

A top-down photograph of a sandy beach littered with various pieces of discarded plastic. The debris includes bottle caps in shades of blue, green, and orange; fragments of plastic bottles; a small purple container with the brand name 'MARTINSON' visible; and other unidentifiable plastic scraps in various colors like red, pink, and yellow. The sand is a light tan color, and the overall scene illustrates the problem of plastic pollution.

Single Use Plastics at the American College of Greece

#ACGGoesPlasticFree Campaign 2019-2020

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Center of Excellence for Sustainability
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Introduction

Since the introduction of plastic material in the 1950s, there has been increasing concern about the plastic pollution of the oceans (Cózar et al., 2014). According to Greenpeace USA (2018), only 9% of plastic generated since the 1950s has been recycled while it takes 450 years for durable plastic, such as a plastic bottle, to biodegrade (Wright et al., 2018). Plastic pollution, and especially tiny particles of plastic debris – the so-called microplastics- are so pervasive to the marine ecosystems and aquatic life that a piece of plastic can be found even in the deepest, most distant part of the ocean (Borelle et al., 2017). There are cases where single-use plastic items have reached unprecedented depths at 10,898m (Chiba et al., 2018). Single-use plastic is consumed at great length on a daily basis and according to the World Bank (2012) it composes 11% of municipal solid waste in high income countries, like Greece (World Bank, 2020).

In light of this situation, campus sustainability which specifically concerns plastic waste generation, should be one of the core goals of college and university management (McClure, 2010).

This report will focus on the consumption of single-use plastic items on the campus of the American College of Greece (ACG) based on data retrieved from an online survey concerning plastic footprint. Firstly, we will present the methodology used for conducting the online survey. Secondly, we will present and analyze the data retrieved from the online survey which will be divided into three sections: participant population characteristics, single-use plastic consumption on the ACG campus and awareness regarding policies and practices adopted by ACG such as labelling and recycling campaigns. Lastly, we will discuss several recommendations for further prevention of single-use plastic consumption and generation of plastic waste on campus based on the positive and negative results extracted from the online survey.

“This is our greatest challenge: learning to live in a crowded and interconnected world that is creating unprecedented pressures on human society and on the physical environment.”

-Jeffrey Sachs

Methodology

The online survey was addressed to students, faculty and staff of ACG. It was conducted with the support of the Centre of Excellence for Sustainability of the College. The online survey was formed following recommendations by the ACG Sustainability Manager, Ms Rania Assariotaki, the instructor of the course on Sustainable Use of Resources and Waste Management, Ms Maria Vitoraki, as well as by students attending this course during the Spring semester of the academic year 2019-2020.

The purpose of this online survey was to calculate the average plastic footprint of the ACG community and the ACG campus and to explore awareness issues regarding sustainability policies and practices the College has already adopted. The survey comprised of nineteen (19) questions divided into three (3) sections. The first section addressed demographics, namely gender, function at ACG, major or minor and year of studies. The second section focused on the plastic footprint, meaning how many single-use plastics does a person use on average per week. The single-use plastics referred to in the survey were plastic bottles, plastic cups for hot and cold beverages, plastic straws, plastic food wrappers and containers and plastic plates and cutlery. These were found to be the single-use plastic items that are most likely to be used and thrown away on the campus grounds of the College. In any case, the survey focuses only on what the students, faculty and staff would consume and then throw away within the campus grounds and does not address the general plastic footprint of each individual. The second section included questions regarding the potential awareness of alternatives such as the usage of reusable bottles, cups and containers for beverages and for food on campus. The third section centered around awareness issues, namely the degree of familiarity of the ACG community with recycling strategies, policies and practices adopted by the College. Moreover, it aimed at finding out the degree of awareness regarding policies that may function as incentives for the elimination of single-use plastic items and the adoption of sustainable personal daily choices and habits.

The online survey was shared through group e-mails, the social media, the Blackboard online educational platform and through personal requests and word-of-mouth. Seventy two (72) people answered the online survey in total. Given the fact that the participation to this online survey was done in a voluntary basis, it is probable that there is a selection bias, meaning that it is likely that the people who chose to participate, did so because this is a topic of interest to them.

