productive disposition in terms of mathematical integrity had a total mean of 4.07 with a descriptive equivalent as high. This indicated that the level of productive disposition in terms of mathematical integrity is oftentimes manifested.

Table 13. *Level of Productive Disposition in terms of Mathematical Integrity*

| | *Mathematical Integrity* | *Mean* | *Description* |
|---|---|---|---|
| 1. | Reviewing the solution to determine when I have satisfactorily completed a problem. | 4.14 | High |
| 2. | Recognizing when I cannot solve a mathematics problem. | 4.03 | High |
| 3. | Aware that understanding mathematics problems is the | 4.03 | High |
| 4. | most difficult part of problem-solving. | | |
| 5. | Sometimes facing difficult math problems that I cannot | 4.02 | High |
| 6. | solve on my own. | | |
| 7. | Interested in learning how to avoid plagiarism in math. | 4.11 | High |
| | Overall | 4.07 | High |

The highest mean is 4.14 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 1 – Reviewing the solution to determine when I have satisfactorily completed a problem. In contrast, the lowest mean is 4.02 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 4 – Sometimes facing difficult math problems that I cannot solve on my own.

**Level of Productive Disposition in terms of Risk Taking**

The level of productive disposition among math major students in teacher education program was measured through the survey questionnaire with the indicator risk taking. The responses of the first year to fourth year math major students on each indicator were

presented and analyzed below.

Presented in Table 14 is the level of productive disposition of math major students in teacher education program in terms of risk taking. The data revealed that the productive disposition in terms of risk taking had a total mean of 4.15 with a descriptive equivalent as high. This indicated that the level of productive disposition in terms of risk taking is oftentimes manifested.

Table 14. *Level of Productive Disposition in terms of Risk Taking*

| | *Risk Taking* | *Mean* | *Description* |
|---|---|---|---|
| 1. | Feeling comfortable asking questions about someone | 4.18 | High |
| 2. | else's solution of a mathematical problem. | | |
| 3. | Willing to share new ideas in mathematics, if, by | 4.13 | High |
| 4. | doing so, I may expose mistakes I made. | | |
| 5. | Feeling most certain about my solving of a mathematics | 3.96 | High |
| 6. | problem. | | |
| 7. | Believing that taking risks in math can lead to greater | 4.34 | Very High |
| 8. | understanding. | | |
| 9. | Believing that taking calculated risk can lead to a | 4.15 | High |
| 10. | remarkable math achievements. | | |
| | Overall | 4.15 | High |

The highest mean is 4.34 with a descriptive equivalent as very high. This means that the said item was always manifested by the Math major students. This is obtained from item no. 4 – Believing that taking risks in math can lead to greater understanding.

However, the lowest mean is 3.96 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 3 – Feeling most certain about my solving of a mathematics problem.

**Level of Productive Disposition in terms of Goals**

The level of productive disposition among math major students in teacher education program was measured through the survey questionnaire with the indicator goals. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below.

Presented in Table 15 is the level of productive disposition of math major students in teacher education program in terms of goals. The data revealed that the productive disposition in terms of goals had a total mean of 4.19 with a descriptive equivalent as high. This indicated that the level of productive disposition in terms of goals is oftentimes manifested.

Table 15. *Level of Productive Disposition in terms of Goals*

| | *Goals* | *Mean* | *Description* |
|---|---|---|---|
| 1. | Trying/learning new things in mathematics or | 4.19 | High |
| 2. | doing more of things I can do already. | | |
| 3. | Believing effort plays a part in my learning of | 4.19 | High |
| 4. | mathematics. | | |
| 5. | Knowing that my goal in mathematics is to achieve | 4.06 | High |
| 6. | a better grade than most of the other students. | | |
| 7. | Wanting to set specific mathematical goals to track my progress. | 4.23 | High |
| 8. | Believing that having clear goals in mathematics can | 4.27 | Very High |
| 9. | lead to greater success. | | |
| | Overall | 4.19 | High |

The highest mean is 4.27 with a descriptive equivalent as very high. This means that the said item was always manifested by the Math major students. This is obtained from item no. 5 – Believing that having clear goals in mathematics can lead to greater success.

In contrast, the lowest mean is 4.06 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 3 – Knowing that my goal in mathematics is to achieve a better grade than most of the other students.

