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*Corresponding author: Juan Romero-Luis Department of Communication and Advertising, Universidad Rey Juan Carlos, Madrid, Spain
E-mail: juan.romero@urjc.es

Reviewing editor: Guangchao Charles Feng, College of Communication, Shenzhen University, China

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Recommendations to improve communication effectiveness in social marketing campaigns: Boosting behavior change to foster a circular economy

Juan Romero-Luis^{1*}, Alejandro Carbonell-Alcocer¹, Manuel Gertrudix¹, María Del Carmen Gertrudis Casado¹, Paolo Giardullo² and Daniel Wuebben³

Abstract: The efficiency of communication campaigns that seek to boost a circular economy, leaving behind the traditional linear economy model, and corresponding behavior change is uncertain, although significant resources are being invested by the European Union and other organizations and institutions around the world. This study aims to identify barriers and enablers faced by the current communication model to generate a series of recommendations, targeted at communication practitioners, that ameliorate communication actions related to social behaviors change. A Grounded Theory process was used to analyze transcripts obtained through focus groups and semi-structured interviews with 22 biotechnology researchers and communication professionals. As a result, the identification of barriers and enablers that prevent or permit different actors to develop sustainable behaviors allowed us to conclude four recommendations aimed at improving the

ABOUT THE AUTHORS

Juan Romero-Luis Predoctoral researcher hired by the Spanish National University Teacher Training Program (FPU) at the Universidad Rey Juan Carlos. Specialized in Science Communication. Master in UX: Usability, Interaction Design, and User Experience at the Barcelona School of Management of Pompeu Fabra University (UPF). Degree in audiovisual communication and journalism.

Alejandro Carbonell-Alcocer Predoctoral researcher hired by the Staff-in-Training internal program of the Universidad Rey Juan Carlos at the Faculty of Communication. Currently developing his doctoral thesis, he has a Master's Degree in Teacher Training, and he is specialized in audiovisual communication and processes. He has a degree in audiovisual communication.

Manuel Gertrudix Associate Professor of Digital Communication at the Rey Juan Carlos University, coordinator of the Ciberimaginario research group, and co-editor of the scientific journal *Icono14*. Specialist in digital communication and elearning, principal researcher of more than 8 competitive national and international research projects, and participant of more than other 20.

María del Carmen Gertrudis Casado Ph.D. in Communication Sciences from the Universidad Rey Juan Carlos. Degree in Documentation (Universidad Carlos III de Madrid), History (Universidad Complutense de Madrid), Master of Communication, Film, Television and Interactive Media (Universidad Rey Juan Carlos) and Expert in Information Management and Treatment in Public and Private Institutions (Universidad Complutense de Madrid).

Paolo Giardullo Sociologist working as a postdoctoral researcher at the University of Padova. Among his research interests, he lists public discourses about science and technology on the media applying mixed methods in connection with the digital methods approach. He also works at the intersection of STS and environmental sociology.

Daniel Wuebben Ph.D. in Literature from the Graduate Center of the City University of New York. Author of *Power-Lined: Electricity, Landscape, and the American Mind*. Former Marie Skłodowska-Curie fellow at University Rey Juan Carlos. Communication Working Group Manager for the International Smart Grid Action Network and adjunct professor of humanities and liberal studies at NYU-Madrid and IE University.

efficacy of communication actions that seek to boost a circular economy and sustainable behavior change: (1) raise awareness among politicians to reduce the barriers that prevent consumers from developing sustainable behavior, (2) involve companies in communication campaign actions as a point of leverage, (3) prioritize long-term interaction over short-term actions, and (4) take advantage of young students (and teachers), who are powerful transmission vectors for promoting sustainable habits among their elders.

Subjects: European Studies; Persuasion; Environmental Communication

Keywords: circular economy; behavior change; social communication; grounded theory; science communication

1. Introduction

Boosting behavioral changes toward more sustainable actions is crucial to promoting a circular economy (CE), and the role of communication is vital to achieving this goal (UNESCO, 2008; United Nations, 2017). Despite the frequent communication and social marketing campaigns carried out (Green et al., 2019) and the efforts expended by numerous institutions and organizations around the world (EPA, 2021; European Commission, 2022; United Nations, 2021), mitigating the most severe consequences of human activity on planetary health still requires unprecedented action across nations and sectors (Pörtner et al., 2022). The current consumption model, which has been enhanced by the linear economy (LE) and perpetuated over the past century due to traditional product marketing campaigns (Baudrillard, 2009), must be changed, since it represents a major problem that prevents citizens from developing sustainable habits. The solution comes from the active participation of several societal actors, such as public and private entities, citizens, educational institutions, and communication agencies. Communication professionals can influence behavior change toward more sustainable actions, either through mass media (Abroms & Maibach, 2008) or through other channels (Valdez et al., 2018). However, the plethora of handbooks and articles that aim to help communication professionals convey issues related to planetary health suggests that communication experts are still struggling to find the most efficient strategies to successfully promote sustainable behaviors (Holland, 2019). What prevents communication actions from being effective when it comes to conveying LE impacts and encouraging behavior change?

This research poses different research questions that contextualize the meanings, target audiences, and practices of communication to promote sustainability and related behavior change. A Grounded Theory qualitative analysis of interviews and focus groups with researchers in biotechnology and communication experts was performed. The outcomes show the informants' perceptions of the barriers that prevent communication actions aimed to promote behavior change from being effective, and the enablers that could potentially be considered to execute more successful communication campaigns. Finally, based on the results of the analysis, the authors conclude a series of recommendations that communication practitioners should consider for increasing the efficiency of communication campaigns that aim to foster a CE and corresponding behavior change.

