Environmental Consumption, Waste Recycling, and Academic Performance among Selected College Students during the COVID-19 Pandemic

John Mark R. Asio *

Research Development and Community Extension Services
Gordon College
Olongapo City, Philippines
asio.johnmark@gmail.com

Abstract: The environment is suffering so much, and yet humanity is still adamant about saving it. This study determines the awareness of environmental consumption, waste recycling, and its relationship to the academic performance of selected college students during the pandemic period of COVID-19. Using a descriptive research design, the researcher used an online survey method to collect the data for the study. With the use of the convenience sampling technique, 192 college students from a local city college responded to the online survey. As for the instrument, the study adopted and modified an existing questionnaire and subjected it to reliability and validity tests, which yielded an acceptable result. Using SPSS 22, results show that college students "often" observe different environmental consumption and waste recycling schemes in school. Their academic performance also is "good" based on their grade point average from their previous semester. Also, the study showed a low positive relationship between environmental consumption, waste recycling, and academic performance. The study concluded that college students still practice appropriate environmental consumption and waste recycling, even during the COVID-19 pandemic. Based on the results, the researcher provided some implications for the learning system.

Keywords: academic performance, college students, COVID-19 pandemic, environmental consumption, recycling

---

* Corresponding Author: John Mark R. Asio, asio.johmark@gmail.com

1. Introduction

In the current state of the pandemic wherein our education system was to a halt, students in the higher education institution had a hard time adjusting to the "new normal" that the COVID-19 crisis brought upon us (Onyema et al. 2020; Toquero, 2020; Upoalkpajor & Upoalkpajor, 2020). Since the COVID-19 is a contagious disease that is transmitted quickly from one person to another, they consider it a biological disaster for humankind. However, the idea is, this biological disaster impacts the environmental concepts and ideas of the students to some extent and level.

In this study, the researcher tried to uncover some interesting ideas about the environmental contexts of college students. From this notion, this paper focused on two important environmental issues, environmental consumption, and waste recycling. It is important to determine some basic notions for students on how this pandemic affected their ideas to some extent. From reviewing previous papers regarding environmental consumption, they tackled the concept of energy consumption of school and its related ideas like the behavior of teachers and level of consumption (Kim et al., 2019; Ouf & Issa, 2017; Zhang & Bluyssem, 2021). It showed some remarkable findings regarding the efficiency of energy utilization of schools. Also, they depicted how school buildings save energy efficiently by their different factors. Water consumption is also another area that researchers focused on (Rajaeian, et al., 2018) in teaching its vital importance to students. Another perspective includes office materials utilization like changing printing preferences (Shah et al., 2019), and students' level of climate change awareness and environmental attitude (Magulod, 2018). Office materials are important in learning since it is part of the daily routine of teachers and students. Teachers need to provide printouts of activities or modules. On the other hand, students also submit requirements in printed office papers. In terms of student awareness in climate change and the environment, there is evidence of awareness and knowledge but the real-life application is essential also. Purnomo and Kurnia (2019) also stated in their article regarding the students' knowledge regarding sustainable consumption and their level of practice. Results show some fascinating findings which include high knowledge but average in the level of practice. Now, in terms of environmental responsibility, Yue et al., (2020) established that it promotes environmental concern and enhances green consumption among their respondents. These articles provided different perspectives on environmental consumption, particularly in the institution. It helps to figure out some important issues and trends that focus on the environment, especially this time of the pandemic.

In terms of waste recycling, a systematic literature review by Salluka et al., (2020), discussed the ideas of environmental concerns, like recycling and environmental policy in higher education institutions. It showed that different factors affect the intention of recycling behavior in higher education institutions. Since a related study reported that there is an increase in food waste generation from students and the knowledge of waste segregation (Basri et al., 2017). However, in the study of Dung et al., (2017), they revealed that students have a low knowledge level on solid waste management but their attitude is positive towards it. Contrary to the findings, Debrah et al. (2021) revealed that students at both secondary and tertiary levels have positive environmental attitudes and high awareness of environmental issues, however, there is a lack of practical education of teachers to guide students. We consider this a gray area that can be useful in promoting environmental awareness in the curriculum, not simply integrating it with lessons. And finally, in terms of sustainability in the environmental concern, a minority of students know what sustainability is, but a majority of them showed it is important (Msengi et al., 2019). This is quite a remarkable finding. It needs further investigation to provide better perspectives.

