Perceived importance and level of mathematical skills among math and non-math major students in mathematics in the modern world

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Abstract

The study assessed the extent of skills acquired by the mathematics and non-mathematics major students to the new general education course, MMW. Specifically, this study investigated the significance of the difference between the levels of mathematical skills and perceived important mathematical skills of the students for career success. Likewise, the correlation between perceived acquired mathematical skills and important mathematical skills in MMW. A descriptive research design, comparative, and correlational methods of analysis were utilized. Data were collected using a survey questionnaire with prior validation and reliability measurements. A random of 134 teacher education students were selected. The results revealed that the overall level of mathematical skills in the MMW of the mathematics major students was very good, while Good for the non-mathematics major students. On the other hand, the mathematics major students perceived the skills acquired in the MMW as very important for career success for a moderately important perception of the non-mathematics major students. A statistical significance of the difference was obtained between the level of mathematical skills (t = 7.69, p = 0.001), and the perceived importance of skills (t = 4.65, p = 0.001) between the group of students. A significance of the relationship was found between student's perceive important mathematical skills and perceived level of mathematical skills (r=0.421; p=0.001). It is recommended that the teacher education department faculty members should continue improving and strengthening its quality of instruction to increase the level of mathematical skills of the mathematics major students from very good to excellence, and good to excellence for the non-mathematics major students. Maximize the teaching motivation and learning motivation of the nonmathematics major students to increase their perception of the importance of mathematical skills from moderately important to very important.

Keywords: General education course, Mathematics in the modern world, Perceived level of mathematical skills, Perceive important mathematical skills

Introduction

The significance of mathematics in any field of discipline is cannot be denied. Eisen et al. (2005) argued that the necessity of acquiring mathematical knowledge and skills plays a crucial in any occupational field (as cited in McCormick & Lucas, 2011). Mathematical skills are one of the fundamental skills that employers are looking for (Rosenberg et al., 2012). Likewise, the level of mathematical thinking of students in this information-based society is vital in developing process skills such as innovative ways to find a solution to a problem (Anthony & Walshaw, 2009; Karadag, 2009). The need for continuous improvement of mathematical thinking in mathematics education is highly important for the reason that one of the concerns of today's mathematics education is to produce intelligent learners who will eventually become better citizens of the future (Cordova & Tan, 2018). In almost future jobs, college-level mathematical skills will be one of the most required skills (Huebner & Corbett, 2008).

(2009)Laursen defined eight mathematics competencies that students must mathematical thinking, problem handling, modeling, reasoning, representation, symbols and formalism, communications, and aids and tools (as cited in Zeidmane, 2012). Similarly, Cordova and Tan (2018) broken down mathematical proficiency into five strands into conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition. Further, according to Corbeshly and Traxsaw (2010), the mathematical skills that can be acquired by the students upon entering the university can be categorized into four: subject knowledge, number sense, measurement and data, reasoning, generalization. These mathematical competencies can be grouped into competences concerning the ability to ask and answer questions about utilizing mathematics (mathematical thinking, problem handling, reasoning, and modeling); and b) competencies that concern the students' ability to engage with mathematical language and tools (representation, symbols and formalism, communications, and aid and tools). The above categorization of mathematics skills were the demands skills nowadays. According to Achieve (2005), in

today's demands, employers want to have individuals who have the ability and skills to be effective in oral and written communications, to be independent researchers, and be complex problem solvers (as cited in McCormick & Lucas, 2011).