**Level of Productive Disposition in terms of Motivation**

The level of productive disposition among math major students in teacher education program was measured through the survey questionnaire with the indicator motivation. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below.

Presented in Table 16 is the level of productive disposition of math major students in teacher education program in terms of motivation. The data revealed that the productive disposition in terms of motivation had a total mean of 4.20 with a descriptive equivalent as high. This indicated that the level of productive disposition in terms of motivation is oftentimes manifested.

The highest mean is 4.27 with a descriptive equivalent as very high. This means that the said item was always manifested by the Math major students. This is obtained from item no. 3 – Finding mathematics tasks very challenging.

Table 16. *Level of Productive Disposition in terms of Motivation*

| | *Motivation* | *Mean* | *Description* |
|---|---|---|---|
| 1. | Curious about exploring discoveries in mathematics. | 4.19 | High |
| 2. | Believing that learning mathematics makes my life more | 4.13 | High |
| 3. | meaningful. | | |
| 4. | Finding mathematics tasks very challenging. | 4.27 | Very High |
| 5. | Believing that motivation is key to success in mathematics. | 4.24 | High |
| 6. | committed to maintaining a positive attitude toward | 4.19 | High |
| 7. | mathematics. | | |
| | Overall | 4.20 | High |

However, the lowest mean is 4.13 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 2 – Believing that learning mathematics makes my life more meaningful.

**Level of Productive Disposition in terms of Self-efficacy**

The level of productive disposition among math major students in teacher education program was measured through the survey questionnaire with the indicator self-efficacy. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below.

Presented in Table 17 is the level of productive disposition of math major students in teacher education program in terms of self-efficacy. The data revealed that the productive disposition in terms of self-efficacy had a total mean of 4.03 with a descriptive equivalent as high. This indicated that the level of productive disposition in terms of self-efficacy is oftentimes manifested.

The highest mean is 4.15 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 4 – Excited about discovering my own strengths and capabilities in mathematics.

Table 17. *Level of Productive Disposition in terms of Self-efficacy*

| | *Self-efficacy* | *Mean* | *Description* |
|---|---|---|---|
| 1. | Feeling confident about getting a correct solution to the | 4.03 | High |
| 2. | mathematical equation. | | |
| 3. | Confident in developing my own mathematical abilities. | 3.90 | High |
| 4. | Confident in performing well on mathematics test. | 3.96 | High |
| 5. | Excited about discovering my own strengths and | 4.15 | High |
| 6. | capabilities in mathematics. | | |
| 7. | Committed to maintaining a positive outlook on my | 4.12 | High |
| 8. | math capabilities. | | |
| | Overall | 4.03 | High |

In contrast, the lowest mean is 3.90 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 2 – Confident in developing my own mathematical abilities.

**Summary of the Level of Productive Disposition**

Presented in Table 18 is the overall level of productive disposition in terms of affect, beliefs, identity, mathematical integrity, risk taking, goals, motivation, and self-efficacy. The data revealed that the level of productive disposition as perceived by first year to fourth year math major students has a total mean of 4.11 with a descriptive equivalent of high. This indicates that the level of students' perception as perceived by students is oftentimes manifested by Math major students.

Table 18. *Level of Productive Disposition*

| Indicators | Mean | Description |
|---|---|---|
| Affect | 4.12 | High |
| Beliefs | 4.13 | High |
| Identity | 4.00 | High |
| Mathematical Integrity | 4.07 | High |
| Risk taking | 4.15 | High |
| Goals | 4.19 | High |
| Motivation | 4.20 | High |
| Self-efficacy | 4.03 | High |
| Overall | 4.11 | High |

Furthermore, the highest mean is 4.20 with the descriptive equivalent of high. This indicates that the level of productive disposition in terms of motivation is oftentimes manifested by Math major students.

However, the lowest indicator is identity which obtained a mean of 4.00 with a descriptive equivalent of high. This indicates that the level of productive disposition in terms of identity is oftentimes manifested by Math major students.

The indicator affect obtained a mean of 4.12 with a descriptive equivalent of high. This indicates that the level of productive disposition in terms of affect is oftentimes manifested by Math major students.

Additionally, beliefs obtained a mean of 4.13 with a descriptive equivalent of high. This indicates that the level of productive disposition in terms of beliefs is oftentimes manifested by Math major students.

