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Thinking about Thinking Metacognition and Sexual Orientation

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ABSTRACT

This study examined the relationship between Metacognition and Sexual Orientation of College of Education students of Nueva Ecija University of Science and Technology (NEUST-SIC) San Isidro Campus. The survey used in this study was the Metacognitive Awareness Inventory (MAI). The study aimed to determine the metacognition awareness of the respondents and determine the differences in terms of their sexual orientation. Descriptive method of research was applied in determining the profiles of demographic variables (age, sexual orientation, course program enrolled, and year level) and scores in Metacognitive Awareness Inventory. Analysis of Variance (ANOVA) was administered in determining the significant difference between the scores in the Metacognitive Awareness Inventory according to their sexual orientation. Results show that the majority of the respondents are female, with age range from 16 to 20, enrolled in Bachelor of Elementary Education Program, and in 2nd year college level. Also, the scores of the bisexual respondents got the highest percentage in the knowledge of cognition factor, regulation of cognition factor, and overall scores in metacognitive awareness. Gay respondents on the other hand, got the lowest scores in the two domains and overall scores in metacognitive awareness. Further, there were no significant differences in the scores of respondents when grouped according to their sexual orientation. It is recommended, that the study on metacognitive awareness be applied in the entire LGBTQ community of NEUST-SIC and test its relationship to their academic achievement.

Keywords:

1.Introduction

Metacognition is described as "thinking about thinking," but it also includes mind control, or the capacity to alter one's thoughts. It goes beyond simple awareness of thought processes to include the ability to change thoughts and behaviors (Brookman-Byrne-) (2018). In the 1970s, John Flavell came up with the theory. It encompasses all of the mechanisms involved in controlling how we think. Planning our work and activities, monitoring our success and growth, and evaluating our knowledge are examples.According to Drew (2020), metacognitive techniques allow students to learn more efficiently and with greater self-control. They become more capable of self-improvement as they "think about their thinking."

Metacognition is divided into two sections. The first step is to reflect. It is the process of reflecting on what we learned and self-regulating how we understand. The second step is to take them together. These mechanisms are essential parts of learning and development. Developing these metacognitive skills entails more than only reflective learners; it also involves mastering complex learning techniques. We often use any of the words synonymous with metacognition. Examples are metacognitive attitudes, metacognitive perception, metacognitive memories, metacognitive intelligence, metacognitive abilities, executive skills, higher-order skills, metal elements, and metamemory. Being mindful of one's own thinking is what metacognitive knowledge entails. Metacognition is the understanding of one's own thoughts and tactics. It helps students be more aware of what they are doing, why they are doing it, and how their learning skills can be used differently.

Metacognition is essential for learning and a good indicator of academic achievement (Dunning, Johnson, Ehrlinger, and Kruger, 2003; Kruger and Dunning, 1999). Students with solid metacognition usually outperform students with low metacognition in terms of academic success.

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Metacognitive training can help students with weak metacognition improve their metacognition and academic performance. Individual variations in metacognition exist, and individuals with low metacognition are considered "incompetent" because they perform poorly compared to their peers (Kruger and Dunning, 1999). Metacognition allows learners to be strategic in their learning by, for example, learning new knowledge rather than analyzing previously studied information (Everson and Tobias, 1998).
Learners of both kinds should be mindful of their metacognition. Nonetheless, due to their disposition and gender classification, their academic achievement can vary from those that do not have gender issues. This may include their understanding of metacognition and its connection to academic success.

This study was primarily designed to determine the metacognition awareness of the respondents and determine the differences in terms of their sexual orientation.
Specifically, it seeks to provide significant answers to the following objectives:
1. To determine the demographic profile of the respondents in terms of:
a. Sexual Orientation
b. Age
c. Course
d. Year Level

2. Determine the Number of Actual Responses (True) and Maximum Number of Responses on Metacognitive Awareness Inventory by Sexual Orientation

3. Determine significant differences in the scores on metacognition awareness inventory of the respondents according to their Sexual Orientation.