In the local contexts, in the Philippines, several works of literature have established some pertinent findings that are beneficial for this research and its argument. Although their studies are not parallel to the ideas of the current study, they are still an important basis for argument and a source of vital facts and figures. Based on the reviewed papers, solid waste management is the primary topic on which most of the authors have considered in their studies. Different analysis on the level of awareness and attitude of students is common (Dolipas et al., 2020; Madrigal & Oracion, 2017; Pahasian, 2017). Practice on solid waste segregation (Bautista, 2019; Madrigal & Oracion, 2017;) also provided varied responses ranging from the high extent to moderate practice. In terms of the relationship between environmental awareness and environmental behaviors among respondents, Garcia et al., (2020) showed an affirmative response. Geguinto (2017) established that they implemented solid waste management practices to a great extent to some selected state universities in CALABARZON, Philippines.

Based on the foregoing discussion of literature, they provided substantial shreds of evidence and findings with contrasting references and ideas. Both local and international perspectives showed that there are still some gaps that need to be addressed. Thus, this study, therefore, explored the realm of uncertainties and tried to uncover some more mysteries in the notion of environmental consumption and waste recycling. However, this time around, the researcher will try to relate this with another variable which is the academic performance of students in the higher education institution.

The primary aim of this study is to assess the environmental consumption, waste recycling, and academic performance of selected students from a higher education institution during the pandemic crisis of COVID-19. It also aimed to find any relationship that may exist between the three variables mentioned.

The study will benefit not only the institutions of higher education but also the students, their households, and the community since what they know about environmental consumption and waste recycling starts at home. Finally, to contribute to the ever-growing literature in the field of environmental science and education.

2. Methodology

2.1. Research Design

The study used a descriptive survey design with an online form as the primary source of data gathering. This is because of the restriction of face-to-face contact and quarantine protocols. A descriptive research design is a type of research which tries to find out or describe a natural phenomenon or certain characteristics of a population or sample (Aggarwal & Ranganathan, 2019; Siedlecki, 2020). Since this study tries to uncover the awareness of college students in terms of environmental consumption and waste recycling during the COVID-19 pandemic, therefore the chosen design is appropriate.

2.2. Respondents

This study comprised 192 students enrolled in a local city college in a highly urbanized city in Region 3, Philippines. The researcher used a convenience sampling technique to get the number of respondents. Convenience sampling is collecting data from a certain population that is nearby and readily accessible for the researcher (Rahi, 2017). Because of the pandemic restrictions and to avoid possible infection and transmission, this technique is quite appropriate. The criterion for inclusion is that the respondent is a bona fide and full-time student of the said city college during the first semester of the academic year of 2020-2021.

2.3. Instrument of the Study

To attain the objectives of the study, the researcher adopted and modified a research instrument by Eren and Yaqub (2015). The research instrument comprised the following sections/ parts: the first part is the demographic profile of the respondents. The second part involves the statements for environmental consumption which comprises five items. Finally, the third part comprises statements that focus on waste recycling which makes up nine items. The instrument also underwent to reliability test using the Alpha Cronbach and yielded an overall coefficient of .800 which is above the acceptable benchmark score of 0.70.

2.4. Data Analysis

For the data analysis, this study used the following tools: frequency and percentage for the academic performance of the respondents, which includes the Grade Point Average (GPA). Then, it also used weighted mean and standard deviation for the environmental consumption and waste recycling awareness. Finally, Pearson-r for the relationship between the three variables involved in the study. For the response of the college students, the study assigned a five-point Likert scale: 5=Everytime; 4=Often; 3=Sometimes; 2=Rarely; 1=Never.

3. Results of the Study

This paper aimed to analyze the relationships between the environmental consumption, waste recycling awareness, and academic performance of selected college students during the COVID-19 pandemic. This study happened during the first semester of Academic Year 2020-2021. The succeeding tables below show the findings of this study.

