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The impact of SMS messages on young people's participation in recycling campaigns

El impacto de los SMS entre los adolescentes en campañas de reciclaje

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ABSTRACT: Waste has become a real problem in developed countries; in Spain, municipal waste generated is higher than the European average. To encourage real change in citizens' behaviour in order to achieve a more environmentally friendly society is essential for real sustainable development. The aim of this article is to investigate the effectiveness of workshops and text messages in promoting aluminum recycling among adolescents through quantitative and qualitative investigations, specifically focus groups and questionnaires to young people between 14 and 18 years old. The conclusions of this study provide elements of information that are of interest of those involved in the management of environmental information, and particularly in the designing of communication campaigns to promote recycling among young people more effectively.

RESUMEN: Los residuos se han convertido en un verdadero problema en las sociedades desarrolladas; en España, la generación de residuos está por encima de la media europea. Conseguir un cambio de actitud en la población para que adquiera comportamientos más respetuosos con el medio ambiente resulta imprescindible. El objeto de este artículo es estudiar la efectividad de los mensajes SMS a la hora de promover el reciclado de envases de aluminio en los adolescentes. Para ello se ha empleado una metodología cualitativa y cuantitativa, concretamente, se han realizado grupos de discusión y cuestionarios a jóvenes entre 14 y 18 años. Las conclusiones aportan elementos de interés para los gestores en comunicación ambiental.

Keywords: **Mobile messages, cell phone, mobile Communication, teenagers, environmental communication, mobile application.**

Palabras clave: SMS, móvil, adolescentes, comunicación móvil, comunicación ambiental, aplicación móvil.

1. Introduction

The volume of waste generated has increased relentlessly in developed countries over the last 40 years[2]. Our consumer society has even led to the development of a new "science", the archaeology of garbage, whose foundation is to study our society through the waste it generates[3]. It is critical to change the attitudes of the population so that individuals will adopt behaviours that are more respectful of the environment. Communication and education are two pillars underpinning social change; recognising these pillars, the UN declared the period 2005-2014 as the "Decade of Education for Sustainable Development" and designated UNESCO as lead agency for the promotion of this Decade[4].

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[2] Cfr. SCHIVELY, Carissa, "Understanding the NIMBY and LULU Phenomena: Reassessing Our Knowledge Base and Informing Future Research", *Journal of Planning Literature,* vol. 21, nº 3, 2007, pp. 255-266.

[3] Cfr. RATHJE, William and MURPHY, Cullen, *Rubbish! The Archaeology of Garbage,* HarperCollins, New York, 1992.

[4] NACIONES UNIDAS, *Actas de la Conferencia General. Resoluciones*, 2007, p. 37.

Waste packaging material (especially that made from aluminium and other metals) represents an important source of raw material for industry. Aluminium is the material in any container of waste for recycling that has the highest economic value, with a margin of as much as 2 to 1 over steel, depending on the prices at any given moment[5]. The recycling of aluminium provides numerous advantages: it saves energy (producing a new product using recycled aluminium saves 95% of the energy required in relation to producing it directly from new metal), and it saves the raw material, i.e. the mineral bauxite; during the recycling process the characteristics of the metal remain unchanged, since the product obtained has the same properties; what is more, aluminium can be recycled an indefinite number of times without undergoing any reduction in its quality. For this reason, reclaimed aluminium, once it has been selected and pressed, is melted down to produce new bars of aluminium which can be used for any purpose.

The recycling process requires collaboration on the part of the public, and particularly from teenagers and young adults, being among the most frequent consumers of canned drinks. They will then in turn be able to transmit the "recycling culture" to their families[6].

There are different ways of obtaining the cooperation of the public for recycling, and one of these is to conduct educational and informative campaigns. Various educational campaigns have been conducted in Spain for more than 20 years now, with varied results. On the one hand, opinion surveys show that there is a level of awareness of, and sensitisation to, the need for recycling among the general public[7], but that in terms of action this motivation does not lead to a real change in behaviour. In this respect, according to the latest report by the European Commission into the attitudes of Member States to recycling-related issues[8], it is concluded that significant progress has been made but that much still remains to be done, especially in Spain, which has a level of performance below the European average, as is also the case for Italy and for various countries in Eastern Europe.