As a response to the fast-changing academic and non-academic environment in the demands of the different sectors, Commission on Higher Education (CHED) of the Philippines embarked on the revision of the general education curriculum and set a new minimum standard for the general education curriculum components of all degree programs that applies to any private and public HEI (Francisco, 2017). This includes the Mathematics in the Modern World (MMW) course as the new general education mathematics subject that was stipulated in CHED Memorandum Order No. 20 Series of 2013 (CHED, 2013). This course deals with the different topics in Mathematics that focus on the nature of mathematics, appreciation of its practical, intellectual, and aesthetic dimensions, and application mathematical tools in daily life (CHED, 2013). This was one of the CHED's initiatives to ASEAN integration to increase the effectiveness of higher education in the Philippines (CHED, 2016). Since one of the core missions of any academic institution is to continuously improve the quality of instruction, it has a direct longterm impact on students (Cornillez, 2019). Unlike the previous mathematics general education course that focuses on one learning area per semester in the first-year study, this new mathematics general education course requires students to study the modern approaches and applications of the various learning areas of mathematics. On the other hand, there were only a few studies in the literature were available that centered on MMW. These studies were focused on the assessment of students' performance in MMW, student's level of difficulty experienced in MMW, and the extent of skills acquisition in MMW (Remo, 2019; Roman & Villanueva, 2020). This current study extends on the assessment of the perceived level of skills acquired by the students, and exploring the skills perceived by the students as significantly important for career success. In any Higher Educational Institutions (HEI), students are

trained to be equipped with necessary mathematical knowledge and skills and these become one of the core indicators in producing competent and excellent graduates.

It is time to evaluate the effectiveness and value of the skills and topics discussed in the current general education course, MMW, and determine whether they meet the demands of today's needs. This research will inform teachers in both senior high school and university settings about the skills that students struggle with and do not possess, allowing them to develop necessary strategies to better prepare students. The analysis will also serve as an indicator for HEI understudy students to see if their admission into the mathematics program despite their lack of training in k-12 education has a negative or positive impact on the program's current success.

Objectives of the study

This study aimed to determine the breadth of skills acquired by mathematics and non-mathematics major students enrolled in the CHED-mandated new general education course, MMW. The researchers also evaluated the relative value of the skills taught in the course. The report specifically addressed the following issues.

- To ascertain the perceived level of acquired mathematical skills of MMW students.
- 2. To determine which mathematical skills in the MMW students believe are important for career success.
- To measure the significance of the difference in the perceived level of acquired mathematical skills between mathematics and non-mathematics major students in MMW.
- 4. To measure the significance of the difference in perceptions of important mathematical skills in MMW between mathematics and non-mathematics major students.
- To investigate the significance of the relationship between students' perceived important skills and their perceived level of mathematical skill acquisition in MMW.

Theoretical and conceptual framework of the study

The study was anchored in the theory of Social Learning advocated by Bandura (1977). The theory assumed that personality and behavior can be best explained based on the unique learning experiences of the individual (Bandura, 1977). This assumption does not deny the significance of innate and developmental processes. Social learning theory describes the acquisition of skills that are developed exclusively or primarily within social groups (Bandura, 1977; Ormrod, 1999). Moreover, social learning theory acknowledges significance of self-efficacy that is people's beliefs about their skills, and the outcomes that are likely to result from using these skills, have a significant impact on behavior (Ashford & LeCroy, 2010). This study identified different mathematical skills as the course MMW prescribed. In this study, the students evaluate the level of their acquired skills in the course and perceived that these acquired mathematical skills are significantly important for career success.

The variables and hypotheses that were used in the analysis are shown in figure 1. The students' acquired level of mathematical skills and perceived value of the skills acquired were the dependent variables in this analysis. The division of students into mathematics and nonmathematics majors was the independent variable. To see whether these levels of acquired mathematical skills and the perceived value of the skills covered in the course differed significantly between students who major and non-major in mathematics, an independentsamples t-test for two population means was used. On the one hand, correlation analysis was used to assess the importance of the relationship between learned skills and perceived essential skills in MMW.

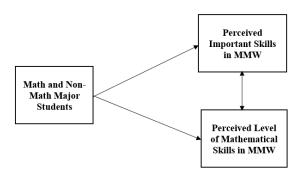


Figure 1. Conceptual Framework of the Study

H₁: there is no statistical significance of the difference between the acquired mathematical skills of the mathematics and non-mathematics major students in MMW;

H₂: there is no statistical significance of the difference between the perceived important skills of the mathematics and non-mathematics major students in MMW;

H₃: there is a statistical significance of the relationship between perceived important skills and the level of acquired mathematical skills of the students in MMW.

Methodology Research Design

The study took a quantitative approach, with descriptive, comparative, and correlational designs (Nassaji, 2015). The study's nature was suitable since the primary goal was to evaluate the students' respondents' level of ability in MMW and their perception of the value of these acquired skills. It assessed the association between perceived essential skills and the degree of acquired skills, so it is correlational. To address the study's research questions, descriptive, comparative methods of analysis, and correlation were used.