2. Materials and Methods

The respondents of the study were One hundred eighty-three (183) college students enrolled in the Bachelor of Secondary Education Program and Bachelor of Elementary Education Program. All of them are from the College of Education, Nueva Ecija University of Science and technology, San Isidro Campus. They were asked to voluntarily complete the Metacognitive Awareness Inventory (MAI) for the duration of 1st Semester of S.Y. 2020-2021. The researchers used a survey–questionnaire as the instrument in gathering data. These were Metacognitive Awareness Inventory (MAI) and the demographic Profile Questionnaire. Descriptive method of research was applied in determining the profiles of demographic variables (age, sexual orientation, course program enrolled, and year level) and Metacognitive Awareness Inventory. Analysis of Variance was administered ANOVA in determining the significant difference between the scores in the Metacognitive Awareness Inventory according to their sexual orientation.
First designed and tested by Schraw and Dennison in 1994. The Metacognitive Awareness Inventory (MAI) was used to measure students' metacognitive awareness. It is consisted of 52 statements that are under the two components. The two components of metacognition are represented within the scale, metacognitive knowledge and metacognitive regulation. Within the MAI these are referred to as the knowledge of cognition factor and the regulation of cognition factor. Within the inventory there are 17 questions related to the knowledge of cognition factor for a possible total score of 17. There are 35 questions related to the regulation of cognition factor

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for a possible point total of 35. Higher scores correspond to greater metacognitive knowledge, greater metacognitive regulation, and greater Metacognitive Awareness. In addition to the knowledge of cognition score and the regulation of cognition score a MAI total score is derived by summing responses to all 52 questions. The instrument was designed for use on student populations.

C. Procedure

Students were asked to complete the MAI and to provide details about their sexual orientation, age, course program enrolled, and year level. Students were not provided incentive in the form of additional points to complete the MAI as this extra credit would have an effect on their grade and confound the results of the study. Total sampling was employed but not all data were retrieved. Only data from students belonging to Bachelor and Elementary Education and Bachelor of Secondary Education were able to answer the questionnaire.

3. Results

Frequency Distribution of Respondents in terms of their Sexual Orientation

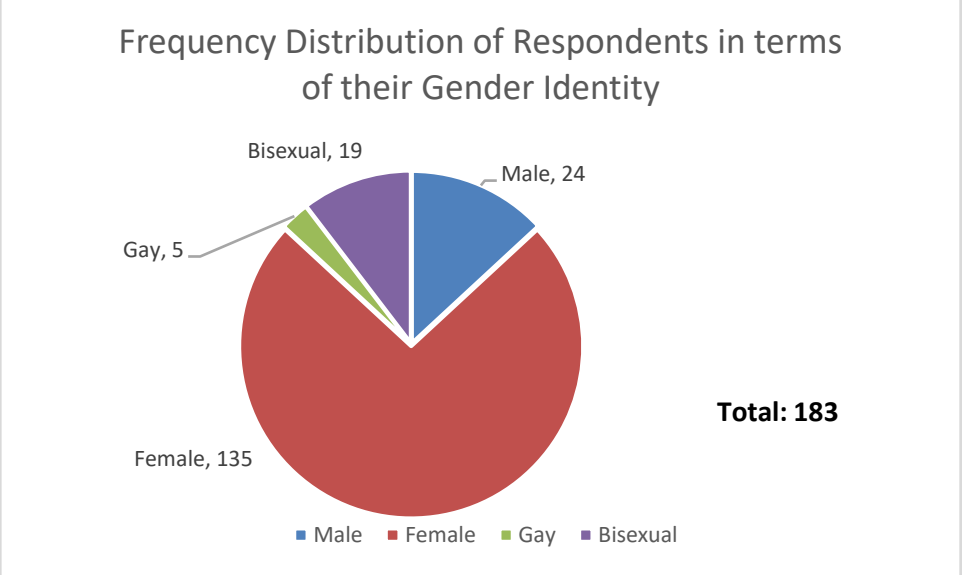

Figure 1.

It can be seen from the figure that the majority of the respondents are female with 135 or 73.77 %. It is then followed by males with 24 or 13.11 % and bisexual with 19 or 10.38 %. Lastly, the gays with a total of 5 respondents or 2.73%. Figure 1 illustrates that 5 gay respondents and 19 bisexuals have identified themselves as totally different from the usual dichotomous gender classification of male and female. This implies that the 24 respondents for both gays and bisexuals are aware that sexual orientation is beyond the confinement of physical boundaries. This finding is a testament that the College of Education students are not afraid of expressing their sexual orientation as a “Bisexual”. It can also be noted that there is no respondent classified as “Lesbian”. The finding may also implies that NEUST-SIC as a university is committed to a positive school climate and culture, which is inclusive of difference and diversity and are therefore more open in accepting sexuality of different orientations (GLEN, 2016).

