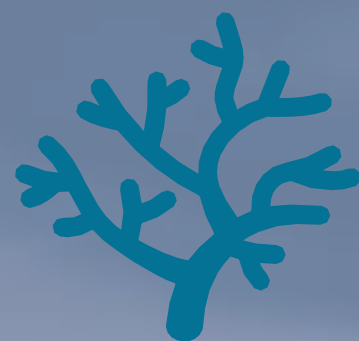
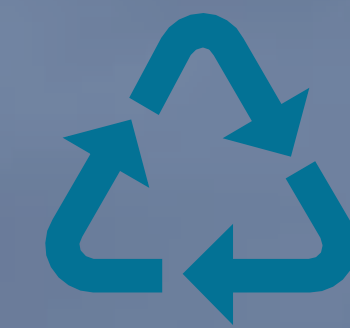




Public Understanding of Plastics in the Marine Environment



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Introduction

- By 2030, the expected plastic input into oceans is 35-90 million metric tons (Rynek *et al.*, 2024).
- Different plastic types have varying densities which affects the distribution of microplastics within the water column.
- The ocean is responsible for the removal of one third of anthropogenic CO₂ emissions from the atmosphere (Alvarez-Fernandez *et al.*, 2018).
- Invasive species use hard plastics as an alternative transport material in the ocean.
- Society is concerned and interested in the marine environment although the severity of environmental threats lacks robust knowledge (Easman *et al.*, 2018).

AIM - To investigate and understand public understanding on marine environments and public opinions.

OBJECTIVES

- To develop a questionnaire for public to complete and reach up to 100 participants.
- To analyse the collected data, derive statistical insight and present findings through graphical representations.

Hypothesis

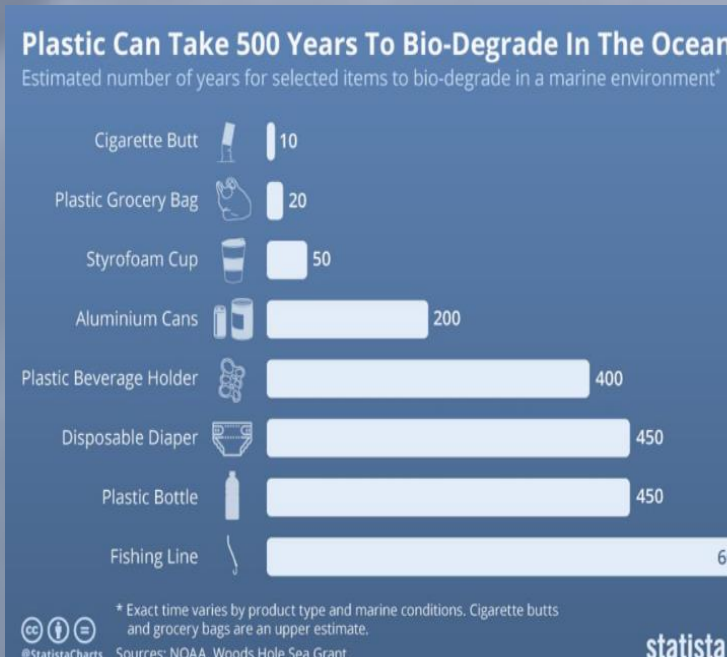
H0: THERE IS NO STATISTICALLY SIGNIFICANT ASSOCIATION BETWEEN DEMOGRAPHIC AND PUBLIC OPINION

H1: THERE IS A STATISTICALLY SIGNIFICANT ASSOCIATION BETWEEN DEMOGRAPHIC AND PUBLIC OPINION

Literature Review

Urbanisation, industrialization and mining are at the forefront of global environmental pollution causes (Gong *et al.*, 2020). Tran (2006) found that water quality and coastal pollution were highly ranked for crucial socio-economic issues in case studies. Li (2023) analysed existing literature and concluded that water pollution and waste disposal were the highest ranked closely followed by overpopulation and urbanisation.

Soares *et al.*, (2021) explained that the public acknowledge plastic as the most prominent environmental threat and human consumerism is the primary source of marine litter. The most common litter type is cigarette butts (over 50%) and tourism is a likely promoting factor in ocean littering (Soares *et al.*, 2021).



Global gyres contribute to microplastic quantities ingested by marine species. Plastic bag handles, beverage holders and fishing nets entangle larger fish, seabirds and sea turtles; smaller fish are more likely to sink immediately (Savoca *et al.*, 2021). From entanglement, there are secondary effects including strangulation and drowning. Plastics also leach additives into the ocean, altering the abiotic compositions negatively (Galgani and Loisel, 2021).

Methodology

Participants were recruited through a stratified sampling technique based on demographic results of age and occupation.



83 participants were reached within two months. The questionnaire was shared on social media platforms and to Askham Bryan students.

Various question styles were used as well as realistic scenario pictures to gather honest opinions between landscape plastic and animal plastic issues.