Research respondents

The study's respondents were Visayas State University Alangalang campus undergraduate second-year teacher education students from Alangalang, Leyte, Philippines enrolled in the first semester of the school year 2019-2020 in the Bachelor of Elementary Education (BEED) and

Bachelor of Science in Secondary Education with a major in mathematics (BSEd-Math) programs. Using the electronic student's management system (e-SMS) of the HEI under review, the population size of the target respondents was determined to be 206 (59 BSEd and 147 BEEd students). The sample size was estimated at 134 using the sample size formula for finite population (Israel, 1992) with a degree of precision of 5%, a level of confidence of 95%, and a proportion of data variability of 50%. To ensure that the survey respondents were representative of the degree programs, the researchers used a stratified random sampling technique (Rahi, 2017) in the selection process. proportionate distribution of representative sample was as follows: The BSEd Mathematics program yielded 38 students, while the BEEd program yielded 96.

Female respondents account for 82.1 percent of the 134 student respondents, while male respondents account for 17.9 percent. The majority of the respondents, 80.6 percent, are between the ages of 19 and 21, with just 17.9% over the age of 22. 74.6 percent of respondents were enrolled in a BEEd program, while 25.4 percent were in a BSEd mathematics program.

Research instrument

The researchers used survey questionnaires created by the researchers. The elements used were taken from a CHED sample syllabus (CHED, 2017). The questions were all closedended and consisted of the following main components: delves Part Ι into demographics of the respondents in terms of age, gender, and degree program, while Part II delves into the level of mathematical skills acquired and the respondents' perceptions of level value for the defined mathematical skills. For measuring the level of mathematical skills acquired, respondents were asked to rate the survey questionnaire using a 5-point scale rating (Vagias, 2006), ranging from strongly disagree (1) to strongly agree (5), while a 7-point scale rating (Vagias, 2006), ranging from not all important (1) to extremely important (7), was used to assess the perceived level of importance of the skill. Each of the identified competencies consists of five items/statements where respondents were asked to rate using a five-point Likert scale

ranging from (1) Not Competent to (5) Very Competent. Similarly, respondents were asked to rate their overall satisfaction towards their science teacher's teaching competence using the scale response (1) Very Dissatisfied to (5) Very Satisfied.

Validity and reliability of the research instrument

The questionnaire consisted of 33 questions that assessed the extent of acquired mathematical skills as well as the perceived value of those skills. The researchers performed a validity and reliability evaluation of the research instrument before the final data collection process. Face validity (Connell et al., 2018) was used to measure the items on the adequacy, comprehensiveness, and significance of a specific instrument. This means that allimportant items are included and all items that are unacceptable to a particular construct are eliminated. Four senior mathematics faculty members with at least five years of teaching experience were selected to participate in the face validity process. Furthermore, a dry-run survey of the updated instrument after face validity was conducted with 116 student respondents on one of the HEI understudy's external campuses. Cronbach's alpha and Composite reliability were used to assess the reliability of the produced data (Taber, 2017, Peterson & Kim, 2013). The Statistical Product and Service Solution program was used to calculate the reliability metric (Brace et al., 2012).

Following the face validity procedure, 29 of the 33 objects were agreed to be held. Four items were omitted, and slight changes were made to the grammar and layout of some of the items that were kept. Table 1 shows the results of the survey questionnaire's reliability test.

Table 1. Reliability Measurement

(Construct	CA	CR	Interpretation
	PLMS	0.943	0.901	Reliable
	PIMS	0.907	0.899	Reliable

Notes: PLMS – Perceived Level of Mathematical Skills; PIMS – Perceived Important Mathematical Skills; CA – Cronbach's alpha; CR – Composite reliability If CA and $CR \ge 0.70$ – Reliable Test of reliability or internal consistency was used to assess the consistency of the items in terms of what the items are supposed to measure (Taber, 2017; Kim & Peterson, 2013; Roldán & Sánchez-Franco, 2012). A coefficient value of Cronbach's alpha and composite reliability of equal to or greater than 0.70 must be met to obtain high reliability or internal consistency of items being measured (Kock & Lynn, 2012). As presented in Table 1, the items' measured of the instrument were reliable.