The goal of this research to identify barriers and enablers faced by the current communication model in order to generate a series of recommendations, targeted at communication practitioners, for improving communication actions related to social behaviors that contribute to boosting CE. To this end, authors adopt an applied communication approach to produce practical solutions that affect the real world (Kreps & O'Hair, 2013).

1.1. Literature review

1.1.1. Communication in social marketing to foster circular economy: meanings and general context

Since its inception, the concept of Social Marketing (Kotler & Zaltman, 1971) has shown how effective communication campaigns contribute to social change by increasing the common good (Lee & Kotler, 2019) and citizen engagement (Levit & Cismaru, 2020). The Strategic Social Marketing focus (Gordon & French, 2015) proposes a more comprehensive approach and implies mobilizing the individual, community, socio-cultural, and political dimensions. As applied to sustainability and climate change, Community-Based Social Marketing (CBSM) assumes that a cornerstone of sustainability is behavior change (McKenzie-Mohr, 2000). CBSM is a theoretical and applied framework that includes: Selecting Behaviors, Identifying Behaviors & Benefits, Piloting the Strategy, and Broad Scale Implementation. Persuasive communication, a key element of this process, must be based on a solid understanding of the audience's attitudes and behaviors. In addition, it must create vivid, concrete, and personal messages that inspire credibility and lead to actions and problem solving. The effectiveness of social change campaigns stems from their ability to persuade audiences to accept, change, or abandon certain ideas, attitudes, practices, or behavior (Kotler et al., 2002). This effectiveness, in addition to limitations and errors, has been evaluated, among others, by McKenzie-Mohr and Schultz (2014), Fries et al. (2020), and Akbar et al. (2021).

To examine the effectiveness of CBSM for sustainability and behavior change, we draw from the CE model, which provides a critique and an alternative to the LE model (Stahel, 1982, 2016). Together with the models of sustainable growth and sustainable degrowth (D'alisa et al., 2015; Martínez-Alier et al., 2010), CE represents a potential shift in global production and consumption practices (Camacho-Otero et al., 2018).

Whereas CE proposes a closed-loop system to generate eco-products (Tseng et al., 2020), reduce waste, and increase the efficiency of manufacturing processes (Nascimento et al., 2019), LE leads society to unsustainable consumption and does not consider the circularity of waste for allowing the material reincorporation into the supply chain (Ellen MacArthur Foundation, 2013). LE has operated as a black box whose primary reference point for progress has been profit. Georgescu-Roegen (1971) raised the need for an ecological economy to replace notions of progress based on individual consumption of exosomatic goods. An emerging eco-consciousness was used to promote a global, integral, and symbiotic relationship between human consumers and the finite goods of nature (Taibo, 2022). In recent years, climate science has further reinforced the need to transition from LE to CE before 2050, as established in the European Green Deal by the European Commission (2020b). While this transition demands a multidisciplinary approach and will require changes by some of the world's most powerful actors (e.g., high-emission countries and fossil fuel corporations), consumers will play a crucial role in the transition to CE due to the importance of certain essential actions such as repair, reuse, and recycling, among others (Geissdoerfer et al., 2017).

Despite academic consensus on the importance of consumer actions such as recover, recycling, repurpose, remanufacture, refurbish, repair, reuse, reduce, rethink, and refuse (Geissdoerfer et al., 2017; Morseletto, 2020; Potting et al., 2017), the most well-known behavior changes in Europe (European Commission, 2016; Zero Waste Europe, n.d.) and around the globe (US EPA, 2013; Susanto et al., 2019; United Nations, 2004) are the "three Rs": Reduce, Reuse, and Recycle.

Considering the given context and existing social system, the first research question posed we ask ourselves is RQ1. *How should these new consumer paradigms be approached in order to foster the circular economy model from the communicational perspective?*

1.1.2. *Communication in social marketing to foster circular economy: target audiences*

One of the fundamental problems in the successful implementation of awareness campaigns aimed at promoting sustainable habits has been the attitude-behavior consistency. This phenomenon has been explored through the value-action gap (Blake, 1999) and analytical frameworks such as the linear progression and prosocial behavior models (Kollmuss & Agyeman, 2002). Most recently, the value-action gap was applied to communication in social marketing (Tavri, 2021) and transformative learning in schools (Evers, 2022). Such models help clarify the disconnect between European citizens' belief that growth in waste is one of the top concerns (European Commission, 2020a), and their apparent unwillingness to participate in CE practices or reduce consumption behaviors (Duke et al., 2018). In other words, there is a consensus on the need to change consumption, production, and trade patterns (European Commission, 2020a), but effective behavioral change remains lacking. (Hornsey & Fielding, 2020). Clearer understanding of consumer behavioral logic is necessary to activate such leverage.

Customer behavior in the CE has been primarily examined from economics, psychology, and marketing disciplines (Garcia et al., 2021). The so-called "green" consumer represents a lucrative marketing opportunity (Van Dam & Apeldoorn, 1996), and for decades, companies have promoted recycling and energy conservation (Kilbourne & Beckmann, 1998; Peattie, 2010). More recent research on sustainable consumer behavior has been framed as an opportunity for young citizens to mitigate climate change (Raducu et al., 2020) and for colleges and universities to spread knowledge about CE (European Week for Waste Reduction, 2022; One Planet network, 2020).

Considering that communication could more effectively inspire behavior change, the second research question was posted: RQ2. *How could communication in social marketing be adapted to contribute to removing the barriers that prevent social behavior change from happening and to boost comprehensive politics toward attitudinal change?*

1.1.3. *Communication in social marketing to foster circular economy: communicative practices*

Social marketing-based communication practices often consolidate social models of consumption, thereby reproducing LE behaviors. In accordance with the Theory of Structuration (Giddens, 1993), advertising and communicative models have not only contributed to exacerbating consumption but also served to mask consumption practices under the umbrella of green marketing and greenwashing (De Freitas Netto et al., 2020). These practices have been broadly studied in the literature (Vollero, 2022) and lead to poorer green economy (European Commission, 2020c). They have distorted the real objectives of change toward a sustainable economy (Lukinović & Jovanović, 2019) and further reduced the credibility and effectiveness of communication (Qayyum et al., 2022), leading to growing concern from the European Commission (2022).