The chi-squared test determined the relationship between demographic variables and responses to specific questions. Bar graphs and word clouds represented other sections of data.

MORE

A larger sample size in each demographic would justify trends.

Differences in demographic categories that lacked participants decrease the reliability of some results.

66.3%

of participants found the questionnaire insightful.

FOSSIL FUEL BURNING

seen as the most severe environmental issue – an issue that participants directly contribute to throughout daily routines therefore are more aware of this increasing greenhouse gases.

'SMALL DAILY CHANGES CAN REDUCE PLASTIC POLLUTION IN MARINE ENVIRONMENTS'.

LOCATION

Geographical demographics would be significant to identify in future research.

18-24

The mode age demographic (n=50).

H0

The null hypothesis was accepted.

Discussion

50/50

50% of respondents didn't realise the extent of plastic effects, and 50% already understood the repercussions of plastic on marine environments.

3.5

Highest average knowledge score resulted from ages 39-45. This could be due to occupations, geographical location as well as hobbies and interests.

PREVIOUS STUDIES

Results show that public opinion has shifted from viewing environmental issues as equally as social issues in early 2000s (Tran, 2006), to prioritising environmental issues over social issues. This could be from the demand for global environmental action.

EMOTIVE ANSWERS

'Poor human health and loss of employment' – public only care about plastic issues when humans are directly impacted.

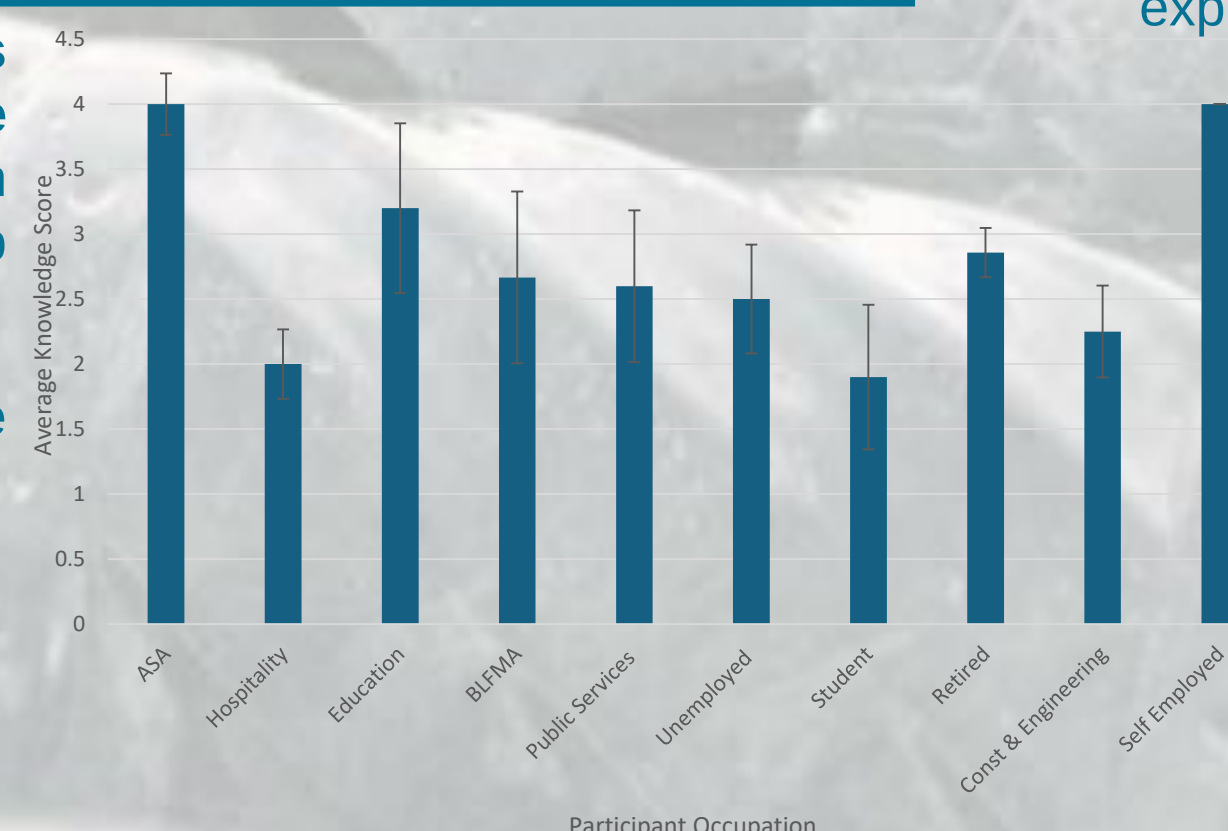
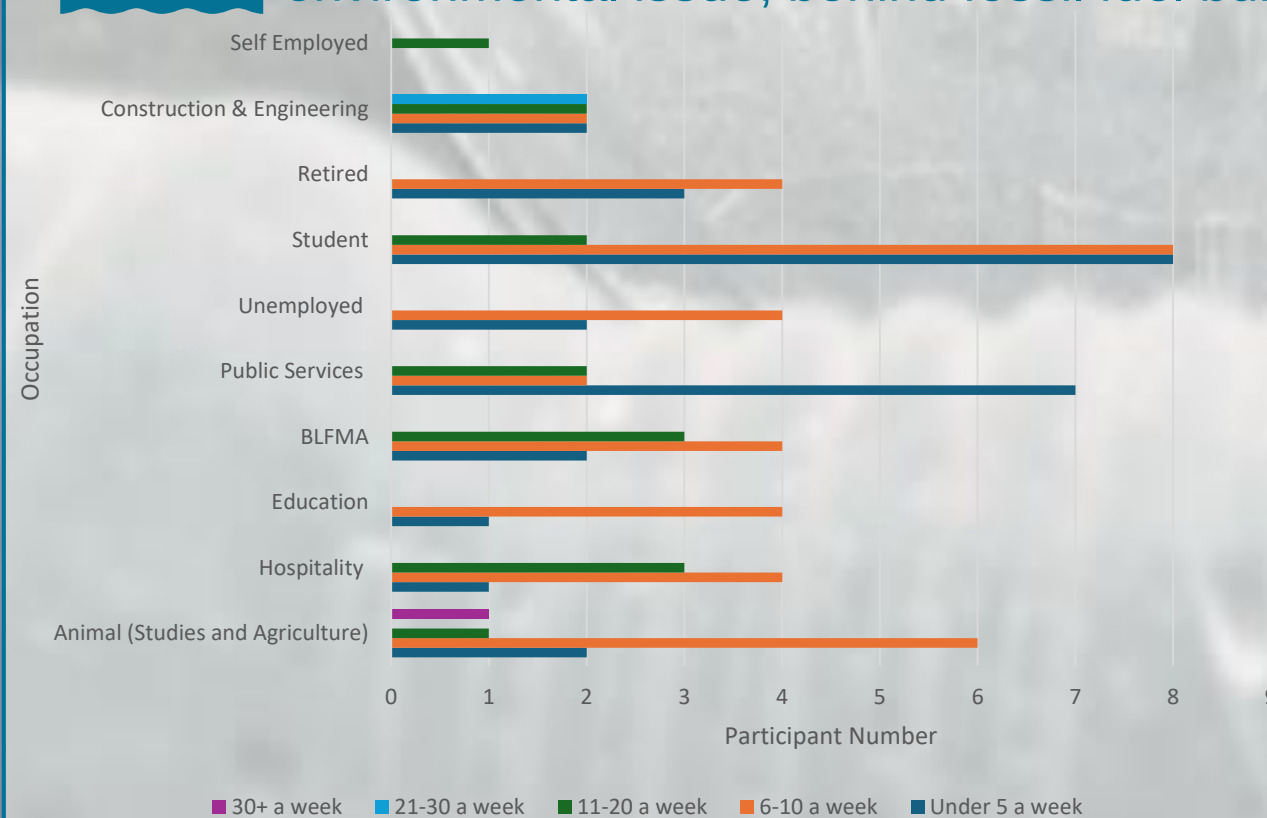
'Small changes help' – participants that had learnt new knowledge throughout the questionnaire will go on to improve their pollution choices.