Data gathering procedure

Before collecting data, the researchers made certain that all procedures were followed. The actual data collection process began on November 25, 2019 and was concluded on November 27, 2019. The researchers administered the survey questionnaire to the selected respondents after outlining the study's goals and importance, as well as its ethical considerations, and assuring them that all data collected would be treated with the utmost confidentiality and used solely for the study. All of the collected data was electronically coded and stored for review.

Ethical Consideration

Prior to the conduct of the study, the researchers ensured that they had all the required permit letters and sent them to the various deans of the HEI where the study was performed. Informed consent was signed by the interested respondents, ensuring voluntary involvement of the selected respondents. All of the respondents were given a thorough explanation of the study's goals and significance. The data collected was kept in strict confidence and was only used for the analysis.

Data analysis

The researchers hypothesized that there was no substantial difference between mathematics and non-mathematics students' levels of acquired mathematical skills and perceived significance. Similarly, there is no significance of the correlation between mathematical ability level and perceived importance of these skills. To test the study's hypotheses, the independent-samples t-test for two population means (Kim, 2015) and

Pearson r correlational analysis was used. Also computed were descriptive statistics including percentage, mean (M), and standard deviation (SD). We rejected the study's null hypotheses, the degree of significance alpha was set at 0.05.

Result and discussion

The objectives of this study were to determine the breadth of skills acquired by mathematics and non-mathematics major students enrolled in MMW, a new general education course. The researchers used comparative and correlational analysis to determine if there was a substantial gap between the students' acquired level of mathematical skills and their perceived value of those skills and a significant relationship between variables under study.

Students Perceived Level of Mathematical Skills in MMW

Table 1 indicates the perceived level of competence in the science teaching competence of the students towards their science teachers in Tolosa Leyte. It can be gleaned that students perceived their teachers as competent in terms of commitment, knowledge of the subject matter, application of teaching strategy, and classroom management with a corresponding weighted mean of 3.60; 3.85; 4.19; 4.04, respectively. It can be noted further that the overall science teacher's teaching competence obtained a weighted mean of 3.92 (SD = 0.468), interpreted as competent with the standard deviation of 0.468 is interpreted as satisfied in terms of the student's level of satisfaction.

The level of mathematical skills gained by BEEd students in the MMW is shown in Table 3. The ability to express the importance of mathematics in human life received the highest mean score (M = 3.92, SD = 0.77). The skills "I can build my conjecture" (M = 3.01, SD = 0.77) and "I can prove the given conjecture" (M = 3.05, SD = 0.66), on the other hand, had the lowest mean scores and were interpreted as strong. The non-mathematics students' overall level of mathematical skills is considered high (M = 0.40, SD = 0.45).

Table 2. Level of Acquired Mathematical Skills in the MMW Among Mathematics Major Students

Stı	adents	Ü		,
	Acquired	WM	SD	Interpretation
	Mathematical Skill	W 1V1	<i>5D</i>	Interpretation
1.	I can identify the	4.03	0.72	Very Good
2	Fibonacci sequence.			,
2.	I can identify patterns in nature and			
	regularities in the	3.65	0.77	Good
	world.			
3.	I can articulate the			
	significance of	4.40	0.04	0 1
	mathematics in	4.12	0.81	Good
	human life.			
4.	I can determine the			
	significance of			
	mathematics in			
	predicting the	3.68	0.88	Good
	behavior of nature			
	and phenomena in the world.			
5.	I can explain the			
٥.	nature of			
	mathematics as a	3.62	0.82	Good
	language.			
6.				
	functions, relations	3.88	0.69	Good
	and binary operations.			
7.	I can use some basic			
	concepts of			
	elementary logic such	3.82	0.76	Good
	as connective,			
	quantifiers, negations, and variables.			
8.				
٠.	properly in solving			
	mathematical and	4.18	0.76	Very Good
	statistical problems.			
9.	I can find			
	connections between	3.68	0.64	Very Good
	mathematical ideas.			
10	. I can reflect on my	2.71	0.70	W C 1
	mathematical	3.71	0.68	Very Good
11	reasoning. I can prove a given			
11	conjecture.	3.24	0.78	Good
12	. I can justify my			
	answer to my given	3.53	0.90	Very Good
	solution.			,
13	. I can apply the given			
	for solving problems	3.56	0.79	Very Good
	in multiple contexts.			
14	. I can develop my	3.35	0.77	Very Good
1.5	conjecture.			,
13	. I can use various forms of reasoning to	3.44	0.75	Very Good
	problem solve.	J.44	0.73	very Good
16	. I can use			
. 0	appropriately	2.50	0.70	
	inductive and	3.50	0.79	Very Good
	deductive reasoning.			
17	. I can use	3.50	0.93	Very Good
	appropriately Polya's	5.50	0.73	very Good