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Table 1. Frequency Distribution of Respondents according to their Age and Sexual Orientation

AGE RANGE	Male	Female	Gay	Bisexual
16-20	19	104	3	14
21-25	5	25	1	3
26-30	0	0	1	1
31-35	0	5	0	1
36-40	0	1	0	0

It can be seen that majority of the respondents with a frequency of 104 and 25 are female with ages 16 to 20 and 21 to 25 respectively. It is then followed with 19 male respondents ages 16 to 25. Further, the greatest number of the bisexuals and gays were between the age range of 16 -20. This implies that most of the respondents are in their prime years and capable of expressing their sexual orientation in as early as 16 years of age. According to Giordano (2020), the proportion of high school students who identify as a sexual minority — lesbian, gay, bisexual, or questioning (LGBQ) — doubled in the past several years. This has an effect in the number of students who are coming out in the tertiary level.

Frequency Distribution of Respondents according to their enrolled Course Program and Sexual Orientation

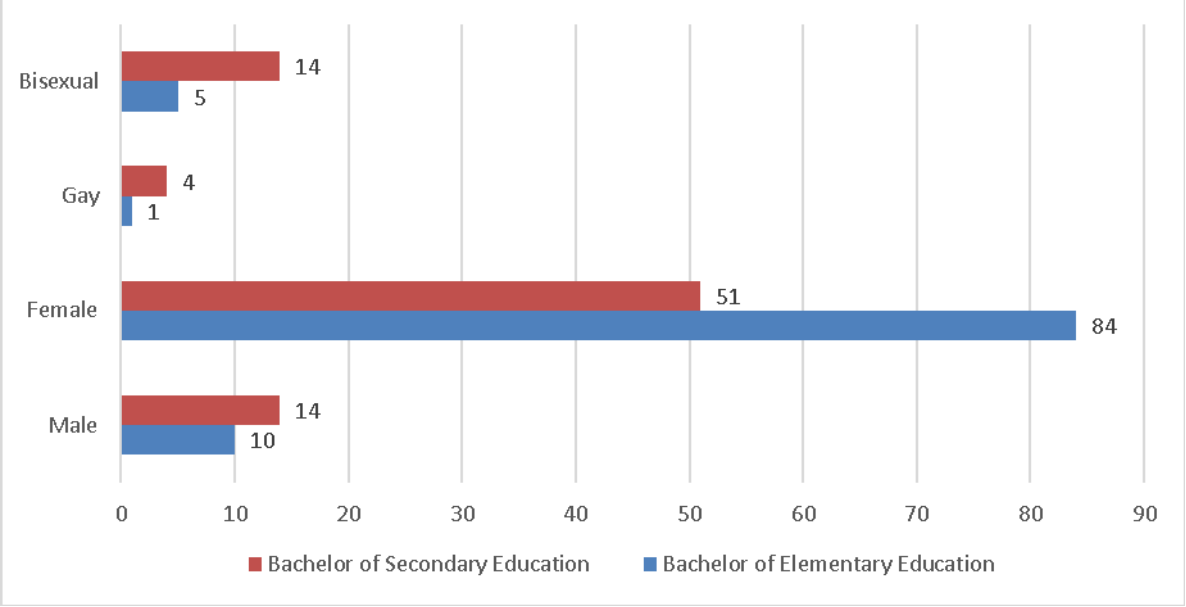

Figure 2.

It can be noted that most of the male, gay, and bisexual respondents are enrolled in the Bachelor of Secondary Education. It can also be gleaned from the graph that majority of female respondents are from the Bachelor of Elementary Education. This implies that most of the respondents from male, gay, and bisexual are interested in handling and in teaching high school students while more female respondents are interested in handling children in elementary grade level. Over the years, the Census findings disclose that in the Philippines, teaching is a woman-dominated profession. There are more female school teachers than male, both in the public elementary and secondary schools (Regalado, 2016). This finding may change in the near future

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as more and more college education students are becoming more aware of identifying themselves as bisexual and gay rather than male and female in the field of education.