Table 1. Environmental Consumption of College Students

Statements	Mean	Interpretation
1) I reuse the paper of lecture notes.	3.99	Often
2) I take a print on both sides of a paper.	3.51	Often
3) I checked the preview of the document on the computer before printing.	4.43	Often
4) I often sent an e-mail instead of a hard copy output.	3.73	Often
5) I prefer to read the document on a computer instead of the print on paper.	3.14	Sometimes
Average Weighted Mean	**3.76**	**Often**

Legend: 1.00-1.49= Never; 1.50-2.49= Rarely; 2.50-3.49= Sometimes; 3.50-4.49= Often; 4.50-5.00= Everytime

Table 1 shows the environmental consumption of college students. As seen, statement 3 got the highest weighted mean with 4.43 and has a corresponding descriptive interpretation of "often" in the Likert Scale. It shows that students are smart enough to save some few pieces of papers before printing. They maximize the contents of the document to make the most out of it without spending too much. On the other hand, Statement 5 got the lowest weighted mean score with 3.14 which corresponds to "sometimes" in the Likert scale. This only means that not all of the students have gadgets like personal computer at home. They seldom go to computer shops not unless necessary. Overall, the average weighted mean was 3.76 which has a Likert scale interpretation of "often". This means that majority of the students or most of the students exercise proper environmental consumption of the different commodities mentioned in the statements.

Table 2. Waste Recycling Awareness of College Students

Statements	Mean	Interpretation
1) I throw the used batteries in waste collection boxes.	3.44	Sometimes
2) I use rechargeable batteries instead of disposable batteries.	3.86	Often
3) I prefer to use long-lasting products for a sustainable environment instead of disposable ones.	4.38	Often
4) I avoid using plastic bags or packages.	3.50	Often
5) I use easily soluble bags rather than plastic bags.	3.61	Often
6) I pay attention to water consumption when using the sink and toilet.	4.39	Often
7) I try to protect the environment by using the least number of paper towels.	3.99	Often
8) I throw the garbage into dustbins before leaving the place and not leaving any trash around.	4.54	Everytime
9) I throw the plastic, metal, and paper to separate recycling boxes or bins.	4.18	Often
Average Weighted Mean	**3.99**	**Often**

Legend: 1.00-1.49= Never; 1.50-2.49= Rarely; 2.50-3.49= Sometimes; 3.50-4.49= Often; 4.50-5.00= Everytime

Table 2 shows the waste recycling awareness of college students. Based on the result, statement 8 got the highest mean score with 4.54 which translates to "everytime" on the Likert scale. The result indicates that students are conscious in their actions in terms of proper waste disposal. They also possess the concept of "clean as you go" since this is always emphasized in schools. Statement 1 got the lowest mean with 3.44 with a descriptive interpretation of "sometimes" in the Likert scale. Basically, students have little idea and seldom dispose used batteries especially at home. This might be the reason for such low result. Overall, the average weighted mean is 3.99 with a Likert scale descriptive interpretation of "often". The results only show that the college students are quite aware of waste recycling, especially at this time of the pandemic.

Table 3. Grade Point Average of College Students

GPA Range	Frequency	Percentage	Descriptive Interpretation
90% - 94%	52	27.1	Very Good
85% - 89%	67	34.9	Good
80% - 84%	26	13.5	Average
Prefer not to say	47	24.5	Not Applicable
Total	**192**	**100**	

Table 3 shows the academic performance of the college students as per Grade Point Average (GPA). As observed, more students belong to the GPA range of 85-89% which corresponds to a "good" descriptive interpretation. The GPA range of 90-94% followed which corresponds to a descriptive interpretation of "very good" and finally, the GPA range of 80-84% came last, which corresponds to "average" in the descriptive interpretation. Unfortunately, one-fourth of the college students did not provide their GPA range because of a variety of reasons. Based on the GPA results, most of the students have good academic performance in their classes despite the current pandemic situation.

Table 4. Correlation Matrix between Environmental Consumption, Waste Recycling and
Academic Performance of College Students

	1	2	3
Environmental Consumption	1		
Waste Recycling	.333* (.000)	1	
Academic Performance	-.241* (.000)	-.135 (.063)	1

p < .05

Table 4 specifies the correlation matrix between the environmental consumption, waste recycling, and academic performance of college students. As shown, environmental consumption produced a positive weak correlation with waste recycling since r = .333, *p* = .000. However, environmental consumption yielded a negative weak correlation with academic performance. With these contrasting results, the study showed that environmental consumption correlates positively with waste recycling. This means that an increase in environmental consumption will also increase the waste recycling awareness of college students. But in terms of academic performance, the result is the other way around. An increase in environmental consumption means a decrease in the academic performance of college students.