Mathematical integrity obtained a mean of 4.07 with a descriptive equivalent of high. This indicates that the level of productive disposition in terms of mathematical integrity is oftentimes manifested by Math major students.

Moreover, risk taking obtained a mean of 4.15 with a descriptive equivalent of high. This indicates that the level of productive disposition in terms of risk taking is oftentimes manifested by Math major students.

Goals obtained a mean of 4.19 with a descriptive equivalent of high. This indicates that the level of productive disposition in terms of goals is oftentimes manifested by Math major students.

Lastly, self-efficacy obtained a mean of 4.03 with a descriptive equivalent of high. This indicates that the level of productive disposition in terms of self-efficacy is oftentimes manifested by Math major students.

**Level of Goal Orientation in terms of Task Orientation**

The level of goal orientation among math major students in teacher education program was measured through the survey questionnaire with the indicator task orientation. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below.

Presented in Table 19 is the level of goal orientation of math major students in teacher education program in terms of task orientation. The data revealed that the goal orientation in terms of task orientation had a total mean of 4.18 with a descriptive equivalent as high. This indicated that the level of goal orientation in terms of task orientation is oftentimes manifested.

Table 19. *Level of Goal Orientation in terms of Task Orientation*

| | *Task Orientation* | *Mean* | *Description* |
|---|---|---|---|
| 1. | Feeling satisfied when I have learned something in math | 4.35 | Very High |
| 2. | that makes sense to me. | | |
| 3. | Preferring difficult assignments from which I can learn | 4.01 | High |
| 4. | something new, to easy assignments. | | |
| 5. | Feeling satisfied when I learned something interesting in | 4.24 | High |
| 6. | mathematics. | | |
| 7. | Enjoying learning something new in mathematics. | 4.21 | High |
| 8. | Believing that when I encounter a problem without an | 4.08 | High |
| 9. | immediate solution, I am committed to putting in extra | | |
| 10. | effort to find the answer. | | |
| | Overall | 4.18 | High |

The highest mean is 4.35 with a descriptive equivalent as very high. This means that the said item was always manifested by the Math major students. This is obtained from item no. 1 – Feeling satisfied when I have learned something in math that make sense to me.

On the other hand, the lowest mean is 4.01 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 2 – Preferring difficult assignments from which I can learn something new, to easy assignments.

**Level of Goal Orientation in terms of Error Frustration**

The level of goal orientation among math major students in teacher education program was measured through the survey questionnaire with the indicator error frustration. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below.

Presented in Table 20 is the level of goal orientation of math major students in teacher education program in terms of error frustration. The data revealed that the goal orientation in terms of error frustration had a total mean of 4.05 with a descriptive equivalent as high. This indicated that the level of goal orientation in terms of error frustration is oftentimes manifested.

The highest mean is 4.19 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 5 – Aware that learning from my errors is an important skill in math.

Table 20. *Level of Goal Orientation in terms of Error Frustration*

| | *Error Frustration* | *Mean* | *Description* |
|---|---|---|---|
| 1. | Hating it when I cannot solve a mathematical problem. | 4.03 | High |
| 2. | Aware that having a lower grade in math than usual can | 4.05 | High |
| 3. | lead to feelings of disappointment. | | |
| 4. | Not pleased with myself when I am not working | 3.93 | High |
| 5. | hard enough for math. | | |
| 6. | Recognizing that when I don't meet my usual standard in | 4.03 | High |
| 7. | completing assignments, I strive to improve and meet | | |
| 8. | my own expectations. | | |
| 9. | Aware that learning from my errors is an important skill | 4.19 | High |
| 10. | in math. | | |
| | Overall | 4.05 | High |

In contrast, the lowest mean is 3.93 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 3 – Not pleased with myself when I am not working hard enough for math.

**Level of Goal Orientation in terms of Self – Enhancing Ego Orientation**

The level of goal orientation among math major students in teacher education program was measured through the survey questionnaire with the indicator self-enhancing ego orientation. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below.

Presented in Table 21 is the level of goal orientation of math major students in teacher education program in terms of self-enhancing ego orientation. The data revealed that the goal orientation in terms of self-enhancing ego orientation had a total mean of 3.91 with a descriptive equivalent as high. This indicated that the level of goal orientation in terms of self-enhancing ego orientation is oftentimes manifested.