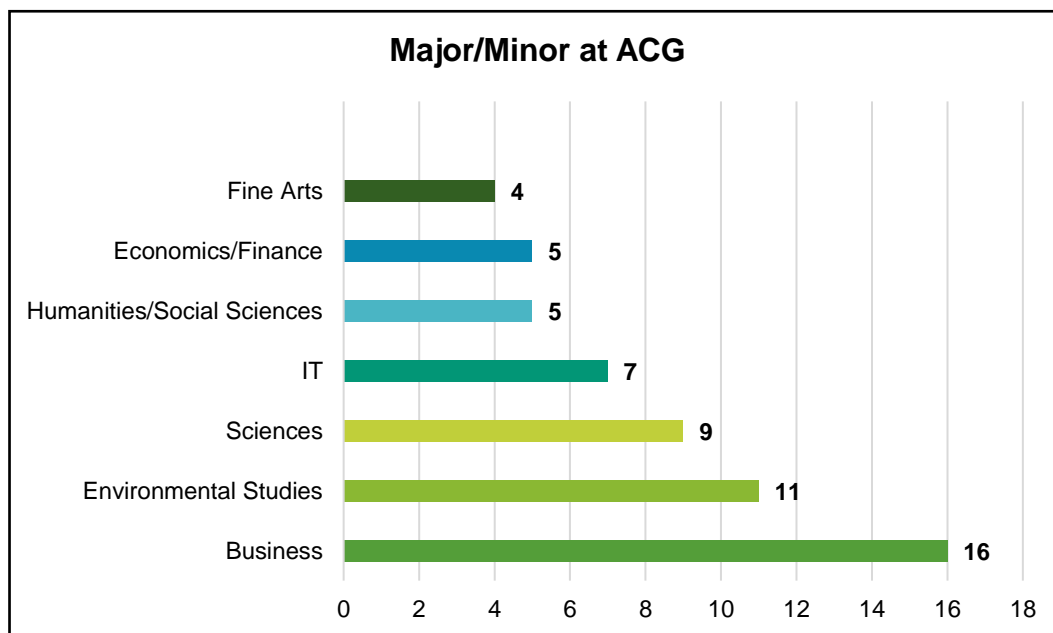
Results and Analysis

Participant Population

From the total of 72 people who answered the online survey, **86%** were women, **11%** were men and **3%** preferred not to say. Out of the 72 people, **79%** were students, **13%** were staff and **8%** were faculty. Given the fact that the majority of participants were students, their studies, either their major or minor, was categorized to seven (7) fields: business, environmental studies, sciences, information technology, humanities/social sciences, economics/finance and fine arts. As seen in *Figure 1*, the survey was answered by a wide array of students coming from different disciplines and backgrounds.

Figure 1

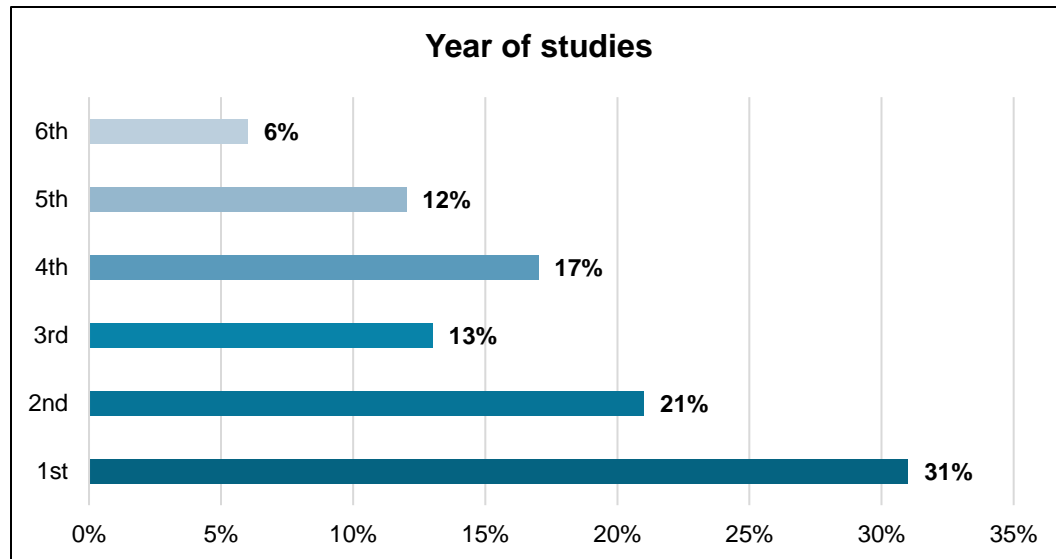
Number of student participants by their major or minor at the American College of Greece.



As seen in *Figure 2*, the majority of the student participants were enrolled in their first year of studies, a big percentage was enrolled in their second and fourth year of studies, some of them were enrolled in their third and fifth year of studies and very few were enrolled in the sixth year.

Figure 2

Number of student participants by their year of studies at the American College of Greece.



Single Use Plastic Consumption

As mentioned in the “Methodology” section, the questions concerning single-use plastics consumption were centered around the five most common single-used plastics found on campus: plastic bottles, plastic cups, plastic straws, plastic food wrappers and containers and plastic plates and cutlery. The survey contained one question for each category of single-use plastics and it provided four options: no consumption of the single-use plastic, consumption of less than five plastic items per week, consumption of five to ten items and consumption of more than ten items per week. The weekly timescale seemed the most appropriate choice so that the participants be able to provide a realistic estimate of the number of plastic items in each category used. It should be noted that there are four main sources from which students, faculty and staff can buy single-use plastic items on the campus grounds belonging to one of the five most common categories referred to above. These sources are:

1. The Starbucks coffee shop where students, faculty and staff can acquire different kinds of hot and cold beverages and foodstuffs usually wrapped in plastic and/or laminated paper,
2. The Venetis coffee shop where students, faculty and staff can acquire different kinds of hot and cold beverages and foodstuffs usually wrapped in plastic and/or laminated paper,
3. The Dipnosofistirion coffee shop where one can buy a wide range of hot and cold beverages as well as certain foodstuffs wrapped in paper or plastic packaging,

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4. The Dipnosofistirion catering service where one can buy a wide selection of hot and cold meals,
 5. Vending machines where one can buy prepackaged foodstuffs and a narrow selection of hot beverages, either in plastic containers and bottles or in aluminum cans.

Most Common Single Use Plastics

The following five figures show the answers given by the participants of the online survey to the question: how many of each single-use plastic item do you use per week on campus?

Figure 3, 4, 5, 6 and 7 demonstrate the estimated plastic footprint of each category of plastic items a person on the ACG campus has on a weekly basis (5 days). As seen in *Figure 8*, **64%** of participants answered that they do not use any of these items, **30%** that they consume less than 5 plastic items per week on campus, **6%** that they use between 5 to 10 items and **0%** uses more than 10 . That leads us to the conclusion in *Figure 9*, that the average consumption of one of these common categories of single-use plastics is **1** plastic bottle, **1.5** plastic cups, **0.9** plastic straws, **2.4** plastic containers and **1** set of plastic plates and cutlery per person per week.