Sustainability is a fundamental ethical component of social marketing and communication due to its impact on promoting responsible and conscious consumer behavior (Eagle et al., 2020).

The effectiveness of communicative actions to promote eco-gestures (Abbati, 2019) is evident when it comes to inducing a mechanical or repetitive behavior, such as the proper recycling of waste, in which clear associations between product-service and user needs are present and the reward system is exploited (Nilashi et al., 2020). However, eco-gestures are inefficient when a long-term awareness process that affects the development of atomic habits is required (Clear, 2018). Nudge Theory, for instance, shows the effectiveness of heuristic social availability techniques in raising awareness of sustainability (Ritch & McColl, 2021), but it becomes more complex when it comes to finding studies that show such effectiveness of long-term behaviors (Raducu et al., 2020), or that they do not generate counterproductive effects such as the rebound effect (Heras, 2009; Redondo, 2003) or empathy fatigue.

Given the context provided by the literature for communicative practices, the authors posed the third research question. RQ3: *How communication actions could most effectively contribute to accelerating social change?*

1.1.4. Communication in social marketing to foster circular economy: challenges and opportunities

A change in communication practices in coordinate with comprehensive policies is required to facilitate the transition to a CE. Several international organizations, such as UNESCO (2008) and the United Nations (United Nations, 2017), have highlighted the importance of communication and education for sustainable development and responsible consumption practices (Servaes, 2012). To this end, sustainability communication actions need to facilitate the transition from information to action. This implies building a longer-term relationship with the consumer and favors consumer education on sustainability-related issues (United Nations, 2017).

Citizens understand the magnitude and urgency of the climate problem, but many have the inability or unwillingness to act (Hornsey & Fielding, 2020) in response to the emergency planetary situation (Willis, 2020). Communication, from a social perspective, should not consider the target as consumers but as citizens. In addition, for young people, it is important to consider how to promote the principle of reciprocity to stimulate responsible consumption of company products or services (Mejía-Giraldo, 2021).

Communication entities have an ethical responsibility to build a new relationship between citizens and the sustainable consumption of goods and services (Trudel, 2019). This implies a radical change, a real and effective compromise, of the practices of commercial communication that have shaped consumer and leisure industrial culture over the last century (Baudrillard, 2009). Communication actions could, for example, contribute to promoting political initiatives—such as the Global Climate Action Agenda (European Commission, 2022), the Green New Deal (European Commission, 2020a), the Climate Change and Energy Transition Law (Spanish Government, 2021)—and foster a social conscience that firmly situates consumption practices within a higher principle of “Do no significant harm” (DNSH).

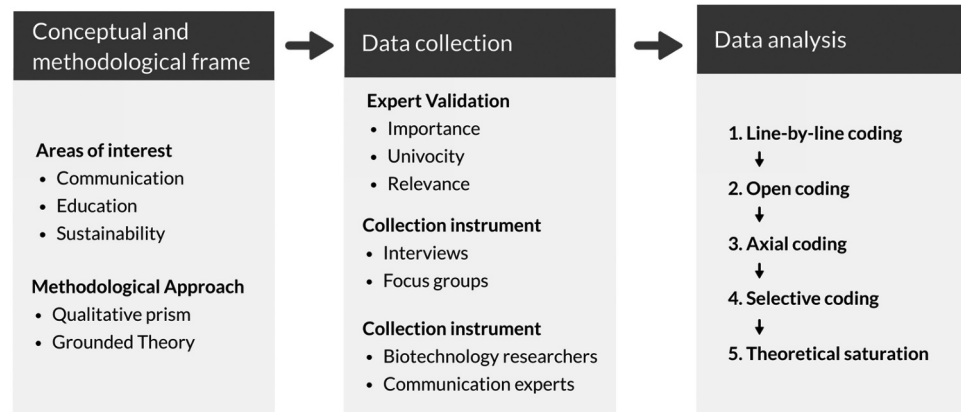
The role of companies, through their Corporate Social Responsibility (CSR) actions, their Societal Marketing strategy (Crane & Desmond, 2002), and the leverage they can provide by means of marketing campaigns, is also crucial to strategically support this commitment, as the Global Compact Chile Network (2022) highlighted in the Guidelines for Sustainable Communication, grounded on the Green Integrated Marketing Communications model (Bosah, 2022).

The existing literature indicates a lack of research that studies in more detail the collaboration mechanisms among the different agents involved in the communication processes to promote CE and sustainability, so that more holistic and global approaches that actively involve schools could be proposed. This research seeks to contribute to this applied research gap.

2. Methodology

This inductive study adopts the methods of Grounded Theory (Corbin & Strauss, 2008) which considers complex social systems as composed of individual elements and the sum of their parts. These sums, produced by identifying and clarifying relationships, (Cardozo Brum, 2011) influence the social system in a non-linear way (Sánchez-Gutiérrez, 2000) and the liquid nature of the relationships generates a high degree of uncertainty (Bauman, 2013). By recognizing spatial and temporal contexts (Flick, 2018), this inductive and qualitative approach allows researchers to understand and theorize about the object of study and to generate knowledge about actions and consequences (Argyris, 2013). In other words, Grounded Theory (Clarke & Friese, 2007) is more focused on understanding the perceptions of a target population and generating hypotheses that can be carried out in subsequent, longer-term investigations.

Figure 1. Method design.
Elaborated by the authors.