Table 21. *Level of Goal Orientation in terms of Self – Enhancing Ego Orientation*

| | *Self – Enhancing Ego Orientation* | *Mean* | *Description* |
|---|---|---|---|
| 1. | Feeling good when being the first to know the answer to | 4.16 | High |
| 2. | a mathematical problem. | | |
| 3. | Enjoying showing others that I can solve a math | 4.01 | High |
| 4. | assignment. | | |
| 5. | Enjoying being the only one who can answer a question | 3.85 | High |
| 6. | during math lessons. | | |
| 7. | Enjoying outperforming my classmates in getting the highest marks for mathematics. | 3.64 | High |
| 8. | Enjoying finishing my math tasks before the other | 3.88 | High |
| 9. | children. | | |
| | Overall | 3.91 | High |

The highest mean is 4.16 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 1 – Feeling good when being the first to know the answer to a mathematical problem.

On the other hand, the lowest mean is 3.64 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 4 – Enjoying outperforming my classmates in getting the highest marks for mathematics.

**Level of Goal Orientation in terms of Self – Defeating Ego Orientation**

The level of goal orientation among math major students in teacher education program was measured through the survey questionnaire with the indicator self-defeating ego orientation. The responses of the first year to fourth year math major students on each indicator were presented and analyzed below.

Presented in Table 22 is the level of goal orientation of math major students in teacher education program in terms of self-defeating ego orientation.

The data revealed that the goal orientation in terms of self-defeating ego orientation had a total mean of 3.77 which means high. This indicated that the level of goal orientation in terms of self-defeating ego orientation is oftentimes manifested.

The highest mean is 3.92 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major students. This is obtained from item no. 1 – Aware that during math tasks I feel afraid that other students will notice my mistakes.

However, the lowest mean is 3.67 with a descriptive equivalent as high. This means that the said item was oftentimes manifested by the Math major student. This is obtained from item no. 3 – Feeling embarrassed when I have to ask for help during math lessons.

Table 22. *Level of Goal Orientation in terms of Self – Defeating Ego Orientation*

| *Self – Defeating Ego Orientation* | *Mean* | *Description* |
|---|---|---|
| 1. Aware that during math tasks I feel afraid that other | 3.92 | High |
| 2. students will notice my mistakes | | |
| 3. Feeling unpleasant when other students finish more | 3.79 | High |
| 4. assignments than I do | | |
| 5. Feeling embarrassed when I have to ask for help | 3.67 | High |
| 6. during math lessons | | |
| 7. Thinking that when I do not immediately succeed in | 3.72 | High |
| 8. solving a mathematics assignment, I feel unpleasant | | |
| 9. when others point this out | | |
| 10. Aware that during math tasks I am afraid that the other | 3.74 | High |
| 11. children will notice that me making mistakes | | |
| Overall | 3.77 | High |

**Summary of the Level of Goal Orientation**

Presented in Table 23 is the overall level of goal orientation in terms of task orientation, error frustration, self-enhancing ego orientation, and self-defeating ego orientation. The data revealed that the level of goal orientation as perceived by first year to fourth year math major students has a total mean of 3.98 with a descriptive equivalent of high. This indicates that the level of goal orientation is oftentimes manifested by Math major students.

Table 23. *Level of Goal Orientation*

| *Indicators* | *Mean* | *Description* |
|---|---|---|
| Task Orientation | 4.18 | High |
| Error Frustration | 4.05 | High |
| Self – Enhancing Ego Orientation | 3.91 | High |
| Self – Defeating Ego Orientation | 3.77 | High |
| Overall | 3.98 | High |

Further, the highest mean is 4.18 with a descriptive equivalent of high. This indicates that the level of goal orientation in terms of task orientation is oftentimes manifested by Math major students.

In contrast, the lowest indicator is self-defeating ego orientation which obtained a mean of 3.77 with a descriptive equivalent of high. This indicates that the level of goal orientation in terms of self-defeating ego orientation is oftentimes manifested by Math major students.

Moreover, error frustration obtained a mean of 4.05 with a descriptive equivalent of high. This indicates that the level of goal orientation in terms of error frustration is oftentimes manifested by Math major students.

