

# Practices on Reduce, Reuse, Recycle of University of Mindanao Criminology Students in Addressing the Issue of Climate Change

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**ABSTRACT:** This study aimed to assess the Practice of reusing, reducing, and recycling of University of Mindanao Criminology students in addressing climate change issues. The participants of this study were Criminology students of the University of Mindanao, and are doing (300) research participants from each year level were used for a total of 400 respondents. This study's research subjects are all enrolled Criminology Students at the University of Mindanao who are taking Face to Face classes. The researcher used a survey questionnaire to assess criminology students' Practice on reuse, reducing, and recycling of University of Mindanao Criminology students in addressing climate change issues. The questionnaire for this study was divided into two parts: the first was Reuse, Reduce, Recycle question, and the second part was the Perception on climate change question. The researcher used Descriptive Correlational Research; when the data was gathered, it was statistically analyzed and interpreted by the statistician using the mean. Overall, the Practice of 3Rs in Addressing Climate Change Issues has a range of 3.64 which implies that the Practice of reuse, reduce, and recycle by University of Mindanao Criminology students in addressing the issues of climate change is often exhibited among participants. Statistical tools are used in analyzing and interpreting the data retrieved from the questionnaire. The mean was used to determine the central tendency of the data, which is the Practice of reuse, reducing, recycle of University of Mindanao Criminology students. The Pearson correlation coefficient was used to analyze the data gathered from the respondents. The variables have a significant relationship as they move in the same direction. They could use the result as supplementary data to show a locally- conducted study about the subject and may conduct a further study using more participants to gain further information on this subject matter to fill in the opportunities present in this study.

**KEYWORDS** -reuse, reduce, recycle, climate change, college students, Davao City, Philippine, Criminology

## I. INTRODUCTION

The world faces climate change, an unavoidable environmental threat of the 21<sup>st</sup> century, and is looking for ways to adapt and lessen its effects (IPCC, 2022). The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as "a change that is ascribed directly or indirectly to human activities that modify the composition of the global atmosphere across similar periods." Life on Earth has already started to alter due to climate change. Seasons are changing, temperatures are rising, and sea levels are rising worldwide (NOAA, 2019).

The impact of climate change on our lives and the environment is a complex and multifaceted issue that cannot be ignored. The changes in temperature and precipitation patterns and the increase in extreme weather events significantly impact our food supply. Temperature changes, for instance, can lead to changes in crop yields, crop pests, and disease outbreaks. Similarly, changes in precipitation patterns can lead to water scarcity and drought, harming our food supply; climate change also affects transportation options. As the world gets warmer, the demand for cooling and air conditioning will increase, increasing energy consumption and greenhouse gas emissions. This can be a significant problem, especially in urban areas, where the concentration of vehicles and buildings can exacerbate the problem. Furthermore, rising sea levels can also impact transportation infrastructure such as roads, bridges, ports., wardrobe preferences, and vacation destinations.

This impact also extends to our future, health, and capacity for survival. However, the Intergovernmental Panel on Climate Change (IPCC) statement that "human activity has been the primary cause of the observed warming since the mid-20th century encapsulates the consensus position (Qin, 2014, p. 17) for the reason that we are the ones that raise livestock, consume fossil fuels, and remove forests that increase the atmosphere's concentration of gases that trap heat.

Moreover, the education sector is also directly impacted by climate change, based on the evidence, through repercussions such as infrastructure damage, material loss, student and teacher injuries and deaths, and emotional stress brought on by exposure to extreme weather events. A study by Bucharest found that many academic institutions lacked the resources to maintain effective waste management (Lojă, 2012).

In addition, Parocha. (2015) noted that despite numerous attempts to implement a solid waste strategy. It was discovered that students did not know enough about segregation. However, teachers' competitiveness and incentive to succeed in solid waste management activities encouraged students to segregate correctly. A study by a reliable recycling program must be run because most of the waste produced on campuses is recyclable. The achievement of a student is directly correlated with the school climate. Based on a study, it can, for instance, increase graduation rates, attendance, achievement, and retention. There are numerous facets to the school atmosphere. Educators can identify critical areas to concentrate on to establish safe and supportive climates in their schools by defining a framework for assessing school climate. Beyond doing everything in our power to reduce emissions and slow down the rate of global warming, we must adapt to the effects of climate change in order to safeguard our communities and ourselves (Moqbel, 2018).