	- /						
4-steps in solving real-world problems.				and regularities in the world.			
18. I can use different				3. I can articulate the			
mathematical			** 0 1	significance of			** 0 1
strategies in solving	3.68	0.84	Very Good	mathematics in	3.92	0.77	Very Good
real-world problems.				human life.			
19. I can solve real-world				4. I can determine the			
problems related to	3.62	0.82	Very Good	significance of			
simple interests.			ŕ	mathematics in			
20. I can solve real-world				predicting the	3.37	0.58	Good
problems related to	3.74	0.75	Very Good	behavior of nature			
compound interest.			,	and phenomena in			
21. I can solve real-world				the world.			
problems related to	2.50	0.70	W C 1	5. I can explain the			
credit cards and	3.50	0.79	Very Good	nature of	2.47	0.72	V C 1
consumer loans.				mathematics as a	3.47	0.73	Very Good
22. I can explain the				language.			
difference between	2 (5	0.05	Vam Caad	6. I can calculate sets,			
data, information, and	3.65	0.85	Very Good	functions, relations,	2.26	0.72	Good
variable.				and binary	3.26	0.72	Good
23. I can determine the				operations.			
appropriate level of				7. I can use some			
the measurement	3.71	0.84	Very Good	basic concepts of			
scale of a given			,	elementary logic			
variable.				such as connective,	3.50	0.70	Very Good
24. I can construct				quantifiers,			•
different graphical				negations, and			
presentations	3.68	0.73	Very Good	variables.			
appropriate to a given				8. I can use a			
data set.				calculator properly			
25. I can calculate the				in solving	3.80	0.74	Very Good
measures of central				mathematical and			
tendency (mean,	4.15	0.74	Very Good	statistical problems.			
weighted mean	4.13	0.74	very Good	9. I can find			
median, and mode) of				connections	3.48	0.75	Very Good
a given data set.				between	J. 4 0	0.75	very Good
26. I can calculate the				mathematical ideas.			
measures of				10. I can reflect on my			
dispersion (range,	3.91	0.75	Very Good	mathematical	3.44	0.77	Very Good
variance, and standard	3.71	0.73	very Good	reasoning.			
deviation) of a given				11. I can prove a given	3.03	0.66	Good
data set.				conjecture.	5.05	0.00	Good
27. I can calculate the				12. I can justify my			
correlation between	3.79	0.69	Very Good	answer to my given	3.50	0.85	Very Good
two variables.				solution.			
28. I can calculate the				13. I can apply the			
linear regression	3.50	0.86	Very Good	given for solving	3.36	0.66	Good
between variables.				problems in	5.50	5.50	3004
29. I can distinguish the				multiple contexts.			
use of correlation and	3.44	0.79	Very Good	14. I can develop my	3.01	0.77	Good
linear regression.				conjecture.	0.01	0.77	0004
Overall	3.68	0.48	Very Good	15. I can use various			
Notes: 1.00-1.80-Poor; 1.81-		iir; 2.61	-3.40- Good; 3.41-	forms of reasoning	3.25	0.81	Good
4.20-Very good; 4.21-5.00-E.	xcellent			to problem solve.			
				16. I can use			
Table 3. Level of A	canired	Math	nematical Skills	appropriately		0.0-	· ·
				inductive and	3.65	0.82	Very Good
in the MMW Amon	ig mon	-iviath	iemaucs major	deductive			
Students				reasoning.			
Acquired	Maan	cn.	Intounuotation	17. I can use			
Mathematical Skill	Mean	SD	Interpretation	appropriately		0.0-	6 1
1. I can identify the				Polya's 4-steps in	3.40	0.82	Good
Fibonacci	3.88	0.69	Very Good	solving real-world			
sequence.			•	problems.			
2. I can identify	2 (2	0.62	Vor Caal	18. I can use different	3.41	0.79	Very Good
patterns in nature	3.63	0.63	Very Good	mathematical	•		<i>y</i> =