Lastly, self-enhancing ego orientation obtained a mean of 3.91 with a descriptive equivalent of high. This indicates that the level of goal orientation in terms of self-enhancing ego orientation is oftentimes manifested.

**Significant Relationship between Students' Perception and Goal Orientation**

Presented in Table 24 is the result of the significant relationship between students' perception and goal orientation, r (148) = .654, p<.001. Since the probability value (p<.001) is less than the level of significance (α=0.05). In this study, 65% of goal orientation is attributed to the influence of students' perception, while the remaining 35% is due to the unexplored variables. Consequently, the null hypothesis is being rejected within this context. This means that there is a positive and significant relationship between students' perception and goal orientation. In other words, higher level of students' perception tends to be associated with greater goal orientation.

Table 24. *Significant Relationship between Students' Perception and Goal Orientation*

| *Variables Correlated* | *Mean* | *R-Value* | *P-Value* | *Decision @=0.05* |
|---|---|---|---|---|
| Students' Perception | 4.22 | .654 | <.001 | Ho Rejected |
| Goal Orientation | 3.98 | | | |

**Significant Relationship between Productive Disposition and Goal Orientation**

Presented in Table 25 is the result of the significant relationship between productive disposition and goal orientation, r (148) = .729, p<.001. Since the probability value (p<.001) is less than the level of significance (α=0.05). In the study, 72.9% of goal orientation is attributed to the influence of productive disposition, while the remaining 27.1% is due to unexplored variables. Consequently, the null hypothesis is being rejected within the context. This means that there is a positive and significant relationship between productive

disposition and goal orientation. In other words, higher level of productive disposition tends to be associated with greater goal orientation.

Table 25. *Significant Relationship between Productive Disposition and Goal Orientation*

| *Variable Correlated* | *Mean* | *R-Value* | *P-Value* | *Decision @=0.05* |
|---|---|---|---|---|
| Productive Disposition | 4.11 | .729 | <.001 | Ho Rejected |
| Goal Orientation | 3.98 | | | |

**Significant Influence between Students' Perception and Goal Orientation**

Presented in Table 26 is the significant influence of the domains of students' perception that can considerably influence the goal orientation among math major students in teacher education program. The results showed that family encouragement, a domain of students' perception, appear to be a statistically significant predictor of the level of goal orientation among math major students, (β=0.2405, p=.004). At 0.05 level of significance, the null hypothesis is rejected. The beta value indicates that for every unit increase of family encouragement, the level of goal orientation among math major students will also increase by 0.2405 units.

Furthermore, the results showed that confidence, a domain of students' perception, appear to be a statistically significant predictor of the level of goal orientation among math major students, (β=0.2529, p=.001). At 0.05 level of significance, the null hypothesis is rejected. The beta value (β=0.2529) indicated that for every unit increase of confidence, the level of goal orientation among math major students will also increase by 0.2529 units. Therefore, this leads to the rejection of the second null hypothesis states that there is/are no domain/s of students' perception that can significantly influence the goal orientation of the respondents.

Table 26. *Significant Influence between Students' Perception and Goal Orientation*

| *Independent Variable Students' Perception* | *Unstandardized Coefficients* | | *Standardized Coefficients* | | *Decision* |
|---|---|---|---|---|---|
| | *β* | *SE* | *Beta* | *P - value* | *@=0.05* |
| Competence | 0.0841 | 0.0905 | 0.0837 | .354 | Ho Accepted |
| Effort | 0.0621 | 0.0979 | 0.0634 | .527 | Ho Accepted |
| Teacher Quality | 0.1388 | 0.0818 | 0.1384 | .092 | Ho Accepted |
| Family Encouragement | 0.2405 | 0.0817 | 0.2577 | .004 | Ho Rejected |
| Enjoyment of Mathematics | -0.0225 | 0.1053 | -0.0233 | .831 | Ho Accepted |
| Difficulty of Mathematics | 0.0705 | 0.1063 | 0.0705 | .508 | Ho Accepted |
| Confidence | 0.2529 | 0.0780 | 0.2722 | .001 | Ho Rejected |
| Dependent Variable: Goal Orientation | | | | | |

*Note: R=0.654, R2=0.427, F-ratio=16.9 P-value=<.001*

On the other hand, the p-values for the remaining five domains, competence (β=0.0841, p=.354), effort (β=0.0621, p=.527), teacher quality (β=0.1388, p=.092), enjoyment of mathematics (β=-0.0225, p=.831), and difficulty of mathematics (β=0.0705, p=.508) do not have a significant influence on students' goal orientation. At 0.05 level of significance, the p-values of the five domains exceeded the level of significance (α=0.05). This suggests that the five domains which are competence, effort, teacher quality, enjoyment of mathematics, and difficulty of mathematics were not a significant predictor of students' goal orientation.