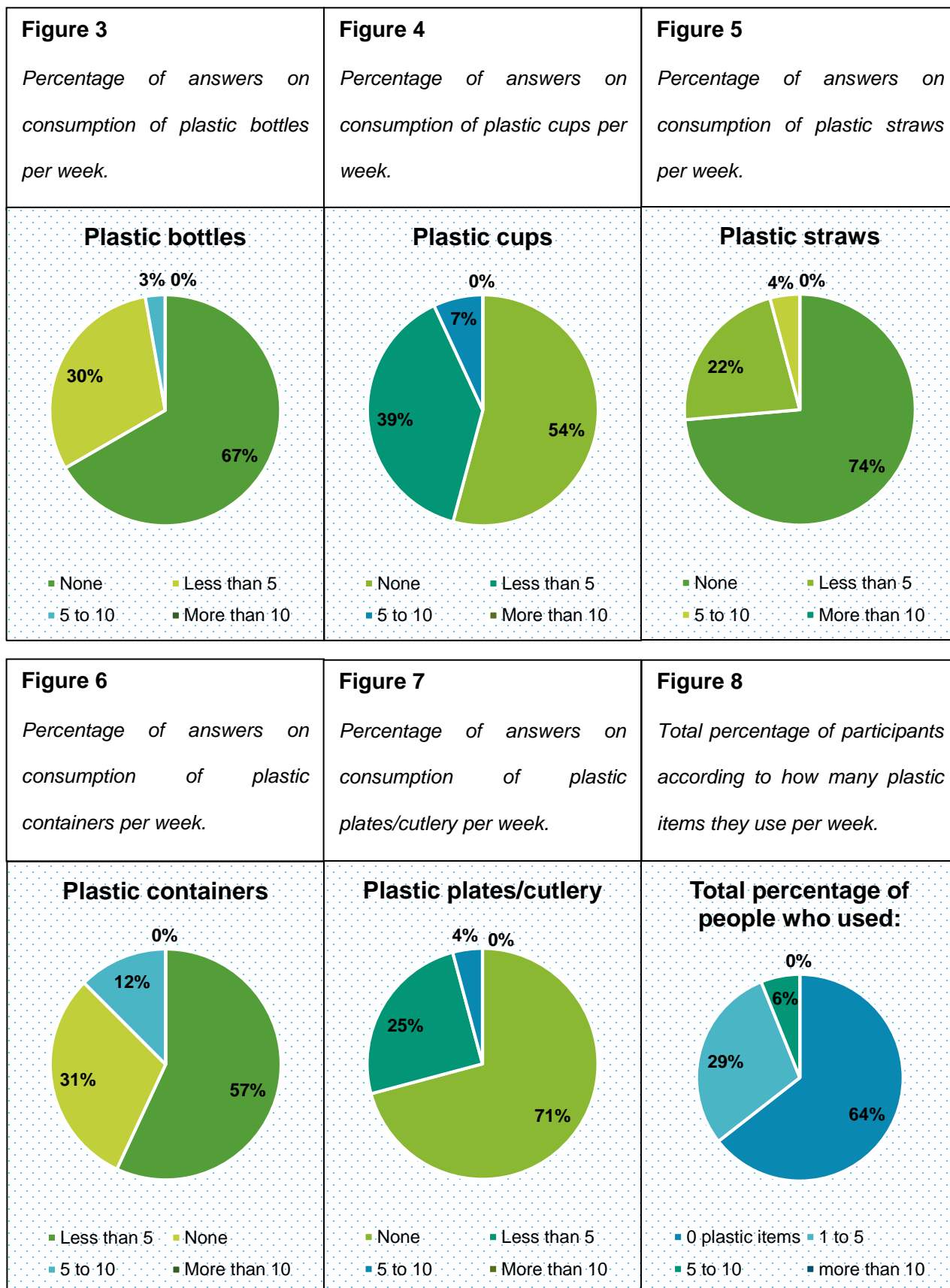
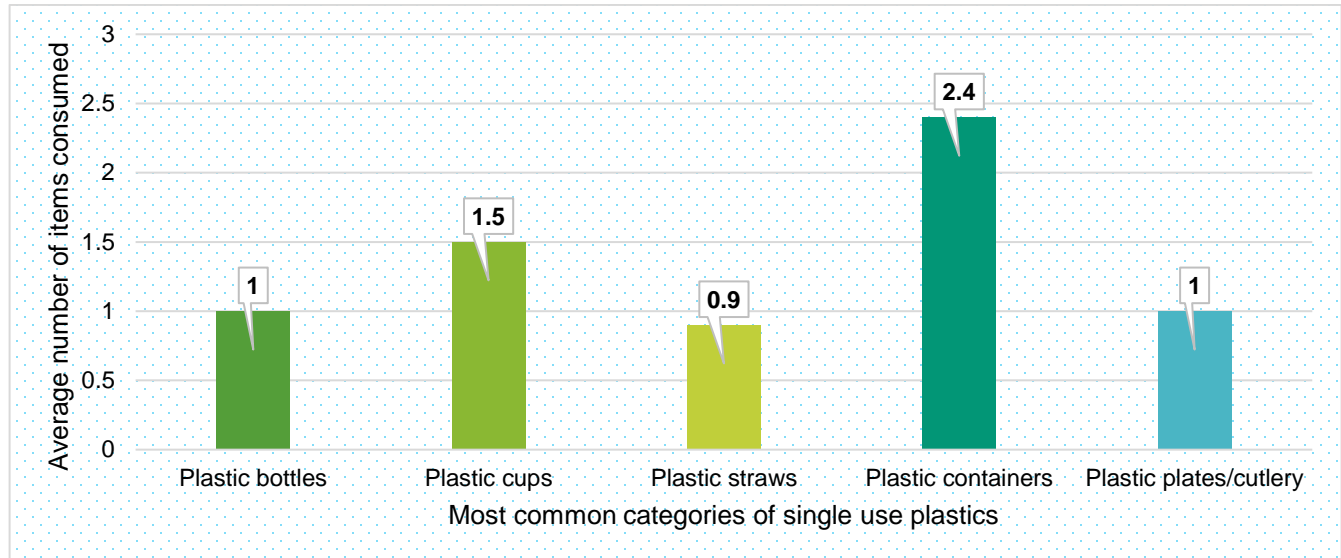


Figure 9

Average consumption per person per week on the ACG campus of each of the most common single-use plastic categories.