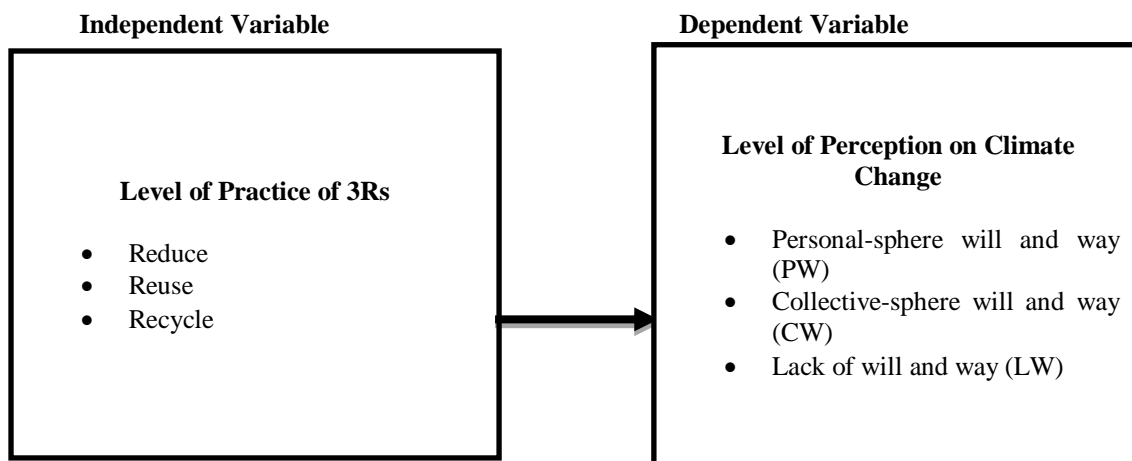
The study adopted the 3 R's as a Climate Change Mitigation Strategy (United Nations Environment Programme, 2018); the theory posits that by implementing the 3 R's—reuse, recycle, and reduce—societies can effectively reduce GHG emissions, conserve resources, and minimize environmental degradation. This, in turn, contributes to the mitigation of climate change impacts. The references provided offer more detailed information and can be a starting point for further exploration. By adopting the principles of reuse, recycling, and reduction, societies can significantly reduce greenhouse gas (GHG) emissions, conserve natural resources, and minimize environmental degradation, thereby mitigating the impacts of climate change.

The Circular Economy theory supported the study (Geissdoerfer, 2017); the circular economy is an economic model aiming to maximize resource value while minimizing waste and environmental impact. It promotes a closed-loop system where products and materials are reused, repaired, and recycled rather than disposed of as waste. This concept aligns with the principles of the three R's and provides a holistic approach to addressing climate change. By implementing the principles of the Circular Economy, societies can reduce their reliance on virgin materials and decrease the energy and resource consumption associated with extraction and production. This, in turn, reduces greenhouse gas emissions and slows down the depletion of natural resources.

Shown in Figure 1 is the conceptual Framework of the study consisting of independent and dependent variables. The independent variable is the practices of 3Rs (Paghasian, 2017) with the following indicators: *Reuse*, which refers to utilizing products or materials for their intended purpose multiple times or extending their lifespan through repair, refurbishment, or repurposing. It involves finding alternative ways to use an item without being discarded as waste; *recycling* involves collecting, sorting, and processing waste materials to transform them into new products or raw materials. It aims to extract valuable resources from waste and

reintroduce them into the production cycle, *reduce* referring to the conscious effort to decrease the consumption of goods and resources, and minimize waste generation. It involves making choices that result in fewer materials, less energy consumption, and reduced environmental impact.

On the other hand, the dependent variable is the level of Perception of climate change (Li & Monroe, 2017) indicated by *personal-sphere will and way (PW)*, which refers to individual motivation, intention, and ability to take action or make changes within one's sphere of influence. It involves personal choices, behaviors, and actions contributing to addressing a particular issue or achieving a specific goal.; *collective-sphere will and way (CW)* refers to a group or community's collective motivation, intention, and ability to work together and take action to address an issue or achieve a common goal. It involves collaborative efforts, shared responsibility, collective decision-making.; and *lack of will and way (LW)*, which to a situation where individuals or communities lack the motivation, intention, or ability to take action or make changes concerning a particular issue or goal. It represents a lack of commitment, interest, or resources hindering progress or desired outcomes.