The data from the latest Eurostat report on the treatment of municipal waste in the 27 countries of the EU show that Spain is progressing slowly. Levels of recycling of municipal waste are low (15% compared with a European average of 24%), levels of discharge in refuse dumps are high (52% compared with an average of 38%), while on the other hand the level of waste generation is higher than average (547 kg per person per year, while the average is 513 kg per person). Belgium, Luxembourg, Germany, the Netherlands, Austria and the Scandinavian countries are highest-placed, being the countries that recycle more waste than the European average[9].

A gap can be observed between awareness and action, an effect which has been studied by various authors[10]. Among the strategies used to overcome it are educational and

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[5] Asociación para el Reciclado de Productos de Aluminio, España, 2013.

[6] Cfr. MEE, Nicky and CLEWES, Debbie, "The Influence of Corporate Communications on Recycling Behavior", *Corporate Communications: An International Journal,* vol. 9, nº 4, 2004, pp. 265-275.

[7] Cfr. INSTITUTO NACIONAL DE ESTADÍSTICA (INE), 2010, Encuesta sobre Hogares y Medio Ambiente 2008. (*www.ine.es/revistas/cifraine/0609.pdf) (29-01-2010)*; MINISTERIO DE MEDIO AMBIENTE Y MEDIO RURAL Y MARINO, Perfil Ambiental de España 2009: Informe Basado en Indicadores, Ministerio de Medio Ambiente y Medio Rural y Marino, Madrid, 2010.

[8] EUROSTAT, 2013, Environment in the EU27. http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/8-04032013-BP/EN/8-04032013-BP-EN.PDF (04-03-2013).

[9] *Ibíd.*

[10] Cfr. ARTZ, Nancy and COOKE, Peter, "Using E-Mail Listservs to Promote Environmentally Sustainable Behaviors", *Journal of Marketing Communications*, vol. 13, nº 4, 2007, pp. 257-276; TUDOR, Terry L., BARR, Stewart W., and GILG, Andrew W., "A Novel Conceptual Framework for Examining Environmental Behavior in Large Organizations. A Case Study of the Cornwall National

informative campaigns on the subject of waste recycling. As indicated by Solano (2008), in Communication and Education for Sustainable Development (BCSD) campaigns, the important goal is not to raise awareness but to engage the population in the campaign[11]. For such campaigns it is important also to select the most suitable instruments of communication[12]. Until recently it was considered that person-to-person techniques (such as, for example, educational workshops) were effective ways of creating awareness and commitment. Through them it is possible to promote attitudes that cannot be encouraged through the use of other means of communication such as advertising, which transmits information but through which it is difficult to disseminate new attitudes[13].

Over the last 15 years new techniques of communication have developed which have since become routinely familiar to a generation of youngsters[14]. Here we are referring to communication through social networks such as Facebook, Twitter or the Spanish-based network Tuenti, through Microsoft's Messenger function, and, of course, all the functions provided through the use of mobile telephones, particularly those of the *smartphone* variety. SMS, *advergaming, mobi sites, apps* (applications), etc.

The growth of the use of cell phones has proceeded at a dizzying pace[15] and their adoption as a means of communication has been quite simply unstoppable[16]. Today, young people could not imagine the world without interactive devices, especially cell phones, which have become an essential part of their lives and the lives of their peers[17]. A cell phone is a "multi-use terminal", through which young people access social networks, record and broadcast video, and write and send messages, among other applications. This "fourth screen" is set to be key in the future of communication[18].

New functions are constantly being introduced, as exemplified by the appearance of *apps*, which have very quickly become the second most widely-used cell phone supplementary function both in the U.S. and in the U.K., second only to the sending and

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Health Service (NHS) in the United Kingdom", *Environment and Behavior*, vol. 40, nº 3, 2008, pp. 426-450.