Thus, the **average individual plastic footprint** (including all five common categories of single-use plastic items) on campus amounts to **1.2 plastic items per week**. If we consider that the academic year of 2019-2020, according to the ACG Academic Calendar (excluding the summer sessions and the summer term during which less students enroll for classes and not taking into account this year's extraordinary closure of all educational institutions in Greece due to the pandemic of Covid-19), the **average individual plastic footprint on campus** is **35 plastic items per academic year** (30 weeks). If multiplied by the number of undergraduate and graduate students enrolled in the Fall semester of 2019, the number of academic faculty and the number of staff at Deree campus (excluding the Alba campus which is located in downtown Athens) the **overall average plastic footprint of the campus** (4,152 individuals) amounts to **4890 plastic items per week** and to **146,714 plastic items per academic year**.

If we look at *Figure 8*, we will notice that **94%** of participants use between 0 and 5 plastic items of each category of single-use plastic items per week. If we take this percentage into account, we can calculate that the potential range of the individual plastic footprint is calculated to be **between 0 and 25** plastic items per week and **between 0 and 750** plastic items per academic year. In this context, the potential range of the campus plastic footprint could be **between 0 and 103,800** plastic items per week and **between 0 and 3,114,000** plastic items per academic year. It has to be noted that the potential range of the plastic footprint showcase the best and worst-case scenarios while the most realistic representation of the present situation according to the answers of the online survey are illustrated

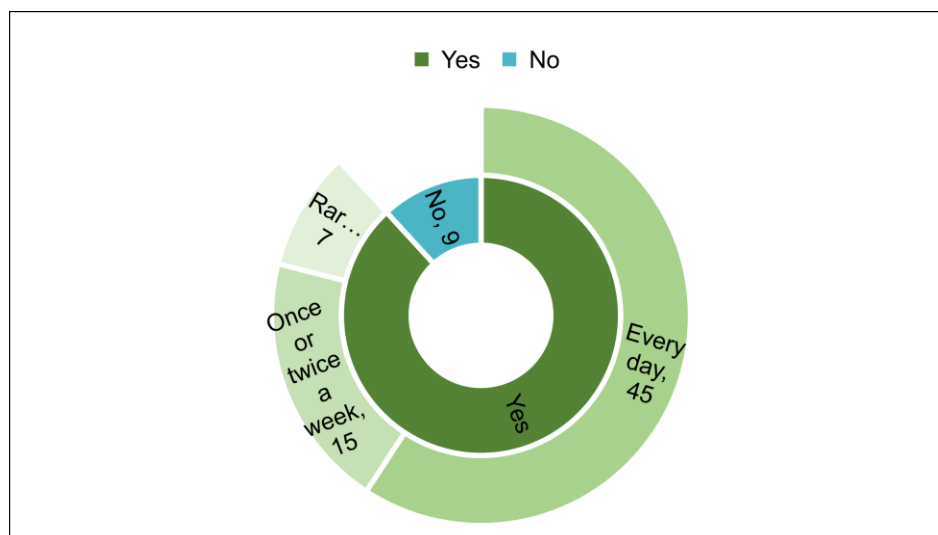
through the average individual and plastic footprint as presented in *Figure 9*. Error can be present in these calculations as not all individuals, especially students, attend classes every day or every week during the academic year and we are not taking into account visitors that are likely to buy something to eat or drink during the visit around the campus which may be packaged in a single-use plastic item. Moreover, as seen in the figures above, some plastic items are more consumed than others. Thus, **66%** of participants do not buy plastic bottles, **54%** do not buy plastic cups, **73%** refuse plastic straws and **71%** do not use plastic plates and cutlery. However, **69%** of participants consume at least 1 to 10 plastic food wrappers and containers each week. A positive result of the answers given in the survey is the fact not a single participant consumes more than 10 single-use plastic items of the most common categories of items cited above.

Alternatives and Reusables

This line of questions focused mostly on whether the participants know and use alternatives to single-use plastic items. **87%** of participants own a reusable bottle or cup while **13%** do not. *Figure 10* illustrates how many people own a reusable bottle or cup and how frequently they bring it on campus. **67%** of participants bring their reusable bottle/cup to campus every day, **23%** bring it once or twice a week and **11%** do not bring it more than once. The people who do own a reusable bottle/cup use it on campus on average **3.7 times per week**. This means that if we exclude the people who refuse plastic bottles and cups on campus, the rest of the people consume on average **2.9 plastic bottles** and **3.3 plastic cups** per week.

Figure 10

Number of people who own a reusable bottle or cup and number of people according to frequency of its use on campus.



Another big source of single-use plastics on campus is the catering service and overall food packaging. *Figure 11* showcases the percentage of participants who bring their own food on campus. **90%** of participants answered that when they bring food on campus, they bring it in a reusable food container while only **10%** answered that they do not. When it comes to buying food on campus, there are very few who bring their reusable container just for that purpose. **41%** opt for a plastic container and cutlery and another **43%** opts for a ceramic plate and cutlery provided by the catering service, as seen in *Figure 12*.

Figure 11

Percentage of participants according to how frequently they bring food on campus.