The following subsections describe the three main phases of this study: conceptualization, data collection, and data analysis (Figure 1).

2.1. Research conceptualization

Extending from the objectives of the BIOTRES-CM project (S2018/EMT-4344), we identified the most pressing areas of interest—communication, education, sustainability, and behavior change—and a need to show their connections and overlaps. This required us to develop categories that would offer relevant and contextualized information, from a critical, qualitative, and systematic perspective. Furthermore, aiming to standardize, validate and organize the information gathering process, we created a guideline for data collection that included a questionnaire for data collection, an instrument of validation, the list of the validation expert’s profiles, and the informed consent to be signed by participants (Romero-Luis et al., 2022a). With these documents, the research proposal gained approval from the ethics committee of the Universidad Rey Juan Carlos (internal registration 1,806,201,910,519).

2.2. Data collection

2.2.1. Gathering instrument

The authors elaborated the first four-item questionnaire draft that went through a process of validation of expert judgment (Escobar-Pérez & Martínez, 2008). Each item was qualitatively reviewed by eight Spanish specialists, either academics or communication experts, who assessed whether the questions were univocal, pertinent, and relevant (Zambrano Díaz, 2017). A self-administrated questionnaire (Lavrakas, 2008)—that included a Likert scale for each criterion and an open-ended question for each item—helped collect and arrange validators’ comments. Only minor changes to the questionnaire were required. After the validation process, we had an instrument for data gathering composed of four open-ended questions that ranged from general to concrete topics (Romero-Luis et al., 2022a).

2.2.2. Data collection and participant demographics

After the consistency and validity of the questions was verified, interviews and focus groups were organized to take place between November 2019 and July 2020 either online or face-to-face. To best explore new situations and scenarios the first collection of information was carried out in a face-to-face event called “VI Digital Communication Conference: Actions to Raise awareness of Reduction, Reuse and Recycling,” celebrated in Madrid and organized within the framework of the BIOTRES-CM project. During the event, interviews with five Spanish biotechnology researchers helped us identify the perspectives to be prioritized during theory generation and identify the second group to be included in this research: communication experts in social awareness campaigns (Table 1). We chose biotechnology researchers in the first place to better understand how these technologies are communicated to the public. Their responses revealed the need to speak with communication experts. While we initially planned to conduct four focus groups, we eventually conducted two focus groups and 10 semi-structured

Table 1. Sample elaborated by the authors

Group ID	Group	Subjects	Collection method	Format
[B]	Biotechnology researchers	5	Focus group	Face-to-face
[B]	Biotechnology researchers	7	Focus group	Virtual conference
[C]	Communication experts	10	Semi structured interview	Virtual conference
	TOTAL	22		

interviews (Romero-Luis et al., 2022a). All focus groups and interviews were conducted in their native languages, recorded and transcribed using the sonix.ai artificial intelligence software. Then, the transcripts were manually reviewed to identify the speakers and eliminate automated transcription errata and errors. In each focus group or interview, subjects were provided with online forms to obtain their informed consent and share sociodemographic data and profile information (Romero-Luis et al., 2022a).

All participants were selected using systematic convenience sampling. For one thing, the first group, biotechnology researchers, was chosen based on their active involvement in the development of new technologies for processing organic biowaste into high-value-added bio-based products. They work at universities or research centers. All communication experts, the second group, have collaborated in the creation of an awareness campaign and have extensive experience in the communication and advertising sectors in Spain.

2.3. Data analysis

The units of analysis are the focus group and interview transcripts. Atlas.ti version 9 software was used to facilitate the application of Grounded Theory methods. Again, this method follows a structured process that includes constant comparative method, live, axial and selective codification of the data (Corbin & Strauss, 2008). By analyzing verbal and textual data (Flick, 2004) through the procedural and relational aspects of Grounded Theory (Glaser, 1992), our goal was to design an initial basic theoretical model that would be both substantive and situational (Elliott, 2000). This permitted the authors to understand the phenomenon in its context and its boundaries without the imposition of persistent theoretical models or need to establish formal theories (Escalante-Gómez, 2011).

3. Findings

A total of 519 quotations and 400 codes were identified. Despite this initially large number of codes and categories, only a smaller subset was exploited for research (Romero-Luis et al., 2022b). Codes were separated into two main groups: interviewees' perceptions and the communication model. The first main category identified different perceived qualities of social awareness, including the barriers and enablers for communicating climate change impacts and behavior changes. The second main category—communication model—was divided into the subcategories, Agents and Audiences (Figure 2).

Considering the scale and nature of the research, the analysis focused on the common barriers and enablers of communication actions. Some particularly representative quotations stated by the informants have been included with the findings to better illustrate the overall opinion of the sample. Quotations have been translated by the authors in the process of writing the results section. The results presented were selected because theoretical saturation (Corbin & Strauss, 2008) was found either in both or one group (Table 2). Barriers and enablers are presented according to the categories obtained in the analysis. The last column of Table 2 shows the codification used along the text to help the reader spot, in the results section, the fragments that better respond the research questions posed in the literature review.

Figure 2. Identified categories in the codification process. Elaborated by the authors.