[11] SOLANO, David, *Estrategia de Comunicación y Educación para el Desarrollo Sostenible*. UNESCO, Santiago, 2008. http://unesdoc.unesco.org/images/0015/001595/159531S.pdf.

[12] MENESES, Gonzalo D. and PALACIO, Asuncion B., "Recycling Behavior: A Multidimensional Approach", *Environment and Behavior*, vol. 37, nº 6, 2005, pp. 837-860.

[13] Cfr. SOLANO, *op. cit.*; THACKERAY, Rosemary, NEIGER, Brad L., HANSON, Carl L. and MCKENZIE, James, "Enhancing Promotional Strategies within Social Marketing Programs: Use of Web 2.0 Social Media", *Health Promotion Practice*, vol. 9, nº 4, 2008, pp. 338-343; VICENTE, Paula and REIS, Elizabeth, "Factors Influencing Households' Participation in Recycling", *Waste Management & Research*, vol. 26, nº 2, 2008, pp. 140-146.

[14] Cfr. PRENSKY, Marc, "Digital Natives, Digital Immigrants", *On the Horizon*, vol. 9, nº 5, 2001, pp. 1-6; GRANT, Ian and O'DONOHOE, Stephanie, "Why Young Consumers Are Not Open to Mobile Marketing Communications", *International Journal of Advertising*, vol. 26, nº 2, 2007, pp. 223-246.

[15] UNIÓN INTERNACIONAL DE TELECOMUNICACIONES (ITU), *The World in 2009: ICT Facts and Figures*, ITU, Geneva, 2010.

[16] AGUADO, Juan Miguel and MARTÍNEZ, Immaculada, *Sociedad Móvil. Tecnología, Identidad y Cultura,* Bibliotecanueva, Madrid, 2008; CASTELLS, Manuel, *Comunicación Móvil y Sociedad*, Ariel, Madrid, 2007; FERNÁNDEZ-CAVIA, José and LÓPEZ, Marina, "Communication, Destination Brands and Mobile Applications, Communication & Society/ Comunicación y Sociedad, vol 26, nº 2, 2013, pp. 95-113.

[17] AGUADED, J. Ignacio, "Niños y Adolescentes: Nuevas Generaciones Interactivas", *Comunicar*, vol. 18, nº 36, 2011, pp. 7-8; MALO, Sara, "Impacto del Teléfono Móvil en la Vida de los Adolescentes Entre 12 y 16 Años", *Comunicar,* nº 27, 2006, pp. 105-112.

[18] CEBRIÁN, Mariano, "Nuevas Formas de Comunicación: Cibermedios y Medios Móviles", *Comunicar,* vol. 17, nº 33, 2009, pp. 10-13.

receiving of messages[19]. SMS messages are among the most widely used communication functions, and in some cases the most widely used function, in Spain, as they are in the U.K. or the U.S.[20]. Moreover, as Priporas & Mylona (2008) confirm, SMS messages are greatly appreciated as a means of communication by young consumers[21] and SMS's language may accelerate demand process[22].

For these reasons, this study aims to analyse the effectiveness of SMS messages in environmental communication campaigns, particularly to promote among teenagers the recycling of aluminium packaging. Moreover we try to investigate young people's perception of SMS messages as a new method of communication function. This study was particularly interested in how adolescents perceive the use of SMS in environmental campaigns; adolescents are particularly interesting because young people act as prescribers in their homes and represent tomorrow's adults. –teenagers and young adults are among the most frequent consumers of canned drinks–. They will then in turn be able to transmit the "recycling culture" to their families. It was also useful to test the complementarity between these two techniques as educational workshops may appeal directly to the conscience of the people and can adapt to any audience, but they have the problem of cost and scope, while SMS are reduced cost and their reach are as great as mobile users. Therefore it was found interesting to study the effectiveness of the SMS and their potential complementarity with the workshops.

In order to achieve its objective, this article is divided into five sections. After this introduction there is a review of the relevant literature. The methodology used is described in the following section. The fourth section then deals with the analysis of the results, while the fifth and final section contains the conclusions of the study and possible future lines of research.