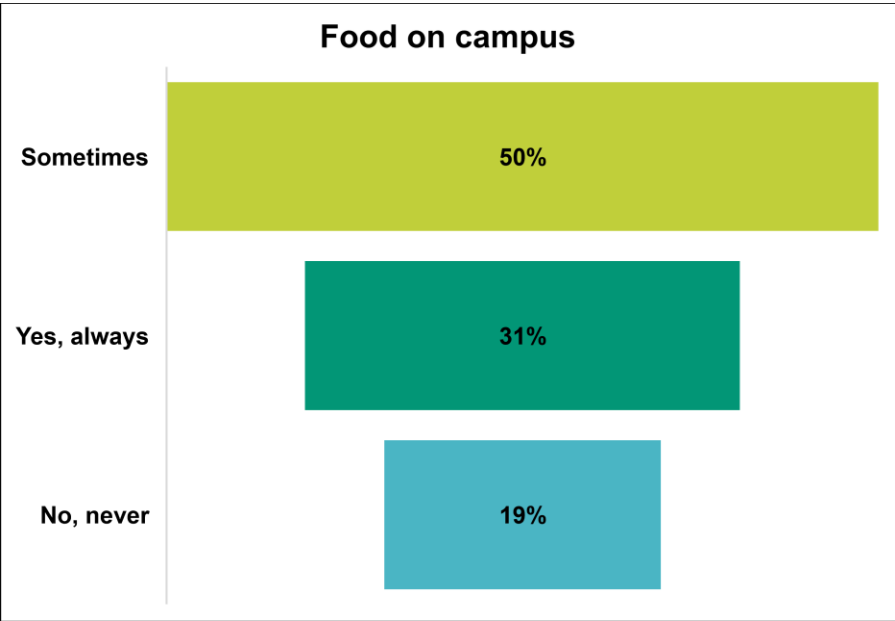
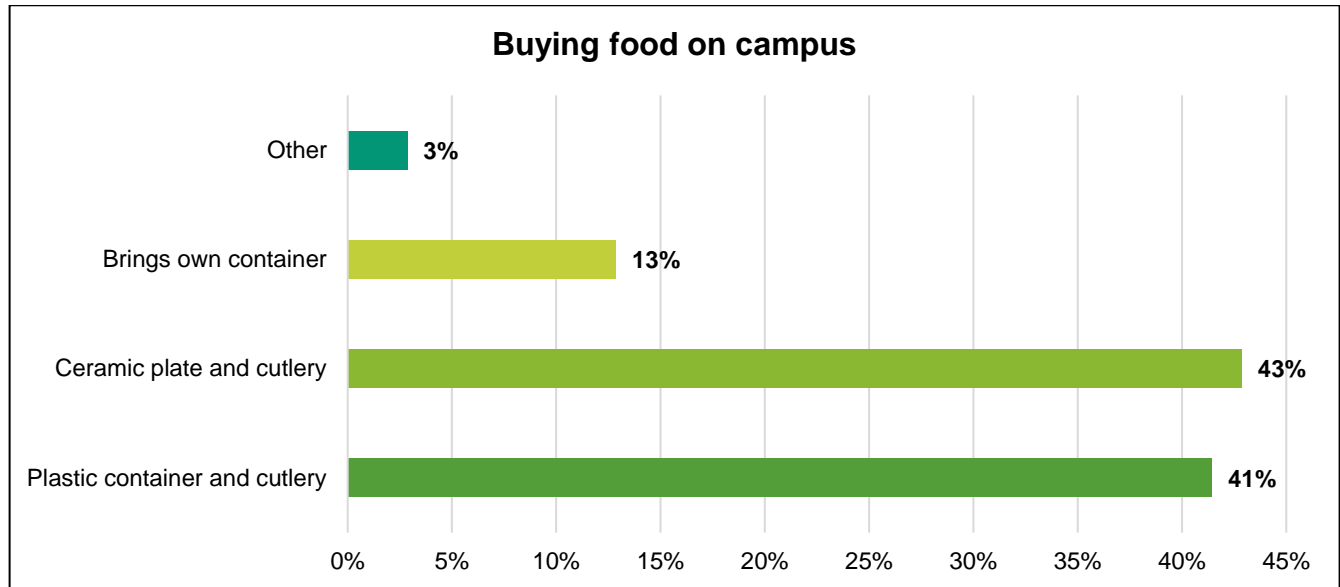


Figure 12

Percentage of participants according to their choices when buying food on campus.



Awareness

This section of the online survey focused on the degree of familiarity and awareness of the participants regarding policies and measures that have been taken by ACG.