**Figure 1:** The Conceptual Framework of the Study

The following terms are defined operationally for a clear understanding of the readers. *Practice on 3 R'* refers to the actions and behaviors of students at the University of Mindanao to reduce, reuse, and recycle materials and resources to minimize environmental harms and address climate change. *Climate change* refers to the long-term alteration of the Earth's climate patterns due to natural or human factors, such as greenhouse gas emissions, deforestation, and land use changes, that have significant impacts on ecosystems, biodiversity, and human well-being; *Green criminology* refers to a branch of criminology that studies environmental harms and crimes against the environment broadly conceived, including the study of environmental law and policy, corporate crimes against the environment, and environmental justice from a criminological perspective.

The study aims to investigate the effectiveness of practicing the 3 R's (Reduce, Reuse, Recycle) to address the climate change issue among students at the University of Mindanao. The study aims to achieve the following objectives: first, to ascertain the level of Practice on the 3 R's (Reduce, Reuse, Recycle) among Criminology students at the University of Mindanao regarding Reduce, Reuse, and Recycle. The second is to assess the level of Perception of Climate change among Criminology students' personal-sphere will and way (PW), collective-sphere will and way (CW), and lack of will and way (LW). Lastly, to determine the significant relationship between the level of reuse, recycle and reduce practices and the level of Perception of climate change among Criminology students of the University of Mindanao.

Furthermore, the formulated null hypotheses were tested at the level of significance of 0.05. It assumed that there is no significant relationship between the level of reuse, recycle and reduce practices and the level of Perception of climate change among Criminology students of the University of Mindanao.

The findings of the study provided baseline data to the following individuals or groups of individuals: The administration; the results of this study were crucial to the college's executives in their needs analysis for putting a Solid Waste Management Program through practicing the 3 R's in place on a campus-wide scale. The results indicated that structure and facilities should be offered, rules should be followed, and penalties and consequences should be implemented. *The UM personnel* will gain pertinent Knowledge about the practices of their coworkers who participated, thanks to the study's findings. They will know the need for proper garbage disposal in their line of work. *The Criminology students*: These people can better understand their roles in promoting proper garbage disposal, mainly the 3 R's, thanks to the study's findings. They can serve as positive role models for their families as well as other students. *The future researchers* this research will guide future research on the impact of practicing the 3 R's in different educational contexts and regions, advancing efforts to address environmental issues.

## II. METHOD

This part illustrates and discusses the methodology for acquiring data, evaluating data, and presenting the instrument. The study design, research respondents, research instrument, research procedure, and statistical tools used are all part of this.

### ***Research Respondent***

The respondents in this study were college students from 1<sup>st</sup> year to 3<sup>rd</sup>-year criminology students in the first semester of SY: 2022-2023. The researcher took 400 Criminology students as respondents to the study. In selecting the respondents, the researchers considered a purposive sampling technique because, based on (Ang-ug et al., 2014), this technique is founded on the selection of respondents based on the premise that there were good groups to address the phenomena and purpose of the study. The study took place at the University of Mindanao, particularly in Matina Campus. In terms of inclusion, respondents taken were willing criminology students, while in terms of exclusion, those students from other programs. Regarding withdrawal, criminology students who have expressed willingness and later on changed their mind and opted to discontinue their participation have all the right to do so; it was their prerogative, and the researchers respected their decision.

### ***Materials and Instruments***

This study utilized a questionnaire comprising two variables, each adapted from different sources. The independent variable is from Paghastian (2017), and the dependent variable is from Li and Monroe's (2017) study. Advisers and panels conducted face validation and reliability testing. The questionnaire was designed to obtain information on which of the 3 R's are more practiced by the University of Mindanao Davao City criminology students.