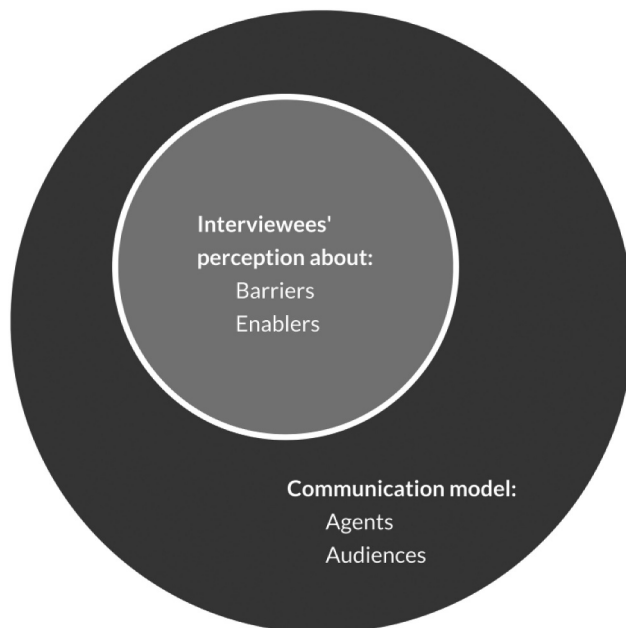


Table 2. Theoretical saturation of categories and research question codes

Category	Subcategory	Theoretical saturation found in	Related to RQ
Barriers	LE-powered consumption model	[B] & [C]	[RQ1] & [RQ2]
	No ease in developing sustainable habits	[B]	
	Complexity of the problem	[B]	[RQ2]
	Agents not working together	[B] & [C]	
	Inefficiency of the operating model of public institutions	[B]	[RQ2]
Enablers	Taking advantage of transmission vectors	[B] & [C]	[RQ3]
	Legislation and political action	[B]	
	Taking advantage of the permeability of audiences	[B]	[RQ3]

3.1. Barriers to be aware of when planning communication strategies

3.1.1. LE-powered consumption model

The interviewees expressed the current consumption model problem promoted by traditional advertisements over the years. As one interviewee explained:

[B] It's very difficult. It's all about consuming, consuming, disposing, and consuming ... So, we would need to change, all of us, the way we use natural resources or what we buy for our personal life. I see a major difficulty there.

Private companies have the financial resources to access to high-quality professional communication resources and influence the habits of individual consumption. Although unlimited consumption is the predominant trend, informants perceived citizens as more critical of disposable consumer products and some companies working to project an aura of sustainability, even if the outcomes of their actions and communications are uncertain.

[C] I work with [company anonymized] and a campaign operation like this ... you don't know what it generates, it's incredible. An operation ... I mean ... Multinationals are still "blah, blah, blah, we are social-operational" and they are not implementing it [sustainable habits] yet.

The informants believe that companies should start introducing changes, such as stimulating responsible consumption of products to foster more sustainable commercial activities. In addition, private actors should be involved in the promotion of habit changes through messages aimed at citizens. Boosting activities that actively involve citizens, that call to action to carry out more sustainable acts, and that develop empathy to connect to the audience, can be effective solutions to promote habit change toward more sustainable behavior [RQ1].

Likewise, according to the informants, helping to understand how the production and recycling process is made in a company could help change the perception of citizens about firms and, thus, promote sustainable behavior.

[C] We work on the topic of awareness and educational materials. We explain to kids how cell phones are made, where minerals come from, and what types of risks there are in supply chains related to the environment or human rights [RQ2].

3.1.2. *No ease in developing sustainable habits*

The need for citizens to develop more sustainable habits is clearly identified. However, communication campaigns encounter another important barrier: it is considerably difficult to carry out sustainable actions, even if citizens are predisposed to it. The main reason relates to the complexity of the problem, which is only found in the biotechnology researchers' group discourse.

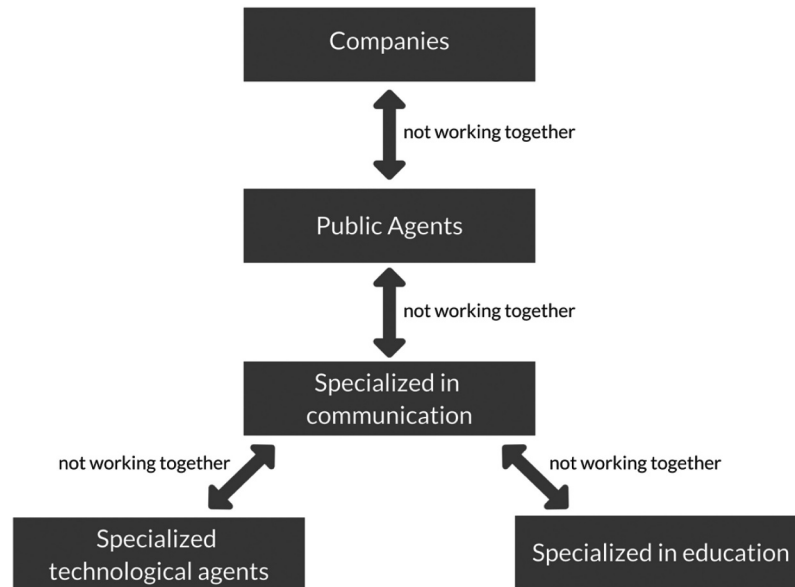
[B] Everything that has to do with the environment and society is an extremely complex problem [...] that has to be approached from many fronts, from many types of professionals: scientists, communicators, primary and secondary school teachers. In other words, social, political, business entities ..., from all points of view.

3.1.3. *Complexity of the problem*

According to the informants, the sustainability issue is hard to convey or understand in the short term and over time, the messages have been reduced to [B]"this [plastic] goes to the yellow bin" or [C]"reduce waste because the planet is full of garbage" without providing any additional justification. Traditionally, advertising communication has been oriented toward short-term conversion. Communication agencies are masters in the use of this type of communication that aims, through emotional appeal, to change the perception of a product to stimulate purchase. This type of communication is very effective at producing surface-level changes, but it is ineffective at causing deep changes because it forbids interaction with the part of ethics and morality that establishes behavior based on the belief that it is the right thing to do to improve the health of the planet. Therefore, the reasons why people should act in a certain way have not been explained, and it has created certain fatigue among citizens, preventing them from carrying out more sustainable actions.