Table 2. Frequency Distribution of Respondents according to their Year Level and Sexual Orientation

Year Level	Male	Female	Gay	Bisexual
1st Year	7	34	0	1
2nd Year	13	44	3	12
3rd Year	3	50	2	6
4th Year	1	6	0	0

It can be seen from the table that the majority of the respondents are in their 2nd year level. The same goes with the male, gay, and bisexual respondents which were all in their 2nd year level while the greatest number of female respondents are in their 3rd year level. It is also striking to note that there are no gay respondents and only 1 bisexual respondent in the 1st year level. This is a normal occurrence since 1st year is the year for developing and finding out the circle of friends they feel comfortable with. Trust issues are a common thing among members of LGBTQ because the idea of discrimination may haunt them. In a report by Amy Ellis Nutt (2018) "A new survey finds significant anxiety and fear among teenagers who identify as lesbian, gay, bisexual, transgender or queer". But once they have established the core group which they belong, coming out is easy knowing that their group of friends accept them for who they are.

Table 3. Number of Actual Responses (True) and Maximum Number of Responses on MAI by Sexual Orientation

	Male	Female	Gay	Bisexual
Knowledge of Cognition Factor (KCF) Total	296 (360)	1747 (2025)	60 (75)	250 (285)
Percentage	82.22	86.27	80.00	87.72
Regulation of Cognition Factor (RCF) Total	686 (840)	3885 (4725)	130 (175)	553 (665)
Percentage	81.67	82.22	74.29	83.16
TOTAL (KCF + RCF)	982 (1200)	5632 (6732)	190 (250)	803 (950)
Percentage	81.83	83.66	76	84.53

Table 3 shows the number of actual responses (true) and the maximum number of responses on the metacognitive awareness inventory by sexual orientation. It can be seen from the table that scores of the bisexual respondents got the highest percentage in the knowledge of cognition factor (Metacognitive Knowledge) with 87.72% while the gay respondents got the lowest percentage of 80.00%. This is also the same with regard to their percentage score in the regulation of cognition (Metacognitive Regulation) wherein bisexual respondents got the highest

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percentage of 83.16 % and while the gay respondents got the lowest percentage of 74.29%. For the overall percentage, the bisexual respondents got the highest percentage of 84.53 % while the gay respondents got the lowest percentage of 76.00%. Taken into account that higher scores correspond to greater metacognitive knowledge, greater metacognitive regulation and greater metacognitive awareness. This finding shows that as a whole, bisexual respondents have the highest metacognitive awareness among the other three sexual orientations. Meanwhile, the gay respondents have the lowest metacognitive awareness among the other three sexual orientations.

Table 4. Difference in the Knowledge of Cognition Scores in MAI by Sexual Orientation

Result Details				
Source	***SS***	***df***	***MS***	
Between-treatments	12.9204	3	4.3068	*F* = 1.08982
Within-treatments	707.3856	179	3.9519	
Total	720.306	182		p-value = .35481

Table 5 shows the difference in the knowledge of Cognition Scores in the Metacognitive Awareness Inventory by Sexual Orientations. The computed f-ratio value is 1.08982 and the p-value is .35481. Thus, the result is not significant at p<.05. This implies that there are no significant differences among the scores in the knowledge of cognition in Metacognitive Awareness Inventory of male, female, gay, and bisexual respondents. Although there are differences in the mean, it is not big enough to be statistically significant. Therefore, whether one belonged to any gender identity does not define the scores in the knowledge of cognition of the MAI.

Table 6. Difference in the Regulation of Cognition Scores in MAI by Sexual Orientation

Result Details				
Source	***SS***	***Df***	***MS***	
Between-treatments	40.6941	3	13.5647	*F* = 0.52773
Within-treatments	4600.9561	179	25.7037	
Total	4641.6503	182		p-value = .663789

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Table 6 shows the difference in the Regulation of Cognition Scores in the Metacognitive Awareness Inventory by Sexual Orientations. The computed f-ratio value is 0.52773 and the p-value is .663789. Thus, the result is not significant at p<.05. This implies that there are no significant differences among the scores in the Regulation of cognition in Metacognitive Awareness Inventory of male, female, gay, and bisexual respondents. Although there are differences in the mean, it is not big enough to be statistically significant. Therefore, whether one belonged to any sexual orientations does not define the scores in the regulation of cognition of the MAI.