	-		
strategies in solving			
real-world			
problems.			
19. I can solve real-			
world problems	2.20	0.70	0 1
related to simple	3.39	0.79	Good
interests.			
20. I can solve real-			
world problems	2.40	0.70	0 1
related to	3.18	0.72	Good
compound interest.			
21. I can solve real-			
world problems			
related to credit	3.13	0.68	Good
cards and			
consumer loans.			
22. I can explain the			
difference between	2.22	0.04	0 1
data, information,	3.33	0.84	Good
and variable.			
23. I can determine the			
appropriate level of			
the measurement	3.30	0.80	Good
scale of a given			
variable.			
24. I can construct			
different graphical			
presentations	3.24	0.77	Good
appropriate to a			
given data set.			
25. I can calculate the			
measures of central			
tendency (mean,	3.56	0.04	Vam Caad
weighted mean	3.30	0.84	Very Good
median, and mode)			
of a given data set.			
26. I can calculate the			
measures of			
dispersion (range,	3.32	0.80	Good
variance, and	3.32	0.60	Good
standard deviation)			
of a given data set.			
27. I can calculate the			
correlation between	3.38	0.69	Good
two variables.			
28. I can calculate the			
linear regression	3.17	0.70	Good
between variables.			
29. I can distinguish			
the use of	3.13	0.79	Good
correlation and	5.15	0.19	Good
linear regression.			
Overall	3.40	0.45	Good
Notes: 1.00-1.80- Poor; 1.8	31-2.60- 1	air; 2.61	-3.40-Good; 3.41-

Notes: 1.00-1.80- Poor; 1.81-2.60- Fair; 2.61-3.40-Good; 3.41-4.20-Very good; 4.21-5.00- Excellent

Students perceived important skills in the MMW

Tables 4 and 5 show the various mathematical skills that students believe are necessary for career success. To answer the research questions, the mean score and standard deviation for each

specified ability were calculated. The statistics ability "I can calculate the measurements of central tendency (mean, weighted mean median, and mode) of a given data set" received the highest mean score (M = 6.12, SD = 0.88) and was interpreted as very significant. The capacity "I can express the importance of mathematics in human life" (6.03, SD = 1.17) follows. The skill "I can apply the given for solving problems in multiple contexts" had the lowest mean score (M = 4.00, SD = 0.00) among the listed skills. It's worth noting that the ability in question received an SD value of 0, indicating that all of the respondents gave the same grade. Almost all of the skills listed were rated as excellent. Overall, mathematics major students viewed their MMW skills as critical to their career success.

Table 4. Perceived Important Skills in the MMW Among Mathematics Major Students

Among l	Among Mathematics Major Students									
	quired natical Skill	WM	SD	Interpretation						
	lentify the cci sequence.	5.68	1.07	Very Important						
1	s in nature gularities in	5.38	1.10	Very Important						
signific	rticulate the ance of natics in life.	6.03	1.17	Very Important						
4. I can d signific mather predict behavio	etermine the ance of natics in ing the or of nature enomena in	5.65	0.98	Very Important						
nature	natics as a	5.41	1.02	Very Important						
	•	5.47	1.16	Very Important						
concep elemen such as quantif	tary logic connective, iers, ons, and	5.62	0.92	Very Important						
8. I can u proper mather	se a calculator ly in solving natical and cal problems.	5.94	1.15	Very Important						