Moreover, students' perception explained a significant proportion of variance in goal orientation, R2=0.427, F=16.9, p<.001. The R2 of 0.427 shows that the model predicts 42.7% of the statistical variation observed in the level of goal orientation among the respondents. The coefficient of alienation which 57.3% points to the extent at which indicators or domains not included in the study may explain the variance observed in the level of goal orientation among the respondents.

**Significant Influence between Productive Disposition and Goal Orientation**

Presented in Table 27 is the significant influence of the domains of productive disposition that can considerably influence the goal orientation among math major students in teacher education program. The results showed that beliefs, a domain of productive disposition, appear to be a statistically significant predictor of the level of goal orientation among math major students, (β=0.25417, p=.009). At 0.05 level of significance, the null hypothesis is rejected. The beta value indicates that for every 1 unit increase of beliefs, the level of goal orientation among math major students will also increase by 0.25417 units.

The results showed that mathematical integrity, a domain of productive disposition, appear to be a statistically significant predictor of the level of goal orientation among math major students, (β=0.18858, p=.030). At 0.05 level of significance, the null hypothesis is rejected. The beta value (β=0.18858) indicated that for every unit increase of mathematical integrity, level of goal orientation will also increase by 0.18858 units. Therefore, this leads to the rejection of the second null hypothesis that there is/are no domain/s of productive disposition that can significantly influence the goal orientation of the respondents.

Furthermore, self-efficacy, a domain of productive disposition, appear to be a statistically predictor of the level of goal orientation among math major students, (β=0.32781, p=.001). At 0.05 level of significance, the null hypothesis is rejected. The beta value

(β=0.32781) indicated that every unit increase of self-efficacy, level of goal orientation will also increase by 0.32781 units. Therefore, this leads to the rejection of the third null hypothesis states that there is/are domain/s of productive disposition that can significantly influence the goal orientation of the respondents.

Table 27. *Significant Influence between Productive Disposition and Goal Orientation*

| *Independent Variable* | *Unstandardized Coefficients* | | *Standardized Coefficients* | | *Decision* |
|---|---|---|---|---|---|
| *Productive Disposition* | *β* | *SE* | *Beta* | *P - value* | *@=0.05* |
| Affect | -0.07424 | 0.0834 | -0.08261 | .375 | Ho Accepted |
| Beliefs | 0.25417 | 0.0964 | 0.25847 | .009 | Ho Rejected |
| Identity | -0.02841 | 0.1004 | -0.02995 | .778 | Ho Accepted |
| Mathematical Integrity | 0.18858 | 0.0860 | 0.22375 | .030 | Ho Rejected |
| Risk Taking | -0.00118 | 0.0904 | -0.00132 | .990 | Ho Accepted |
| Goals | 0.14114 | 0.0984 | 0.15305 | .154 | Ho Accepted |
| Motivation | -0.05405 | 0.0918 | -0.06009 | .557 | Ho Accepted |
| Self-efficacy | 0.32781 | 0.0886 | 0.38259 | .001 | Ho Rejected |
| Dependent Variable: Goal Orientation | | | | | |

*Note: R=0.729, R2=0.548, F-ratio=23.6 P-value=<.001*

Furthermore, self-efficacy, a domain of productive disposition, appear to be a statistically predictor of the level of goal orientation among math major students, (β=0.32781, p=.001). At 0.05 level of significance, the null hypothesis is rejected. The beta value (β=0.32781) indicated that every unit increase of self-efficacy, level of goal orientation will also increase by 0.32781 units. Therefore, this leads to the rejection of the third null hypothesis states that there is/are domain/s of productive disposition that can significantly influence the goal orientation of the respondents.