Table 7. Difference in the Over-all Scores of MAI by Sexual Orientation

Result Details				
Source	***SS***	***Df***	***MS***	
Between-treatments	86.0749	3	28.6916	$F = 0.6964$
Within-treatments	7374.8212	179	41.2001	
Total	7460.8962	182		p-value = .555385

Table 7 shows the difference in the overall Scores in the Metacognitive Awareness Inventory by Sexual Orientations. The computed f-ratio value is 0.6964 and the p-value is .555385. Thus, the result is not significant at p<.05. This implies that there are no significant differences among the scores in the overall scores in Metacognitive Awareness Inventory of male, female, gay, and bisexual respondents. Although there are differences in the mean, it is not big enough to be statistically significant. Therefore, whether one belonged to any Sexual Orientation does not define the overall scores in the MAI.

4. Discussion

This study was conducted at Nueva Ecija University of Science and Technology particularly at the College of Education. The participants are one hundred eighty-three college students in the Bachelor of Elementary Education and Bachelor of Secondary Education in the College of education. The aim is to identify the Metacognitive Awareness Inventory of the respondents when grouped according to their Sexual Orientation (Male, Female, Gay, Lesbian, Bisexual). Metacognition is “thinking about thinking,” but it also encompasses the regulation of these thoughts, which is the ability to change them. It is a step further than a simple awareness of thought processes, incorporating the ability to alter thoughts and behaviors (Brookman- Byrne (2018). John Flavell created the concept in the 1970s. It includes all the processes involved in managing how we think. Examples include planning out our work and activity, tracking our progress and development, and assessing our knowledge. Metacognitive strategies help students

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study smarter and achieve self-control (Drew, 2020). When they "think about their thinking," they become more capable of self-improvement. Thus, more capable of self-learning. Metacognition is a multidimensional set of skills that involve "thinking about thinking." Metacognition entails two components; metacognitive knowledge (knowledge of cognition) and metacognitive regulation (regulation of cognition). The higher the score in the knowledge of cognition, the higher the level in declarative knowledge, procedural knowledge, and conditional knowledge. Declarative knowledge is the factual knowledge of the learner needs before being able to process or use critical thinking related to the topic or lesson. It is about knowing what or that. Procedural knowledge is the application of knowledge for the purpose of completing a procedure or process. It requires students to know the process as well as when to apply process in various situations. And conditional knowledge is the determination under what circumstances specific processes or skills should transfer. It is the application of declarative and procedural knowledge. On the other hand, the higher the score in the regulation of cognition, the more equipped the cognitive functioning of the person. Regulation of cognition involves planning, goal setting, and allocating resources (planning), skills and strategy sequences used to process information more efficiently (information management strategies), assessment of one's learning strategy (Comprehension Monitoring), strategies to correct comprehension and performance errors (Debugging Strategies), and analysis of performance and strategy effectiveness after a learning episode (Evaluation). All of the mentioned cognitive skills are necessary for all types of learners regardless of gender identity to ensure their quality of learning academically.

5. Conclusions

1. Majority of the respondents were female, ages from 16 to 20, enrolled in Bachelor of Elementary Education and in their 2nd year level.
2. The bisexual respondents registered the highest in the knowledge of cognition, regulation of cognition, and overall scores in Metacognitive Awareness. While the gay respondents registered the lowest.
3. No significant differences were found in the scores of the respondents in knowledge about cognition, regulation about cognition, and overall MAI when grouped according to their sexual orientation.

6. Recommendation

1. The study on metacognitive awareness be applied in the entire LGBTQ community of NEUST-SIC.
2. Further studies of metacognition be conducted in different levels of higher studies as well as in different colleges of NEUST.
3. Determine the relationship of metacognition with the student's academic performance at various levels of educational stages.

Research may also be conducted on its relationship to leadership qualities of a person given that most of the students are being trained to become a leader in their own respective fields.

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