9. I can that connections between mathematical ideas. 10. I can reflect on my mathematical ideas. 11. I can prove a given conjecture. 12. I can iposity my mathematical ideas. 13. I can apply the given for solving problems in multiple contexts. 14. I can devolop my conjecture. 15. I can use various forms of reasoning. 15. I can use various forms of exaconing to problems related by the properties of inductive and deductive reasoning. 17. I can use appropriately Polys's 4-steps in solving real-world problems related to compound interest. 18. I can use different mathematical strategies in solving real-world problems related to compound related to compound interest. 19. I can use obscience and consumer classes. 19. I can solve real-world problems related to compound interest. 21. I can caphit the different graphical greath and consumer classes. 22. I can calculate the see of correlation between to statistical problems and fine are regression. 25. I can use different mathematical strategies in solving real-world problems related to compound interest. 25. I can use of given variable. 25. I can calculate the see of correlation between the propriate problems and fine problems related to compound interest. 26. I can calculate the see of correlation between the problems related to compound interest. 26. I can calculate the see of correlation devices on the problems related to compound interest. 26. I can calculate the see of correlation the see of correlation to the problems and the problems related to compound interest. 27. I can calculate the see of correlation the second respective to the see of correlation the second respective to the see of correlation the second reads the see of correlation the see of correlation the second reads of the second respective to the second reads of the second respective to the second reads of the second reads of the second reads of the second reads of the se								
In the provider on my mathematical ideas. 10. I can reflect on my mathematical ideas. 10. I can a reflect on my mathematical ideas. 11. I can prove a given conjecture. 12. I can justify my conjecture on given solution. 13. I can apply the given for solving problems in multiple contexts. 14. I can develop my conjecture. 15. I can use various forms of reasoning to problem solve. 16. I can use various forms of reasoning to problem solve appropriately Polya's 4-steps in solving real-world problems. 17. I can use appropriately Polya's 4-steps in solving real-world problems related to compound strategies in solving real-world problems related to compound interest. 21. I can solve real-world groblems related to compound interest. 22. I can costenation and variable. 23. I can determine the appropriate to a given data set. 27. I can use carolus correction determine the appropriate to a given data set. 27. I can use carolus correction solve. 28. I can alcelate the linear regression. 5.44	9. I can find				dispersion (range,			
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6.	I can calculate sets, functions, relations, and binary operations.	4.79	1.31	Moderately Important	22. I can explain the difference between data, information, and variable.	4.96	1.38	Moderately Important
7.	I can use some basic concepts of elementary logic such as connective, quantifiers,	5.06	1.28	Moderately Important	23. I can determine the appropriate level of the measurement scale of a given variable.	4.81	1.31	Moderately Important
8.	negations, and variables. I can use a calculator properly in solving	5.43	1.26	Very Important	24. I can construct different graphical presentations appropriate to a given data set.	4.72	1.35	Moderately Important
9.	mathematical and statistical problems. I can find connections between mathematical ideas.	4.92	1.29	Moderately Important	25. I can calculate the measures of central tendency (mean, weighted mean median, and mode) of a given data set.	5.07	1.45	Moderately Important
	I can prove a given	4.96 4.48	1.35	Moderately Important Moderately	26. I can calculate the measures of dispersion (range, variance, and	4.74	1.43	Moderately Important
12	conjecture. I can justify my answer to my given solution.	4.48	1.36	Important Moderately Important	standard deviation) of a given data set. 27. I can calculate the correlation between	4.78	1.28	Moderately Important
	. I can apply the given for solving problems in multiple contexts.	4.90	1.40	Moderately Important	two variables. 28. I can calculate the linear regression between variables.	4.65	1.26	Moderately Important
	. I can develop my conjecture I can use various forms of reasoning	4.49 4.70	1.38	Moderately Important Moderately	29. I can distinguish the use of correlation and linear regression.	4.67	1.38	Moderately Important
16	to problem solve. I can use		1100	Important	Overall	4.88	0.98	Moderately Important
	appropriately inductive and deductive reasoning.	5.13	1.43	Moderately Important	Notes: 1.00-1.85-Not at al 2.72-3.57-Slightly importa Moderately important; 5. important	nt; 3.5	8-4.43-N	2.71-Low important; eutral; 4.44-5.29-
17	I can use appropriately Polya's 4-steps in solving real-world problems.	5.17	1.32	Moderately Important	Difference betwo mathematical sk important skills	kills a	nd pei	rceived
	. I can use different mathematical strategies in solving real-world problems.	4.90	1.36	Moderately Important	Table 6. The dif Mathematical Skills Mathematics and Students.	fferenc in the	e on e MMV	the Acquired
19.	. I can solve real- world problems related to simple	4.95	1.27	Moderately Important	Group Mean	n te		<i>p</i> - Interpralue etation
	interests. I can solve real-world problems related to compound interest.	4.74	1.32	Moderately Important	Mathematic s Major Non- Mathematic 4.88 s Major	7.6	59 0.	001 Signific ant
21	. I can solve real- world problems related to credit cards and consumer loans.	4.74	1.35	Moderately Important	Notes: If $p - value \le 0.0$ There wa		nificant impo	rtant gap in
					mathematical skills	gained		