4. Discussion

The primary aim of this study is to determine the environmental consumption, waste recycling, and academic performance of college students. Besides, the study would also like to analyze any statistical relationships between the three variables. The researcher, therefore, found the following interesting results yielded by the online survey.

. For the environmental consumption of college students, the result showed that the majority of the responses fall under the category of "often". This means that students exercise prudence to consume environmental products like paper and printing. Checking the preview of a document on the computer before printing helps save paper and ink by knowing how many pages you will print. It will also save time for reading too many pages which are useless in the end. Some students prefer reading the document on a computer instead of printing it out which is more cost-efficient. This only proves that students are environmentally and economically conscious. This result justifies the study of Yue et al. (2020) which explained that environmental responsibility has diverse effects on green consumption purpose among their respondents in their study. From a fresh perspective, the study of Garcia et al. (2020) found that a reasonable level of awareness in the practice of environmental behavior among their respondents. This somehow still supports the current result of the study.

In waste recycling, it is interesting to note that statement 1 which focuses on the proper disposal of used batteries got the lowest mean score. This means that students still need some reinforcement on the proper disposal of batteries which are quite harmful. This result disagreed with the findings of Prabu (2018) which showed a moderate level of recycling knowledge among students.

 Also, Dolipas et al., (2020) showed that university students have a very low compliance level with waste segregation. Also, Basri et al., (2017) also mentioned that among the students' constraints was the lack of segregation facility bins in their school. Thus, this implies that students in the current study are more aware and practices waste recycling.For the next item in the study, which is the academic performance of the student-respondents, over one-third of the respondents got a grade

point average (GPA) between 85-89 percent. This shows a splendid figure since they blessed not all of the students with high intellect and there are more in the average portion. In an article by Chiu and Cheng (2017), they showed that students adopting active classroom learning were better and more encouraging for students' creativity and innovation. The result shows that the student-respondents are knowledgeable and can grasp ideas, understand and apply what they learn to real life.For the last item of the study where the statistical analysis for relationship was done, a significant finding emerged. Environmental consumption yielded substantial evidence of a relationship to waste recycling and the academic performance of the students. Thus, if an individual is aware of the different environmental consumption, waste recycling also follows. In the same context, a high level of environmental consumption reciprocates high academic performance among students. Studies that provided different perspectives on the related concept of environmental consumption, waste recycling, and academic performance include Magulod (2018) who mentioned that climate change awareness is related to environmental attitude. Madrigal and Oracion (2017) showed the relationship between attitude and practice and the extent of the practice of solid waste management. The educational level also played a role in the attitude and extent of the practice. However, Paghasian (2017) showed that solid waste management awareness did not influence the waste disposal practices of respondents. But Dung et al., (2017) exhibited in their study a relationship between the knowledge and attitude of students and solid waste management. Debrah (2021) also presented almost the same result from the previous study, however this time, it included teachers in terms of the relationship between knowledge and attitude towards solid waste management.

5. Conclusion

Based on the current results of the study, the researcher, therefore, concluded that college students are aware of the different environmental consumption in college. The study also observed the same awareness for the waste recycling knowledge of college students. In the academic performance of the students, based on the previous grade point average (GPA) it showed a fairly good result. Finally, the current study also found a relationship among the three variables where the environmental consumption yielded a low positive relationship to waste recycling and academic performance of the college students. Therefore, the environmental consumption of college students affects their waste recycling and academic performances.

This only means that environmental consumption in the institution among students influences their waste recycling awareness and activities. If a student has plenty of resources that can be used in the school like paper and other writing materials, the more is the possibility of wastage, therefore, recycling is imperative. Not all the time, when a student takes notes, the backside of the paper is also used. Besides, environmental consumption also affects the academic performances of the students, since basic materials like writing, printing, and painting materials are important in learning. Some students have to deal and struggle with the school supplies needed for their learning like notebooks and pens because not all are given provisions. Thus, such a concept can lead to poor performance because it is difficult to study without notes or books to read.