Recycling and Campaigns

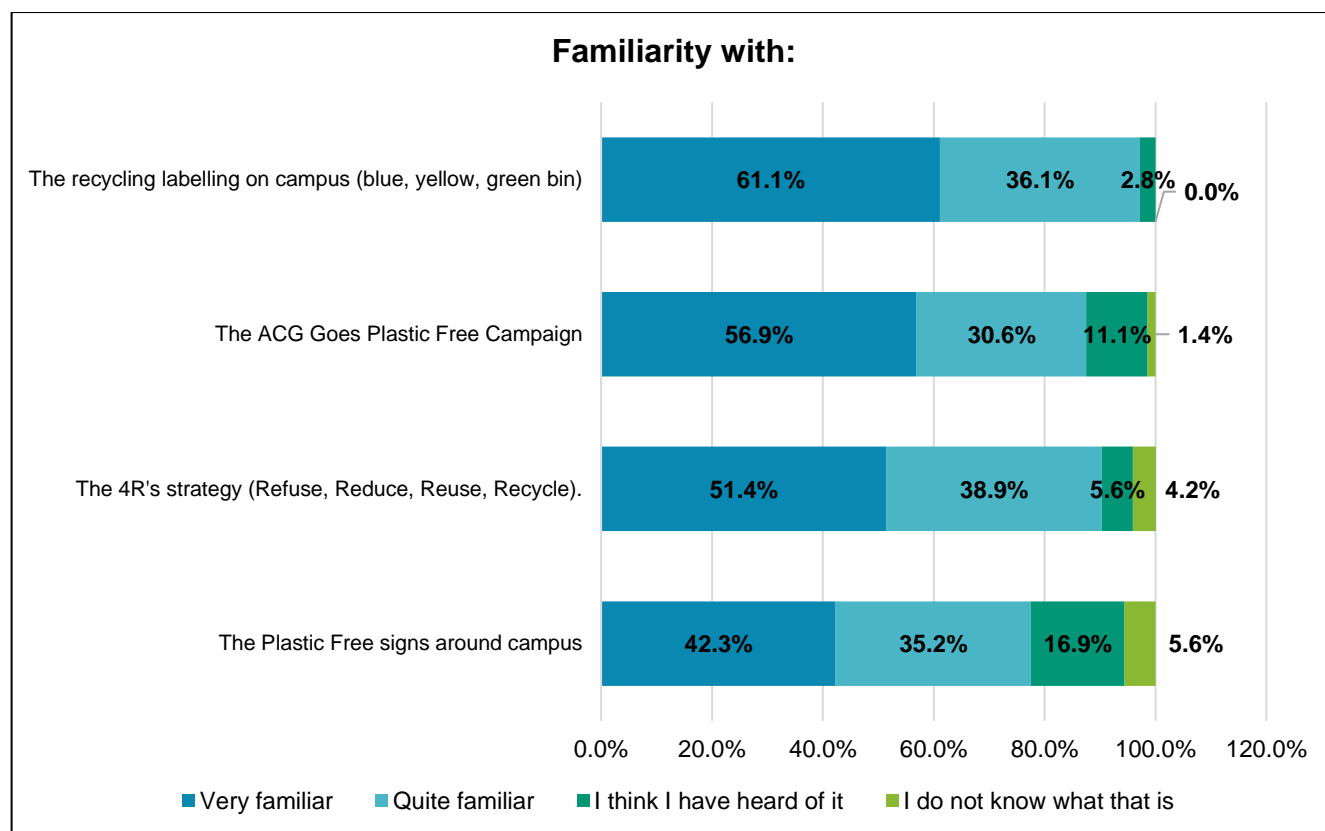
The questions the participants had to answer regarding their awareness of recycling campaigns and policies inside the College concerned their degree of familiarity with the 4R's strategy (Refuse, Reduce, Reuse, Recycle), the ACG Goes Plastic Free campaign, which promotes refusing and eliminating all single-use plastic items on campus, the plastic free signs around campus, which promote reusable and sustainable alternatives to single-use plastics and the recycling labelling around campus. It is worth mentioning that the recycling system on the ACG campus consists of clear and concise labelling and signs that promote separate collection of waste. According to this system, there is yellow bin for paper and cardboard, a blue bin for mixed recyclables, including plastic, and a green bin for residual waste (ACG, n.d.). *Figure 13* illustrates the degree of familiarity of the participants with these policies and practices. As can be seen in *Figure 13*, **40-60%** are very familiar with all the policies and practices. However, **30-40%** are less familiar, **3-17%** are not quite sure what they entail and **0-6%** are not familiar

whatsoever. More specifically, around **60%** is very familiar with the recycling system and how it is used on the ACG campus, around **55%** is very familiar with the existence and the purpose of the ACG Goes Plastic Free campaign, around **50%** is very familiar with the 4R's strategy on minimization of waste and only **40%** is very familiar with the existence of signs around campus that promote alternative options to single-use plastics.

Given these responses, it seems like most people are aware with the recycling system which can be found everywhere on campus, but they are less familiar with the existence of signs that promote the replacement of single-use plastics. It must be mentioned that these signs are found in very visible places around the campus, such as the waiting line for the Dipnosofistirion coffee shop and catering service and near water taps where people can refill their water bottles. It seems that around **6%** has never heard or seen these plastic free signs around campus, thus, is not aware that students, faculty and staff have alternative options.