non-mathematics major students (t =7.69, p = 0.001), as shown in Table 6. At a 5% level of significance, the null hypothesis of no significant difference between the variables was rejected. Based on the mean scores, the finding suggests that mathematics major students in the MMW have more skills than non-mathematics major students. The discrepancy wasn't due to chance, then.

Table 7. The difference on the Perceived Important Skills in the MMW between the Mathematics and Non-mathematics major Students

Group	Mea n	t- valu e	<i>p</i> -valu e	Interpretati on
Mathemati cs Major	3.68		0.00	
Non- Mathemati cs Major	3.40	4.65	1	Significant

If p-value $\leq 0.05 - Significant$

The perceived significance of mathematical skills gained by mathematics and non-mathematics major students differed significantly (t = 3.40, p = 0.001), as shown in Table 7. At a 5% level of significance, the null hypothesis of no distinction between the variables was rejected. According to the results, mathematics major students regarded their MMW skills as extremely important for career success, while non-mathematics major students regarded their MMW skills as only moderately important for career success based on the mean scores given. Then the difference could not have happened by chance.

Table 8. Relationship between Perceived Level of Mathematical Skills and Perceived Important Mathematical Skills of Students

Variable	<i>r</i> -value	<i>p</i> -value	Interpretation
PLMS and PIMS	0.431	0.001	Significant

Notes: PLMS = Perceived Level of Mathematical Skills; PIMS = Perceived Important Mathematical Skills; $p \le 0.05 - Significant$; N = 134

Table 8 presents the analysis of the correlation between student's perceived level of

the acquired skills and perceived important acquired skills in the MMW. The results show that there was a statistical significance of the correlation was found between variables understudy at a 5% level of significance alpha. The correlation was moderately strong and direct which means that as they perceived the skills acquired to be very good to excellence, they perceived these skills acquired to be very important skills for career success. These results imply that students' level of acquired skills in the MMW has a significant bearing on their perceived skills in MMW.

Conclusion and recommendations

Based on the results of the report, it can be inferred that student majoring in mathematics and students majoring in non-mathematics perceived their gained mathematical skills significantly at different levels. In comparison to the learning of good mathematical abilities by non-mathematics major students, mathematics major students have a very good mathematical skill set. In comparison to non-mathematics major students, mathematics major students saw the value of MMW skills for job success as substantially different. These findings show that mathematics majors consider their acquired skills to be a very important factor in their career performance, while non-mathematics majors consider their acquired skills to be a moderately important factor in their career success. Math students' skills maior were statistically significantly different from non-math major students' skills. The difference in the perceived significance of the learned skill between the groups of students was similarly statistically significant, favoring the math majors in their perception of the skills as highly important for professional success. Moreover, assessment of the importance of MMW skills has a significant association with MMW skills acquisition. The study's findings support the concept that math majors are expected to have superior mathematical ability than non-math major students. This research supports the social learning theory by showing that students' selfefficacy assumptions about the number of skills they have learned have a major effect on their behavior. As a result, having appropriate mathematics skills is needed for students to

succeed in their careers. The researchers suggest that faculty members of the teacher education department continue to improve and enhance their standard of teaching to raise the level of mathematical ability acquisition of mathematics major students from very good to excellent, and good to excellent for non-mathematics major students. Increase non-mathematics major students' perceptions of the value mathematical skills from moderately important to very important through increasing teaching and learning inspiration.

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Declaration of no conflict of interest

The authors declare that there is no conflict of interest.

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