The questionnaire was divided into two parts as follows: the first part is the independent variable level of Practice of 3R with indicators of reduce, reuse and recycle comprised of 15 items, and the second is the dependent variable level of Perception of climate change with indicators Personal-sphere will and way (PW), Collective-sphere will and way (CW) and lack of will and way (LW) consisted of 15 items. To ensure the questionnaire is reliable, the researcher conducted pilot testing taking 40 respondents and having a computed Cronbach Alpha of .986, making the questionnaire valid and reliable.

The responses of the study participants were analyzed using the following scale: With a range of the mean of 4.20-5.00 described as *very high*, which means that the *respondents always agree with the stated attributes*; 3.40-4.19 described as *high*, which means that the *respondents often agree with the stated attributes*; 2.60-3.39 describe as *moderately high* which means that the *respondents sometimes agree with the stated attributes*; 1.80-2.59 describe as *low* which means that the *respondents seldom agree with the stated attributes*; and 1.00-1.79 describe as *very low* which means that the *respondents almost agree with the stated attributes*.

### **Design and Procedure**

Quantitative non-experimental research utilizing the descriptive-correlation technique was employed in this study. Descriptive research design gauges the behaviors and attitudes that are being observed during the probe, while correlational research involves identifying statistical relationships between two variables (Vandertoep& Johnston, 2009). The chosen design is acceptable because the purpose of this study is to ascertain college students' understanding of climate change and the practices of the students on the 3 R's, which were Reduce, Reuse, and Recycle. The respondents of this study were criminology students at the University of Mindanao.

The study used Mean and Pearson Product Moment Correlation. Mean was used to determine the students' awareness and practices on solid waste management and the level of Perception of climate change. Pearson Product Moment Correlation was utilized to determine the relationships between the level of practices of reuse, recycle and reduce and the level of Perception of climate change among Criminology students of the University of Mindanao.

### **III. RESULTS AND DISCUSSION**

This section presents the study's results, including the statistical analysis, conclusion, and recommendations. It also discusses the analyses and interpretations of the data gathered from the respondents.

#### **Level of Practice of 3R's in Addressing Climate Change Issues**

Table 1 shows the descriptive statistics of the data analysis. The overall mean is 3.64, with a standard deviation of 0.28. This indicates a high level of agreement with the statements. The mean for reuse is 4.33 (SD = 0.47), which is the highest, indicating a very high level of agreement. The mean for reduction is 3.36 (SD = 0.47), and the mean for recycling is 3.14 (SD = 0.35), both of which indicate moderate agreement. These results suggest that students primarily practice reuse among the 3Rs in addressing climate change issues.

*Table 1*

*Level of Practice of 3R's in Addressing Climate Change Issues*

<b>Indicators</b>	<b>Mean</b>	<b>SD</b>	<b>Descr iptive Level</b>
Reduce	3.36	.47	Often
Reuse	4.33	.47	Very High
Recycle	3.14	.35	Often
<b>Overall</b>	<b>3.64</b>	<b>.28</b>	<b>High</b>

Table 1 indicates that the overall level of Practice of 3.36 (SD=.28), which suggests that students have a high level of understanding and Practice of the 3Rs (reduce, reuse, and recycle) in addressing climate change issues. This is supported by the study of Ramdan et al. (2022) that 74% of respondents ranked the 3Rs as the first or most preferable way to dispose of waste, and the sources of information related to 3Rs were from different mediums such as posters, news or newspapers, and through educational seminars and workshops.

#### **Level of Perception on Climate Change**

Table 2 shows the descriptive statistics of the data analysis. The overall mean is 4.05, with a standard deviation of 0.46. This indicates that students have a high level of agreement with the statements. The mean for Personal-sphere will and way (PW) is 4.38 (SD = 0.45), which is the highest, also indicating a very high level of agreement. The mean for lack of will and way (LW) is 4.25 (SD = 0.48), which indicates a very high level of agreement with statements. The mean for collective-sphere will and way (CW) is 3.75 (SD = 0.66), which indicates a high level of agreement with statements.