On the other hand, the p-values for the remaining five domains, affect (β=-0.07424, p=0.375), identity (β=-0.02841, p=.778), risk taking (β=-0.00118, p=.990), goals (β=0.14114, p=.154), and motivation (β=-0.05405, p=.557) do not have a significant influence on students' goal orientation. At 0.05 level of significance, the p-values of the five domains exceeded the level of significance (α=0.05). This suggests that the five domains which are affect, identity, risk taking, goals, and motivation were not a significant predictor of students' goal orientation.

Moreover, productive disposition explained a significant proportion of variance in goal orientation, R2=0.548, F=23.6, p<001. The R2 of 0.548 shows that the model predicts 54.8% of the statistical variation observed in the level of goal orientation among the respondents. The coefficient of alienation which 45.2% points to the extent at which indicators or domains not included in the study may explain the variance observed in the level of goal orientation among the respondents.

## Conclusions

Based on the findings of the study, conclusions were drawn in answer to questions raised in the previous chapter. The respondents from the teacher education program major in mathematics reported a high level of students' perception which means that the variables is oftentimes observed by the students.

Based on the results in productive disposition among math major students in teacher education program, it can be also drawn that the level of productive disposition was high. This means that the students oftentimes manifested the variable.

Moreover, based on the results in goal orientation among math major students in teacher education program, it can be also drawn that the level of goal orientation was in high. Also, this means that the students oftentimes manifested the variable.

Overall correlation of two variables reveals a significant relationship between two variables which was students' perception and goal orientation among math major students in teacher education program. The study shows that the students' perception has a high, positive, and significant relationship with goal orientation, which means that the first null hypothesis proposed in the study is rejected.

Furthermore, overall correlation of two variables reveals a significant relationship between the two variables which was productive disposition and goal orientation among math major students in teacher education students. The study shows that the productive disposition has a high, positive, and significant relationship with goal orientation, which means that the first null hypothesis proposed in the study is rejected.

Based on the result of regression analysis, two domains have shown significant influence to the students' perception. This means that the two domains – family encouragement, and confidence – are significant predictors of goal orientation among math major students in teacher education program. This also indicates the rejection of the second null hypothesis proposed in the study. Accordingly, the model describes 42.7% of the statistical variation in the level of goal orientation of the respondents, while the remaining 57.3% refers to the other variables that have not been included in the study that also affect the goal orientation of the respondents.

Moreover, based on the result of regression analysis, three domains have shown significant influence to the productive disposition. This means that the three domains – belief, mathematical integrity, and self-efficacy – are significant predictors of goal orientation

among math major students in teacher education program. This also indicates the rejection of the second null hypothesis proposed in the study. Accordingly, the model describes 54.8% of the statistical variation in the level of goal orientation of the respondents, while the remaining 45.2% refers to the variables that have not been included in the study that also affect the goal orientation of the respondents.

Among the indicator of students' perception, it was found that confidence was the item with the lowest mean result. It is hereby recommended that the institution and teachers encourage students to view mathematics positively. Also, teachers should be patient and supportive when students struggle with math problems. This can help students stay interested and keep trying, even when math seems hard.

Furthermore, among the indicator of productive disposition, it was found that identity was the item with the lowest mean result. It is hereby recommended that the institution and teachers encourage students to have a strong sense of identity related to learning that fosters students' engagement, and commitment to their educational journey. By validating and nurturing students' academic identities, it helps cultivate a positive learning environment where students feel empowered to explore their interests, take ownership of their learning, and realize their full potential.

Moreover, among the indicator of goal orientation, it was found that self-defeating ego orientation was the item with the lowest mean result. It is hereby recommended that the institutions and teachers should work to shift students' focus towards more adaptive goal orientations, such as task mastery or self-improvement. By promoting a supportive and growth-oriented environment, it can help students develop resilience, persistence, and a positive attitude towards challenges.

Finally, as the goal orientation has a positive and significant relationship between students' perception and productive disposition, it is recommended that the future researcher investigate other variables that could also have a positive and significant relationship between students' perception and productive disposition throughout the learning of mathematics. They are also encouraged to explore additional methodologies, like mixed-method approach that were not covered in this study. While the current study focused on a quantitative research design involving 150 students, employing a mixed-method approach offers several advantages. Integrating quantitative data from surveys with qualitative insights gathered through interviews can provide a more comprehensive understanding of students' perspectives and attitudes.

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