Figure 13

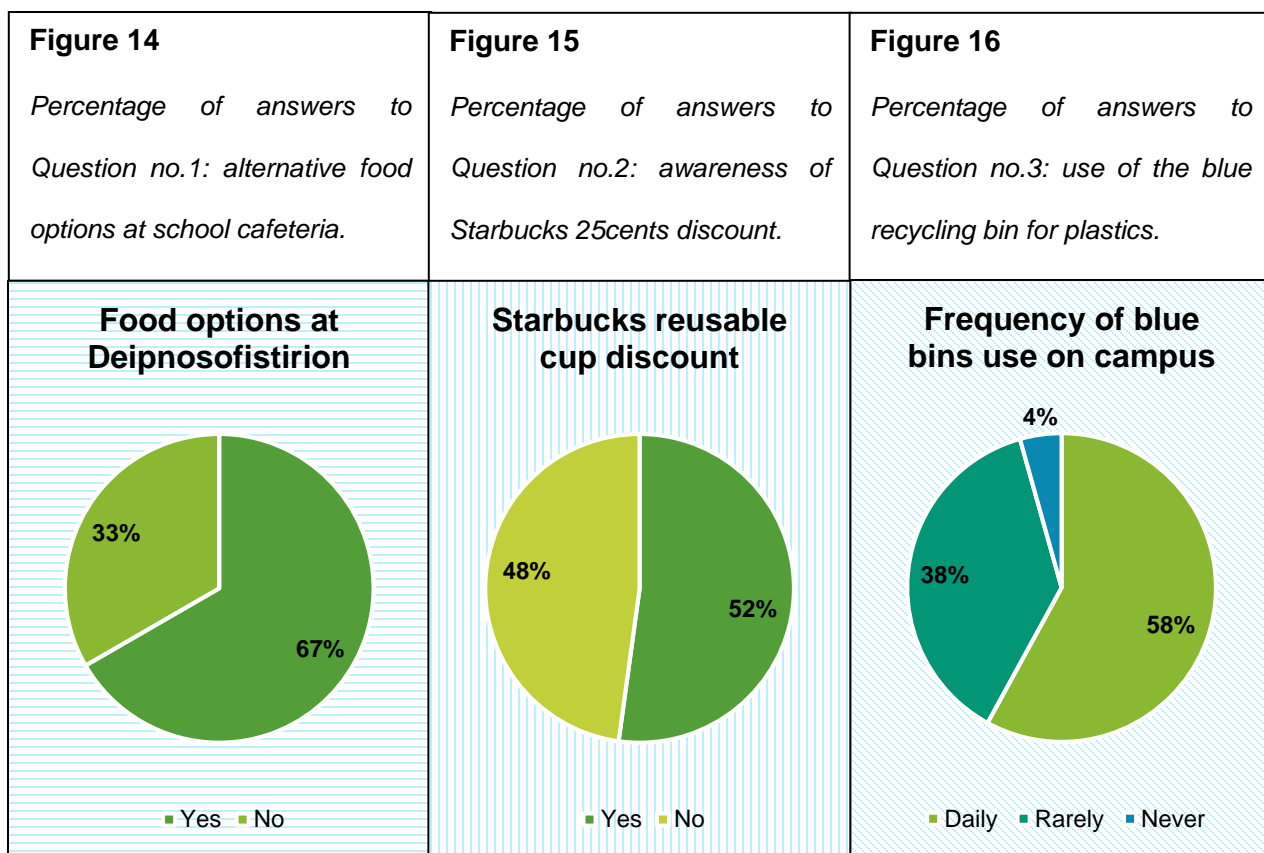
Percentage of familiarity with four basic policies and strategies adopted by ACG.



Incentives and Labelling

The questions the participants had to answer regarding their awareness of incentives and labelling practices inside the College were the following:

1. Are you aware that you can bring your own food at Dipnosofistirion or that you can buy food in your own reusable container?
2. Are you aware that Starbucks offers a 25 cents discount if you bring your reusable cup?
3. How often do you use the blue bin (plastics) for recycling on campus?



Figures 14, 15 and 16 demonstrate that while **66%** of participants were aware that can bring their own reusable container to buy food at Dipnosofistirion catering service, **49%** were not aware that there is a discount at Starbucks if one buys a beverage in their own reusable cup and **43%** of them use the blue recycling bins on campus rarely to never.

Recommendations

Taking into account the responses of the participants of this online survey, we can conclude that the overall plastic footprint of the ACG campus is not high. However, as mentioned above, the online survey was not obligatory and this may have created a selection bias for the people who responded to the survey, as it is most likely that only people who are interested in sustainability issues would have responded. Furthermore, the closure of the campus due to the Coronavirus pandemic for a substantial amount of time during the Spring semester of 2020, obstructed the possible expansion of the sample as the only way to share the survey was through online means, such as e-mails and social media posts.

Positive results

There were definitely some positive results stemming from the responses in the online survey. First of all, it is very positive that there are some people who are interested in sustainability and apply it on campus every day. Moreover, the fact that most of the students who participated in the survey were first year students gives the College a solid base for future campaigns regarding sustainable behavior changes. The fact that so many first year students (**31%**) were interested in either learning about or sharing their everyday sustainability practices on campus gives ground for extensive future participation in the College's effort to become a plastic free institution through student organizations such as the "Sustainability Leaders".

Most importantly, the fact that most participants (**64%**) responded that they do not use any single-use plastic items per week on the ACG campus is very positive. In general, the average consumption of single-use plastic items as depicted in *Figure 9* is quite low. Furthermore, around **40-60%** of participants were very familiar with at least one of policies that ACG has adopted in order to go towards a sustainable campus. Lastly, more than half of the participants responded that they owned a reusable alternative to single-use plastics, such a reusable bottle, cup or food container.

Improving the results

We are going to divide the recommendations that ACG could adopt in three sections according to the sections of the online survey. ACG could use the following recommendations in order to achieve an even more sustainable campus, where single-use plastics are refused and recycled rather than consumed.

Participant Population

1. Given the fact that most student participants were first year students, the College could encourage more sustainable behavior of its students starting from their orientation day. Students who come to the ACG campus for the first time, might not be aware of sustainability practices and why single-use plastics have negative effects on the environment. The orientation day is an event where students take a first glance at how the rest of their student life is going to be. Organizing a **plastic free orientation day** and informing students on the ACG Goes Plastic Free campaign, the recycling system, alternative options and discounts could go a long way in making sure that a larger percentage of students adheres to a sustainable student lifestyle.
2. Of course, sustainability awareness should be spread to the whole ACG community, including students, staff and faculty, and not just specific groups that are already informed about these issues, such as the “Sustainability Leaders” student organization or the Environmental Studies Society students. Conducting an **obligatory survey** on plastic consumption of the ACG community could provide more comprehensive and realistic data that the College administration could use in order to plan next steps and strategies.