[C] But now you have to add a fourth garbage bin.¹ And it probably comes in a situation of some fatigue, especially because I must make room in my house for a fourth recycling bin when probably the other recycling experiences are not entirely positive.

Figure 3. Lack of coordination between agents with crucial roles.



Hence, coherence between the message we are sending and the conditions that must be met in order to overcome resistance to change is crucial. It is easier to achieve the desired conversion if there is consistency; if there is not, people become more resistant to habit change [RQ2].

3.1.4. Agents not working together

Another reason why difficulties in developing sustainable habits among citizens are perceived may be the lack of coordination between actors. The discourses analyzed highlight the importance of collaboration between different actors to mitigate climate change, such as private (companies) and public institutions (ministries), communication agencies, educational institutions (secondary and higher education), and researchers.

More precisely, there is a huge gap between private and public agents that leads to ineffective communication actions that promote sustainable habits, such as, for example, reducing the use of plastics (Figure 3).

[B] I think it's complex because when you want to shop everything at the same supermarket because you want to buy everything there, in the end, you buy a lot of packaged things and so on.

This example shows the importance of the socio-economic context in which the citizens develop their behaviors. Consequently, communication must work to act accordingly and help policies be understood in this context. In this way, companies have enormous potential to mitigate some barriers. Private actors are seen as the most powerful players due to their capacity of influencing consumer behavior. [C]“I think this is often the great mistake of communication of the public sector: it has to compete with the private sector”. Therefore, fostering collaboration between public and private institutions could certainly make a difference. Aligning political actions with RSC strategies could be a valuable avenue to be explored in the future [RQ2].

Furthermore, the relationship between public agents and advertising agencies must be improved. Particularly in communication experts' discourse, a negative perception is found in those communication actions that come from the public sector. This appears to be inefficient, especially when the target audience of the communication action is the youth public.

[C] If you design a very correct, very educational, very formal campaign, approved by a quorum of people engaged in public affairs and who are very focused on education, ethics, and values, everyone is going to be very happy in that room, but young people are not going to connect with the campaign. If you give this [project] to an advertising agency that has experience in connecting with young people [...] maybe, you will get a riskier [meaning successful] campaign.

In Spain, the public sector communication actions are usually outsourced and are carried out by an advertising or communication agency, prior to winning the public tender. However, the client, the pertinent ministry, must approve the result and usually tends to prioritize political goals over conversion goals for which the campaign is intended, in the viewpoint of communication experts. When it comes to awareness campaigns, this is a major issue because, frequently, due to this restriction, public communication misses the mark of its stated purpose.

Lastly, a lack of relationship between the advertising agencies, or the agents in charge of designing the campaign or communication action, and the educational institutions and researchers is also identified. For one thing, the group of biotechnology researchers recognizes the need for them to be more involved in communication actions. However, they claim to have neither the know-how nor the skills to efficiently communicate to a particular audience. [B]“I believe that knowing how to communicate is not a priority for Spanish scientists. This, I believe, is a critical issue for science and technology in Spain”. What they do have is a great deal of knowledge on the subject that could be used to help communication creators design actions that seek to cause deep changes instead of producing surface-level modifications. For another thing, the analysis reveals the absence of references that indicate that communication experts consider schools and educational institutions to collaborate in the execution of a communication campaign.

3.1.5. Inefficiency of the operating model of public institutions

There seems to be a general belief among biotechnology researchers that public authorities are inefficient. [B]“There is a poor relationship between the Minister of Education, the Ministry of Science, and the Ministry of Environment and Ecological Transition ... Let's say there is very little interaction between them.”

For one thing, the lack of municipal coordination and the disparity of policies in so many municipalities complicate for citizens to act in terms of reduction, recycling, and reuse. [B]“I'm a bit concerned about the large heterogeneity that may exist in municipal policies and the difference in the progress that may be achieved in this area”. The absence of collaboration between the ministries and departments is identified as a serious problem that increases the deterioration of the effectiveness of communication actions. Lack of coordination implies that political action is carried out based on limited knowledge, which leads to the implementation of communication acts that are not in line with target audiences.

Attempting to standardize the laws regulating recycling in Spain, fostering communication between the different ministries/departments, and promoting training among public sector workers to broaden their knowledge of communication strategies would simplify the complexity of the matter. [RQ2]

3.2. Enablers that increase the efficacy of communication actions

3.2.1. Taking advantage of transmission vectors

Three significant transmission vectors are identified among the discourses of both groups. Students during childhood or adolescence and teachers are considered important potential vectors of change as well as influential entities.

[B]“Obviously, yes, children come home from school and teach their elders that recycling is a must, that *this* goes to the yellow bin, *this* goes to the blue one, *this* goes to the green one and now, organic waste goes to the brown bin.”

Kids have the greatest potential to boost habit change in their families. According to the informants, kids have the highest degree of influence and may be able to encourage certain sustainable actions to be performed at home. However, if parents are extremely resistant to change, the above transmission vector may not operate effectively. In any case, for students to act as a vector of transmission, teachers are very important. [C] “Maybe they [teachers] have no idea about composting because they don’t need to know. So, it’s good to have environmentalists that could train them and give them that kind of preparation”. If teachers do not have proper preparation, they will not even be aware of their crucial role. Thus, according to the informants, it is crucial to increase their training, so they have the knowledge and aptitudes needed to carry out initiatives to increase public awareness of climate change among students.

The analysis of the experts in communication discourse revealed the potential of the influential entities as transmission vectors. The purpose is to take advantage of people, institutions, or organizations that could help spread the messages that encourage behavioral change. [C]“Actually, an awareness campaign succeeds the moment the media talks about it”. Collaborating with well-known institutions that could facilitate access to a particular target audience could favor the conversion of the message you want to send.

