

ROLE OF PERSUASIVE TECHNOLOGY STRATEGIES IN BEHAVIOR MODIFICATION

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ABSTRACT

Persuasive Technology (PT) is a type of interactive technology that helps and motivates individuals to adopt behaviour that are good for them and their community while avoiding those that are bad for them. In practically all areas of health and wellness, the use of PT, is geared at bringing about desired change by shaping and reinforcing behaviour. The purpose of this study is to analyze and compare the persuasive methods throughout the last ten years (2012-2022) and their implementations for sustainable trash management. This review also focuses on the techniques for developing sustainable behaviour among students. Persuasive techniques that assist different sustainable waste management activities, such as personal monitoring, recycling, conference management, data collecting, food waste management, do-it-yourself projects, games, and so on, are specifically selected.

Keywords: *Persuasive Technology, Sustainable Behaviour, Behaviour Modification.*

Introduction

Transportation networks have a considerable environmental impact, accounting for global energy consumption and carbon dioxide emissions. Current transportation methods are unsustainable, since recent statistics reveal that transportation-related greenhouse gas (GHG) emissions are expanding faster than any other energy-consuming industry, particularly in metropolitan areas. Overuse of land resources, growing urbanization, and mobility solutions that rely heavily on private automobiles are all problems that modern cities face. This has resulted in highly crowded urban areas and situations that are damaging to local residents' quality of life as well as public health and the environment. To respond to these rising unsustainable conditions, a variety of methods are needed, including increased vehicle economy, lower carbon fuel content, and reduced vehicle kilometres travelled.

In the 21st century, various technologies are designed to assist humans in doing daily chores such as administrative work or classroom instruction, as well as convince and encourage them. Persuasive technologies, specialized for and incorporated into route planning apps, can influence urban travellers' decisions and lead them to ecologically beneficial routes. Persuasive technology is widely described as technology that uses persuasion and social influence rather than compulsion to modify the user's views or behaviours. Persuasive systems addressing behaviour modification in the context of personal mobility in urban areas are the subjects for this review study, with a slew of examples and implementations aimed at encouraging users to make more environmentally responsible choices. The aim of this review is to organize existing research results and give a framework for comprehending and analyzing persuasive systems implementations and associated pilot studies in the context of personal mobility in settings.

Related Work

- **Persuasive Technology in Creating Sustainable Innovation and Business Model Innovation**

Throughout the previous decade, persuasive technology's potential for supporting sustainable innovation and business model innovation has been demonstrated. Persuasive technology's unique capacity to engage and mediate among users, consumers, decision makers, and other stakeholders

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gives access to essential behavioural insights as well as chances to influence and even change their behaviour in a good and sustainable way. However, understanding the stakeholders and their behaviours, as well as the opportunities for actively supporting more sustainable behaviours, opens up completely new and unique opportunities for radical and customer-focused sustainable innovation and business model innovation, which is explored in the current study (Annabeth et al., 2015) through a theoretical review and case examples. The findings of this study highlights a number of major possibilities to pursue as well as a number of critical problems to overcome.

- **Persuasive Technology for Appealing Garbage Classification**

Nowadays, the amount of rubbish produced is continually rising, causing serious environmental issues. Garbage recycling is critical in combating the problem, and garbage categorization is crucial in the recycling process. This study (Dingxu Bai, 2020) aims to see whether persuasive technologies may be used to appeal to Chinese motivation for garbage categorization. To put the persuasive strategy into action, a prototype was developed. It is demonstrated through user testing and interviews that those persuasive technologies may definitely appeal to the users' desire for garbage categorization.

- **Persuasive Technology for Energy Conservation and Carbon Emission Reduction**

This study (Anthony Emeakaroha et al., 2014) presents the energy conservation strategies used in University residence halls to solve energy consumption concerns, employing IPTED (Integration of Persuasive Technology and Energy Delegate) in the student residence halls, are presented in this research. The findings suggest that combining real-time energy input through a visual interface with energy delegation can result in considerable energy savings. The results reveal that combining a real-time feedback system with a human energy delegate in eight halls resulted in a 37 percent reduction in energy use when compared to the baseline, saving 1360.49 kWh and 713.71 kg of CO₂. The 8 non-experimental halls, on the other hand, saw just a 3.5 percent reduction in energy usage compared to the baseline, saving 165.00 kWh and 86.56 kg of CO₂.

- **Persuasive Technology in the field of Sustainable Food Consumption**

This research (A. Fradera, 2021) explored the possibility of employing Persuasive Technology to help customers make sustainable food choices. An online grocery shop was built and prototyped utilising Oinas-Kukkonen and Harjumaa's Persuasive Systems Design paradigm to assess its impact. People between the ages of 20 and 34 were the target group. According to the findings, the Persuasive Systems Design approach has the capacity to influence consumers' food choices and found to be useful for implementing a grocery online store and in influencing food choices

- **Patterns of Persuasion for Sustainability**

This study (B. Knowles, et al., 2014) examines the implications of persuasive technology and what it implies for creating interventions with a larger impact. A set of anti patterns to describe persuasive technology approaches that values research suggests are unlikely to yield significant sustainability wins, as well as a complementary set of patterns to describe new guidelines for what may become persuasive technology best practise, to make these implications easily understandable and implementable.