Plastic Footprint

If we look at *Figures 3, 4, 5, 6, 7 and 9*, we can clearly see which of the five categories of single-use plastics, is consumed the most. It seems that **plastic containers**, including plastic food wrappers, is the category that people on the campus have the hardest time avoiding, refusing and replacing. According to *Figure 9*, **2.4** plastic containers are consumed on average by a person on the ACG campus, which is more than two times higher than the average consumption of the other categories of plastics. **Plastic cups** for hot and cold beverages, such as coffee, are also harder to replace and refuse, because of the place they hold in people’s everyday routines. According to *Figure 9*, **1.5** plastic cups are consumed on average per person per week on campus. On a positive note, plastic bottles, plastic straws and plastic plates or cutlery are much easier to replace or to refuse, simply by buying a reusable water bottle and realizing that straws and cutlery are not that necessary. Based on the data extracted from the online survey, if those who do not use a reusable cup or bottle on campus used them at least once a week, gradually replacing and refusing single-use plastics, they would decrease their individual plastic footprint by **60** plastic items per academic year.

1. Plastic containers and plastic cups could be replaced only with the cooperation of the vendors on the ACG campus. For example, the insertion of a clause in vendor contracts with the College could

include the provision of only ceramic plates and cutlery for food and ceramic cups and glasses or reusable plastic ones for beverages. The catering services and coffee shops on the ACG campus would be obliged to provide plates, cutlery, cups and glasses for those who do not want to bring their own on campus, following the **deposit-return scheme**. The incentive to bring back the reusable plastic plate, cutlery, cup or glass is an economic one that is already widely used in many European cities (Plastic Free Flux, n.d.). For instance, a student who decides to buy a cold coffee from Dipnosofistirion and who has forgotten to bring with them their reusable cup, they are given a reusable one by Dipnosofistirion, paying a small price (e.g. 1 euro). As soon as they finish their coffee and before they return home for that day, they simply pass by Dipnosofistirion, leaving the cup that is going to be reused, and taking back the euro they paid as guarantee for the return of the cup.

2. There also must be certain **incentives** for the replacement of plastic cups and containers. The incentive could be economic, much like the Starbucks **discount** according to which the client has a 25 cents reduction in the price of the beverage if they bring their own reusable cup. ACG could incorporate these obligations in future agreements with vendors on campus while the current vendors could be persuaded to start a trial period and continue to phase out single-use plastics, as is required by European Union Directive 2019/904.
3. Plastic containers and food wrappers are harder to phase out as the whole manufacturing process will have to change before we can buy things from a supermarket or a vending machine and avoid single-use plastic. However, unnecessary packaging can be avoided when it comes to products that are prepared on site or brought in by the vendors themselves. In addition, **employees** should be **trained** to always ask if the client needs a plastic bag, plastic package or plastic cutlery and not to assume that these plastic items are always needed.
4. Lastly, the option of buying fresh food from the **Dipnosofistirion** catering service in a **plastic plate** should not be allowed when there already is the option of buying it in a **ceramic plate**. The takeaway preference by some people on campus should be replaced with the **deposit-return scheme**, as mentioned above.

Awareness issues

The online survey data demonstrate a good familiarity of participants with some policies that the College has adopted in order to avoid single-use plastics. However, even if people are reluctant to adopt more sustainable behavior, they should at least be aware of the negative effects their actions are causing on ecosystems and biodiversity as well as of possible alternatives.

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1. According to Halbersleben (2008), the **incorporation of sustainability-related courses into the curriculum** of all academic disciplines offered in an educational institution is very important. ACG could consider adding a sustainability-related course in the general education courses of its program, focusing on simple, everyday changes a person on the campus can adopt. Such a course could impact future behavior changes and contribute to the creation of the “leaders of tomorrow”.
 2. Given that the least percentage of participants was familiar with the ACG **Plastic Free signs around campus**, there could be a simple solution to that problem. The increase of signs around campus is a relatively easy task and will contribute to more people being aware of reusable alternatives to single-use plastics. Signs should contain information on where one can refill their water bottle, what alternatives exist instead of using plastic cups, straws, containers and cutlery, and what discounts or incentives there are for the replacement of single-use plastics.
 3. Awareness raising efforts should also be increased when it comes to **incentives** for sustainable alternatives. *Figure 15* depicts that almost half of the participants were not aware that the **Starbucks** coffee shop offers a discount for those who choose to bring their reusable coffee cup. More signs around campus and around the coffee shop could help in increasing knowledge regarding the existence of this discount. Furthermore, Starbucks **employees** could actively inform clients of this discount, incentivizing them to bring their reusable cup while also attracting clients who are committed to reducing their plastic footprint.
 4. Moreover, according to *Figure 16*, more than **40%** of participants responded that they use the blue **recycling bins** for plastics around campus rarely or not at all. This may be happening because the signs are not clear enough. It is difficult to change recycling habits but making the signs a bit clearer would be helpful. For example, the bins inside the classrooms do not have any signs at all. This allows for a lot of confusion and mistakes. Thus, **clear recycling signs** should be added in the bins of all the classrooms on campus.
 5. Last but not least, a **consultation** of the College administration, namely the Center of Excellence for Sustainability, with the students should be organized. A consultation would help in making the students’ voice heard and would give better understanding of consumption patterns regarding single-use plastics and what can be done to change them in a more sustainable way.

Conclusion

Phasing out single-use plastics certainly constitutes a “cultural challenge” (Hill et al., 2006). Nevertheless, the American College of Greece, with its focus on sustainable policies and behavior, could become the first education institution in Greece to completely eliminate single-use plastics inside its campus. The data provided by the online survey on the ACG campus plastic footprint are not comprehensive as they only tested a portion of the ACG community, but they could act as a starting point towards that goal. The above-mentioned recommendations emphasize on realistic solutions that could be easily adopted by the College in order to raise awareness while also actively minimizing the consumption of single-use plastics on its campus. The American College of Greece has the potential to act now because education is the key to a sustainable future.

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