This idea relates to the concept of user-centered design, which is broadly mentioned in different ways, and to public segmentation as a communication strategy, which is considered essential by communication experts, especially when referring to environmental and sustainable communication. [C]“There are obviously many audiences, [...] those who already have the seed but do nothing or those who do, but could do more. [...] You can’t address everyone using the same message because what you say to one person won’t matter to the other.” Identifying your audience to properly design your message is vital to ensure communication efficacy [RQ3].

3.2.2. *Legislation and political action, the first step*

Legislation is perceived as the most important enabler by the biotechnology researchers’ group. [B]“Raising awareness in society is very important, because, as I said, not only for environmental issues but also for legislative issues, this objective must be achieved”. Regulation that allows the execution of sustainable actions could ensure the efficacy of communication campaigns, especially those that call to action. The law facilitates a scenario in which all actors are more likely to pull in the same direction. [B]“For example, regarding the issue of plastic bags and their prohibition and replacement for ones that can be reused. [...] For that to happen, you would need to demand [by regulation] to do it.” Therefore, political agents are deemed necessary to promote legislation that simplifies the implementation of more sustainable actions for companies, public institutions, or citizens. Furthermore, according to the informants, promoting regulations that favor interaction between the different public agents would help boost collaboration between them, which is a matter that certainly concerns biotechnology researchers.

The analysis highlights the absence of the legislation topic among the discourses of communication experts. They consider public actors as crucial players for mitigating climate change demands, but, at the same time, they do not seem to consider this agent when designing or executing a communication campaign.

3.2.3. *Taking advantage of the permeability of audiences*

Biotechnology experts identify a target audience that emerges to a lesser extent in the discourse of communication experts: young people.

[B] I think that kids, from a very early age, are much more capable of understanding, comprehending and assimilating things much more than we think they are.

According to biotechnology researchers, focusing communication actions on younger people in schools could be a great opportunity due to their predisposition toward acquiring new knowledge and their reduced level of pre-established prejudices [RQ3].

4. Discussion

The results highlight, in line with the work of Corvellec et al. (2022), the urgent need for collaboration between the different actors, which could be fostered by communication campaigns. First, the importance of political and corporate action is underlined, as well as the work of marketing and communication agencies. This is especially important because the complexity of the problem requires a holistic, global, and multilevel approach, an aspect on which Flaherty et al. (2020) agree when proposing the need for macro-social marketing. And this will only be possible if coordinated actions are taken with a comprehensive vision. Furthermore, policies should encourage long-term processes that take advantage of the transforming agents and drivers, especially those that, like schools, generate community-building and citizen participation spaces, and allow, according to the postulates of Empowerment Theory (Zimmerman, 2000), consolidated, lasting, conscious, and critical habit changes (Kamin et al., 2022).

Communication and social marketing campaigns should take advantage of companies' CSR actions and the benchmark they represent for their customers. Assumed as an ethical principle, as an institutional value, synergies should be established, in line with the conclusions of Rundle-Thiele et al. (2019), to contribute to responsible and critical consumption. Similarly, as Eagle et al. (2020) state, incorporating sustainability as a fundamental ethical component of social marketing and communication could positively contribute to promoting responsible and conscious consumption behavior.

Therefore, communication must be supported by a committed Societal Marketing agenda, as noted by Crane and Desmond (2002), allowing companies to establish an ongoing dialogue with their communities. This interaction must be honest and should take advantage of intervention models that have proven to be effective, such as the Community-Based Social Marketing developed by McKenzie-Mohr (2000). And it must especially be demanding to avoid hiding consumption practices behind green marketing and greenwashing, a risk identified by De Freitas Netto et al. (2020).

Furthermore, pro-environmental behavior, and how to address it, is complex, as numerous studies that have evaluated the value-action gap or attitude-behavior gap have shown over the last decades (Blake, 1999; Kollmuss & Agyeman, 2002; Tavri, 2021). This explains the importance of audience segmentation in the communication strategy and the design of social media campaigns, as Detenber & Rosenthal also highlighted (2020).

Adolescents are more receptive to receiving climate change-related messages than adults, as highlighted by Valdez et al. (2018), thus, schools become a fundamental transmission vector for behavior change. Communication actions, from this holistic dimension we suggest, should offer working and reflective resources to work in the classroom with, allowing the development of Transformative Learning to reduce the Value Action Gap, as recently concluded by Evers (2022). Schools and the empowerment of participation, aligned with legislative drives, are key to promoting CE through communication, as Mies & Gold have also highlighted (Holmes & Richardson, 2020).

5. Conclusion and recommendations

This research reveals the importance of the role of communication agencies and communication practitioners to call their social responsibility and convey the values of societal marketing, aspect that Crane and Desmond (2002) and Bloom et al. (2018) have previously noted. In addition, it seeks to foster their self-awareness of the communication model they are utilizing to invite them to perform a self-critical exercise on the effectiveness of their communicative actions. It stems from an applied communication approach (Kreps & O'Hair, 2013) and, thus, as a conclusion of the

Table 3. Relationship between barriers and enablers and the concluded recommendations

Recommendation	Barrier	Enabler
Raise awareness among politicians to reduce barriers that prevent consumers from engaging in behavior change	LE-powered consumption model Agents not working together Inefficiency of the operating model of public institutions No ease in developing sustainable habits	Legislation and political action
Involve companies in communication campaign actions as a point of leverage	LE-powered consumption model Agents not working together	
Foster long-term interactive activities vs using short-term actions	Complexity of the problem	
Take advantage of the most powerful transmission vector: kids and teachers	Agents not working together	Taking advantage of the permeability of audiences Taking advantage of the permeability of audiences

analysis carried out, proposes a series of recommendations targeted at communication practitioners to help them improve the efficiency of their climate change awareness campaigns aimed at promoting CE and change behavior. Table 3 facilitates comprehension of the association between the concluded recommendation and the barriers and enablers.