- **Persuasive Technology to Promote Pro-Environmental Behaviour**

This study (C. Midden, & J. Ham, 2018) examines the dimensions and extent of persuasive technology, as well as its ability to encourage environmentally friendly practices. By interfering in user-system interactions that have environmental repercussions, persuasive technology tries to bridge the gap between technological and psychological contributions to tackling environmental challenges. The employment of persuasive agents, the supply of novel experiences, the use of persuasive ambient technology, and persuasive technology at the group level that recognizes the social aspect of environmental behaviour are all discussed in detail.

- **Persuasive Technology for Promoting Positive Waste Management Behaviours**

This research (M. Nkwo, 2019) aims at novel strategies to persuade individuals to improve their waste management habits and safeguard the environment. A user-based study is undertaken as a first step in contributing to research to determine what tactics may be employed to persuade national residents to adopt beneficial waste disposal practices. It demonstrates how mobile persuasive system interventions could be designed to promote positive and environmentally responsible behaviours and protect the environment from pollution by mapping the results to their matching persuasive technology techniques and operationalizing them in a mobile web platform.

- **Gamification of Persuasive Systems for Sustainability**

This paper (Nyström, 2017) shows some preliminary findings on the application of gamification and persuasive technology to achieving a specific sustainability objective using persuasive systems. In the fields of human-computer interaction (HCI) and information systems, both gamification and persuasive technology have grown in popularity. The importance of designing gamification of persuasive systems with sustainability aims is highlighted in this study. Some dangers have been identified, such as persuasive systems that may be perceived as misleading by the user. When people cease employing the persuasive system, they revert to their old habits of behaviour.

- **Persuasive Technology to Promote Sustainability and Health**

Environmental sustainability has acquired widespread attention as a topic of interest in the scientific community. This study (Song, J., & Fiore, S. M., 2017) focuses on topics to consider when creating and evaluating the persuasive efficacy of virtual reality (VR). A set of research criteria is presented in this study to assist future research on how to improve VR's efficacy as a persuasive tool. This research also uses the use of animal products as an example of how these rules might be applied to a real-world situation involving sustainability and health. A set of criteria for developing research on virtual reality as a persuasive tool is also offered, along with examples of how they may be used in future study.

Research Methodology

Sample Size: For this study, researcher has selected nine research articles based on behaviour modification through persuasive technology.

- **Sources of Data:** Secondary sources of data have been used for this study.
- **Research Period:** This study has covered ten years data from 2017 to 2022.

Findings

In this stage, we identified nine research papers that indicate the use of multimedia as persuasive technology for sustainable behaviour. To simplify the findings, we presented the data in a detailed summary of all unique research reviewed. We use categories which include the author names, PT projects, used technology, motivational strategies applied, and the result obtained as shown in the following table:

Table: Types of Persuasive Techniques

S. No.	Project	Author	Technology	Strategy	Result
1	Sustainable Innovation	Annabeth et.al.,2015	Social Network	Praise, Reward, Simulation	Positive
2	Garbage Classification	(Dingxu Bai, 2020)	Social Media Platform	Monitoring, Reminder, Feedback	Positive
3	Energy Conservation and Carbon Emission Reducation	(Anthony Emeakaroha et.al., 2014)	Virtual network	Support, Social Comparison, Feedback, Alert, Motivation	Positive
4	Sustainable food consumption	A. Fradera, (2021)	Online Network, Mobile App	Simulation Praise, Feedback	Positive
5	Patterns of persuasion for Sustainability	(B. Knowles, et. al., 2014)	Virtual network	Feedback, Tracking, monitoring	Positive
6	Pro-Environmental Behaviour	C. Midden, & J. Ham (2018)	Online Game based approach	Social influence, Support	Positive
7	Positive Waste Management Behaviours	M. Nkwo (2019)	Online Game based approach	Praise, Reward,	Positive
8	Sustainability	Nyström (2017)	Gamification	Social influence, Support	Positive
9	Sustainability and Health	Song, J., & Fiore, S. M., 2017)	Virtual Reality	Simulation, Personalization, Social learning	Positive

Conclusion

The reviewed papers appear to be positive, affecting the targeted sustainable behaviour. No research shows the negative effect towards the aimed behaviour. Since, all reviewed papers represent the positive effect of persuasive technology; thus persuasive technology can be used for modifying the behaviour and developing positive attitude towards sustainability.

According to the review of studies it is found that persuasive technology may be utilized for behaviour modification. The studied methodologies, concepts and principles of persuasive technology may be used to create any persuasive technology to develop sustainable behaviour. The major goal of this research is to employ persuasive technology to help students establish a positive attitude toward sustainability. However, the most effective persuasive technique, strategy, and concept for overcoming sustainable behaviour must be established. As a result, the form of persuasive technologies as well as learning concepts must be adequately established. It can be concluded that computers may be utilized as a persuasive tool to help students acquire good attitudes and change their behaviour.

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