Just like any other researches in the field, this study also possesses certain limitations. First, it only focused on one institution. Because of the current pandemic, the researcher is taking safety precautions in conducting the study. Second, although the study was in just one institution, the respondents were not well represented since other courses were not included in the study. Third, the methodology also needs improvement, specifically in the statistical analysis. One can go further than

Pearson-r and do a regression analysis. Last, a comparative study can also be done with other levels of the educational system.

5.1. Recommendation

Based on the results and conclusion of the study, the researcher provided the following practical suggestions and recommendations: the institution should maintain a vigilant campaign regarding proper waste disposal and recycling as necessary both in the school and at home. In the school (and home) premises, solid waste management should be strictly implemented and should be observed by all the students, staff, and faculty. There is no exception since there is a law, city ordinance, and a school policy that would be a basis of such enforcement. Faculty members and staff should also practice and be role models in personal environmental consumption and waste management in class, in the faculty room, and other premises of the school so that students will also get the message and follow the same. There should be enough signages where waste should be deposited and waste bins should be available everywhere on the campus and they should be checked and monitored from time to time. As for the students, a simple thought that is worth remembering, if the waste is small and there is no waste bin available, keep it in your pocket, purse, bag, or your hand first until you find one. Consider this, you are not just helping yourself, but also the environment. Small things can make great changes.

References

[1] Aggarwal, R., & Ranganathan, P. (2019). Study designs: Part 2 – descriptive studies *Perspectives in Clinical Research, 10*(1), 34-36. https://doi.org/10.4103/picr.PICR_154_18.

[2] Basri, N.E., Ghano, S.F.A., Zain, S.M., & Ghee, T.K. (2017). Waste generation and students' perception on waste separation program at cafeterias UKM Bangi Campus. *Journal of Engineering Science and Technology,* 80-90.

[3] Bautista, P.R. (2019). Level of awareness and practices on solid waste management (SWM) among college students. *Journal of Biodiversity and Environmental Sciences, 14*(1), 131-138.

[4] Chiu, P.H.P., & Cheng, S.H. (2017). Effects of active learning classrooms on student learning: A two-year empirical investigation on student perceptions and academic performance. *Higher Education Research & Development, 36*(2), 269-279. https://doi.org/10.1080/07294360.2016.1196475.

[5] Debrah, J.K., Vidal, D.G., Dinis, A.P. (2021). Raising awareness on solid waste management through formal education for sustainability: A developing countries evidence review. *Recycling, 6*(6). 1-21. https://doi.org/10.3390/recycling6010006.

[6] Dolipas, B.B., Ramos, J.L.S., Alimondo, M.S., Ocampo, P.S., & Fulwani, D.L.A. (2020). Awareness and compliance on waste segregation: Implication to a waste management program in a university. *Athens Journal of Sciences, 7*(2), 67-76. https://doi.org/10.30958/ajs.7-2-1.

[7] Dung, M.D., Mankilik, M., & Ozoji, B.E. (2017). Assessment of college students' knowledge and attitudes toward solid waste management in North Central Zone of Nigeria. *Science Education International, 28*(2), 141-146. https://eric.ed.gov/?id=EJ1155930.

[8] Garcia, L.C., Aguirre, M.L.C., & Galasinao, E.A. (2020). Environmental awareness (EA), awareness of general consequence (AC), and pro-environmental behaviors (EB) among college students. *International Journal of Sciences: Basic and Applied Research, 52*(1), 124-145.

[9] Gequinto, A.C. (2017). Solid waste management practices of select state universities in CALABARZON, Philippines. *Asia Pacific Journal of Multidisciplinary Research, 5*(1), 1-8.

[10] Kim, TW., Kang, B., Kim, H., Park, CW., Hong, W-H. (2019). The study on the energy consumption of middle school facilities in Daegu, Korea. *Energy Reports, 5*, 993-1000. https://doi.org/10.1016/j.egyr.2019.07.015

[11] Madrigal, D.V., & Oracion, E.G. (2017). Solid waste management awareness, attitude, and   practices   in a Philippine Catholic Higher Education Institution. *Recoletos Multidisciplinary   Research   Journal,*43-56.

[12] Magulod, G.C. (2018). Climate change awareness and environmental attitude of college   students in one campus of a State University in the Philippines. *Journal of Biodiversity and Environmental   Sciences, 12*(2), 211-220.