Considering the most powerful agent as a potential target audience for an awareness campaign could be a great opportunity either to remove barriers that avoid promoting behavior change or discover new obstacles that hinder the success of awareness campaigns to this end. Addressing the players who truly have the potential to change the legislation that hampers habit change could improve the effectiveness of communicative actions. The challenge is to discover new barriers to narrow the objectives of awareness communication campaigns. This investigation has drawn a short list of barriers, but more effort must be invested to understand what piece of legislation should be promoted to reduce communication obstacles. Thus, the first recommendation formulated for communication practitioners is: **raise awareness among politicians to reduce barriers that prevent consumers from engaging in behavior change.**

Companies, besides politicians, are also exceptionally effective when it comes to influencing the social context due to their economic clout and access to the highest-quality communication products. Raising awareness among executives of large or medium companies could not only have a direct impact on planet health but also influence their communication practices. If companies are encouraged to incorporate sustainable practices, such as, for example, recycling procedures in supply chains, internal promotion to reduce environmental footprint, and consumption among employees, their communication practices would also be affected, as well as their brand image. Engaging them to act under their CSR (Crane & Desmond, 2002) and beyond the traditional communication model could have a great impact on society and economy (European Commission, 2020a) and improve credibility and effectiveness of a model of communication that is in crisis (Qayyum et al., 2022). If they are aware of the need to have an integral vision, if they assume it as an ethical principle, as an institutional value, this will be transferred through their communication actions and a relationship will be established between the essence of the company and the communication campaigns. We conclude our second recommendation for communication practitioner as follows: **involve companies in communication campaign actions as a point of leverage.**

Furthermore, there are aspects to be improved regarding the communication actions. Media buying is seen as a strategy that could generate a great impact on society. However, it is not possible to generate deep changes through such short and isolated-in-time messages. Causing deep changes requires long-term actions and social marketing campaigns that seek the common

good (Lee & Kotler, 2019) and real citizen involvement (Levit & Cismaru, 2020). A combination of traditional advertising and long-term localized actions could be the key to boosting behavior change. Traditional advertising techniques are very effective for grabbing attention or calling to short mechanical actions; thus, they could be useful to engage people in longer communication activities that require active involvement and consumer participation. Our third recommendation is: **foster long-term interactive activities vs using short-term actions**. This is a real challenge for communication experts because it implies a huge change in mindset when it comes to conceiving communication strategies for climate change awareness campaigns. However, altering the way communication strategies are perceived, while not affecting the objectives, could improve the effectiveness of campaigns of this nature.

The school environment has an enormous potential to carry out long-term activities that could increase the effectiveness of campaigns that aim to foster behavior change among students because they could act as a vector of transmission at home, as shown by Žukauskienė et al. (2021), meaning that parents could potentially be affected by the campaign messages through their children. In the same manner, teachers could produce a great impact on kids if they were correctly trained to do it, aspect highlighted in Varela-Losada et al. (2019) results. Therefore, the fourth recommendation for communication practitioners is: **take advantage of the most powerful transmission vector: kids and teachers**. If teacher training were considered in communication campaigns strategy, could increase the chances of conversion, which is consistent with the results of Nousheen et al. (2020).

The solid foundation of Grounded Theory (Clarke & Friese, 2007) establishes the importance of better understanding the perception of the population rather than producing formal theory. This is considered a methodological limitation in this study. Since we do not attempt to generate formal theory, the recommendation produced through analytic inference after the discourses analysis could be seen as fundamental hypotheses that, on the other hand, could be employed in future long-term research. In addition, another limitation that relates with the study scope is the absence of crucial actors in the study population, that only includes biotechnology researchers and communication experts. Thus, the need of further investigation that could either consider important actors, such as policymakers, heads of educational institutions, and private company CSR managers or identify the details on the gaps in the relationship between them is needed.

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Author details

Juan Romero-Luis¹
E-mail: juan.romero@urjc.es
ORCID ID: <http://orcid.org/0000-0002-5786-3638>
Alejandro Carbonell-Alcocer¹
ORCID ID: <http://orcid.org/0000-0003-0081-4728>
Manuel Gertrudix¹
ORCID ID: <http://orcid.org/0000-0002-5869-3116>
María Del Carmen Gertrudis Casado¹
ORCID ID: <http://orcid.org/0000-0001-6770-203X>
Paolo Giardullo²
ORCID ID: <http://orcid.org/0000-0002-2560-9088>
Daniel Wuebben³
ORCID ID: <http://orcid.org/0000-0002-1776-0036>

¹ Department of Communication and Advertising, Universidad Rey Juan Carlos, Spain.

² Department of Philosophy, Sociology, Pedagogy and Applied Psychology (FISPPA), Università Degli Studi Di Padova, Padua, Italy.

³ Arts and Humanities Division, IE University, Segovia, Spain.

Author contributions

Juan Romero-Luis: Conceptualization, Methodology, Validation, Investigation, Writing - Original Draft, Visualization, Funding acquisition. Alejandro Carbonell-Alcocer: Conceptualization, Methodology, Validation, Investigation, Funding acquisition. Manuel Gertrudix: Conceptualization, Methodology, Validation, Investigation, Supervision, Project administration, Funding acquisition. María del Carmen Gertrudis Casado: Writing - Original Draft, Supervision. Paolo Giardullo: Writing - Review & Editing. Daniel Wuebben: Writing - Review & Editing.

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Correction

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Note

1. The fourth bin is referring to the organic waste bin which has been recently implemented in the cities of Spain in accordance with the Directive 2008/98/EC on waste (European Union, 2017).

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