'Corporate companies are liable' – some participants were angered by the overconsumption of shopping plastics; they expressed it is hard to steer away from buying plastic when on a budget.

Results

Self-employed participants and participants within the **Animal Studies and Agricultural (ASA)** sector had a combined **highest average score of 4** (ASA SD= 0.471405). There was a significant statistical association between occupation and prior knowledge (Chi², $\chi^2_1 = 0.009793811$, $p < 0.05$).

Marine plastic pollution was selected as the second most severe environmental issue, behind fossil fuel burning.



Most commonly, participants consume **6-10 plastics** a week. There was no significant association between occupation and the quantity of plastics participants consume weekly (Chi², $\chi^2_1 = 0.064431181$, $p > 0.05$).

59% of participants chose littering as the main origin of plastic pollution, followed by single use plastics (55.4%).

Respondents were **unsure** as to whether Otters and Crabs are directly affected by plastic debris.

Public interpretation of arising issues from plastic: a compromised food chain, animal death from 'entanglement', **'increasing toxins and digested plastic'** and 'loss of employment for local fisherman'.

"...WHAT WE ARE SOLD ISN'T OUR FAULT... PEOPLE CAN'T AFFORD TO HAVE CHOICES DUE TO FINANCIAL CONSTRAINTS. CORPORATE COMPANIES SHOULD BE LIABLE NOT THE CONSUMER"

Conclusion

The most appropriately displayed data was in the format of bar graphs, tables and word clouds. Coastal pollution and marine impacts were already valued as environmentally important beforehand, and the results of this study further support this narrative. Fossil fuel burning was deemed the environmental issue that damages the Earth the most severely. The study also validates findings showing there was no statistically significant association between demographics and public opinion.

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