[13] Msengi, I., Doe, R., Wilson, T., Fowler, D., Wigginton, C., Olorunyomi, S., Banks I., &   Morel,   R. (2019). Assessment of knowledge and awareness of "sustainability" initiatives among   college   students. *Renewable Energy and Environmental Sustainability, 4*(6), 1-11. https://doi.org/10.1051/rees/2019003

[14] Onyema, E.M., Eucheria, N.C., Obafemi, F.A., Sen, S., Atonye, F.G., Sharma, A., &   Alsayed,   A.O. (2020). Impact of coronavirus pandemic on education. *Journal of   Education and Practice, 11*(13), 108-121. https://doi.org/10.7176/JEP/11-13-12

[15] Ouf, M.M., & Issa, M.H. (2017). Energy consumption analysis of school buildings in   Manitoba, Canada. *International Journal of Sustainable Built Environment, 6,   359-371.* https://dx.doi.org/10.1016/j.ijsbe.2017.05.003

[16] Paghasian, M.C. (2017). Awareness on solid waste management among college students   in   Mindanao State University Maigo School of Arts and Trades. *Advances in Social   Science,   Education   and Humanities Research, 128*, 1-8.

[17] Prabu, P.S. (2018). A study on recycling knowledge among undergraduate students. *International Journal of Research and Analytical Reviews, 5*(4), 90-93.

[18] Purnomo, H., & Kurnia, W.I. (2019). The assessment of college students' knowledge and   practice regarding the application of sustainable consumption patterns in Yogyakarta,   Indonesia.   *IOP Conference Series: Materials Science and Engineering, 598*, 012027. https://doi.org/10.1088/1757-899X/598/1/012027.

[19] Raji, S. (2017). Research design and methods. A systematic review of research paradigms, sampling issues, and instrument development. *International Journal of Economics &   Management   Science,   6*(2), 1000403. https://doi.org/10.4172.2162-6359.1000403 .

[20] Rajaeian, N., Keshtiaray, N., & Nadi, M.A. (2018). Lived experiences of primary school   students   of water consumption phenomenon. *Quarterly Journal of Environmental Education   and   Sustainable Development, 6*(3), 47-60.

[21] Sallaku, R., Baratta, R., Bonfanti, A., & Vigolo, V. (2020). Recycling behavior in higher   education institutions: a systematic literature review. *Sinergie: Italian Journal of   Management,   37*(3) 127-148. https://doi.org/10.7433/s110.2019.06.

[22] Shah, I.A., Amjed, S., Alkathiri, A. (2019). The economics of paper consumption in offices. *Journal   of Business Economics and Management, 20*(1), 43-62. https://doi.org/10.3846/jbem.2019.6809.

[23] Siedlecki, S.L. (2020). Understanding descriptive research designs and methods. *Clinical Nurse Specialist, 34*(1), 8-12. https://doi.org/10.1097/NUR.0000000000000493.

[24] Toquero, C.M. (2020). Challenges and opportunities for higher education amid the COVID-19 pandemic: The Philippine context. *Pedagogical Research, 5*(4), em0063. https://doi.org/10.29333/pr/7947.

[25] Upoalkpajor, J.L.N., & Upoalkpajor, C.B. (2020). The impact of COVID-19 on education in Ghana. *Asian Journal of Education and Social Studies, 9*(1), 23-33. https://doi.org/10.9734/ajess/2020/v9i130238.

[26] Yue, B., Sheng, G., She, S., & Xu, J. (2020). Impact of consumer environmental responsibility on green consumption behavior in China: The role of environmental concern and price sensitivity. *Sustainability, 12,* 2074. https://doi.org/10.3390/su12052074.

[27] Zhang, D., & Bluyssen, P.M. (2021). Energy consumption, self-reported teachers' actions, and children's perceived indoor environmental quality of nine primary school buildings in the Netherlands. *Energy & Buildings, 235*, 110735. https://doi.org/10.1016/j.enbuild.2021.110735.

Biodata*:*

John Mark R. Asio *is currently the Research Director of the Research Development and Community Extension Services (RDCES) of Gordon College, Olongapo City, Philippines. At the same time he is also an Instructor at the Social Sciences and Philosophy Department of the College of Education, Arts, and Sciences of the same institution.*