Table 2  
 Level of Perception on Climate Change

Indicators	Mean	SD	Descriptive Level
Personal-sphere will and way (PW)	4.38	.45	Very High
Collective-sphere will and way (CW)	3.75	.66	High
Lack of will and way (LW)	4.25	.48	Very High
<b>Overall</b>	<b>4.05</b>	<b>.46</b>	<b>High</b>

Table 2 shows that students have a high perception of climate change, with an overall level of 4.05 (SD=.46). This is consistent with the findings of a study by Hasan and Kumar (2019), which found that the majority of farmers (61%) perceived climate change at a medium level (score 46 to 90). Students are also more likely to be exposed to information about climate change through their education and social media. Moreover, a study on farmers' Perceptions of climate change by Ado et al. (2019) found that 95% of respondents said that climate change harmed their ability to produce crops, and 92.25% said that it harmed their ability to support their households.

#### Correlation of 3R's Practices and Perception of Climate Change

Table 3 shows a significant positive correlation between the practices of the 3Rs (reduce, reuse, and recycle) and their Perception of climate change. This means that students who practice the 3Rs are more likely to positively perceive climate change. The correlation coefficient of 0.289\* is statistically significant at the 0.05 level, meaning they are a strong relationship between variables.

Table 3  
 Correlation of 3R's Practices and Perception of Climate Change

Perception of Climate Change	of	The Practice of 3R's in Addressing Issues in Climate Change			
		Reduce	Reuse	Recycle	Overall
Personal-sphere will and way (PW)		.258*	.215*	-.107*	.24
		.000	.000	.000	4*
					.00
					0
Collective-sphere will and way (CW)		.355*	.157*	-.187*	.23
		.000	.000	.000	9*
					.00
					0
Lack of will and way (LW)		.321*	.166*	-.153*	.23
		.000	.000	.000	6*
					.00
					0
<b>Overall</b>		<b>.394*</b>	<b>.207*</b>	<b>-.195</b>	<b>.28</b>
		.000	.000	.000	9**
					.00



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$p < 0.05$

The Practice of the 3Rs (reduce, reuse, and recycle) is significantly and positively associated with personal-sphere will and way (PW), collective-sphere will and way (CW), and lack of will and way (LW), as indicated by the R-values of 0.244\*, 0.239\*, and 0.236\* respectively. The p-value of 0.000 indicates that these correlations are highly statistically significant, providing strong evidence for the relationships observed. This suggests that individuals who engage in the 3Rs tend to have a stronger sense of personal and collective motivation and a reduced sense of apathy or lack of motivation.

Furthermore, the Perception of climate change is significantly and positively correlated with the Practice of reducing ( $r = 0.394^*$ ) and reusing ( $r = 0.207^*$ ). This implies that individuals with a higher perception of climate change are more likely to actively reduce their consumption and reuse resources. Conversely, the Perception of climate change has a statistically significant negative correlation with the Practice of recycling ( $r = -0.194$ ). This finding suggests that individuals with a stronger perception of climate change may be less likely to rely solely on recycling as a means of environmental conservation. These results are consistent with a study conducted by Suberi et al. (2018), where 79% of the participants recognized the impact of climate change on their daily activities. It further reinforces the importance of promoting the 3Rs as effective strategies for addressing climate change.

#### IV. CONCLUSION AND RECOMMENDATION

The findings of this study indicated that criminology students are highly aware of climate change and are taking steps to address it. The most common 3R Practice among students is reuse, followed by reduce and recycle. Students also have a high level of Perception of climate change, with Personal-sphere will and way (PW) being the highest indicator. Additionally, the study found a strong relationship between 3R practices and Perception of climate change, suggesting that students who are more likely to practice the 3Rs are also more likely to be aware of climate change and its effects.

Based on the conclusion, the study recommends that university administrations and personnel recognize and support criminology students' active engagement in addressing climate change. Furthermore, fostering a sustainable campus environment and promoting awareness campaigns can encourage more students to adopt eco-friendly practices and contribute to mitigating climate change. The administration can consider integrating sustainability initiatives into the curriculum and providing resources to enhance students' understanding and participation in the 3Rs.

Students can take advantage of the Knowledge and awareness gained from this study to enhance their sustainable practices further and actively participate in environmental initiatives on and off campus. For future researchers, the study provides a foundation for further exploration of the relationship between criminology, the 3Rs, and climate change. Future research can delve deeper into the motivations and barriers influencing students' adoption of sustainable practices.

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