2. *Some previous considerations on environmental communication*

Environmental communication is relatively new. Scholars from a range of academic disciplines have worked on it. Environmental communication is the result of interdisciplinary work of several scholars in the area of communication, management, environmental risk, sociology and environmental studies. From 1970 to 2000, the growth of papers was 25.5%. Since 1985, such growth has been particularly high:

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[19] According to press release at: http://www.zokem.com/2012/04/press-release-arbitron-mobile-launches-smartphone-and-tablet-measurement-service-in-united-states/

[20] BRINGUÉ, Xavier and SÁDABA, Charo, *La Generación Interactiva en España*. Ariel, Barcelona, 2009; CASTELLS, *op. cit.*; FUNDACIÓN PFIZER, *La Juventud y las Redes Sociales en Internet*, Fundación Pfizer, Madrid, 2009; GARCÍA, M. Carmen and MONFERRER, Jordi, "Propuesta de Análisis Teórico Sobre el Usodel Teléfono Móvil en Adolescentes", *Comunicar,* vol. 17, nº 33, 2009, pp. 83-92; LENHART, Amanda, LING, Rich, CAMPBELL, Scott and PURCELL, Kristen, *Text Messsaging Explodes as Teens Embrace It as the Centerpiece of Their Communication Strategies with Friends,* Pew Internet & American Life Project, Washington DC, 2010.

[21] PRIPORAS, Constantinos and MYLONA, Ifigeneia, "Mobile Services: Potentiality of Short Message Service as New Business Communication Tool in Attracting Consumers", *International Journal of Mobile Communications,* vol. 8, nº 4, 2008, pp. 456-466.

[22] NIETO TAMARGO, Alfonso, "Ciudadano y Mercado de la Comunicación", in *Communication and Society/Comunicación y Sociedad*, vol. XXI, nº 2, 2008, p. 27.

between 1985 and 1990, this growth reached 44% across all disciplines, although most published items were devoted to science and risk communication[23].

According to the focus of this research, we will briefly identify the works of marketing and institutional communication scholars. By the 1970s, some marketing scholars investigated about environmental topics. In 1971, *Journal of Marketing* began publishing on ecological matters[24]. A number of scholars from social marketing have studied the management of environmental communication. The objective of social marketing is to seek a change in people's behaviour. One of the clearest definitions found was that given by Kotler and Roberto in 1992, and which already at that time had introduced advances in technology as an associated factor[25]: "Social marketing is a strategy to change behavior. It combines the best elements of the traditional approaches to social change with integrated planning and a framework for action, and it uses the advances in communication technology and in marketing skills".

Pérez (2004) analyses the impact of environmental issue on social marketing[26]:

> The modification of the beliefs, attitudes and behavior of the public in favour of the rational use and consumption of natural resources such as water, healthy food, the air we breathe, etc., has given rise to a great opportunity for the development and realization of social marketing. The focus for decision-making is formed by the variables consisting of endangered natural resources, followed by individuals' personal needs combined with the provision of services to satisfy these needs, which is undertaken by organisms in the public and private sectors and by non-governmental organizations, who will design the provision of products and services to the benefit of the end user and of the organism concerned without causing damage to the environment. The rights and duties of every citizen in relation to the environment derive from the need for decisions to be taken with a view to maintaining the balance of the environment.

The works of Kotler[27], Andreasen[28] and other authors such as Evans[29], Merino[30], Pérez[31] and Demoss & Nicholson[32], among others, investigate in greater depth environmental marketing. According to Kotler, environmental communication has three

[23] Cfr. PLEASANT, Andrew, GOOD, Jennifer, SHANAHAN, James and COHEN, Brad, "The Literature of Environmental Communication", *Public Understanding of Science,* vol. 11, 2002, pp. 197-205.

[24] Cfr. KASSARJIAN, Harold H. "Incorporating Ecology into Marketing Strategy: The Case of Air Pollution", *Journal of Marketing,* vol. 35, nº 3, 1971, pp. 61-65.

[25] KOTLER, Phillip and ROBERTO, Eduardo, *Marketing Social: Estrategias para Cambiar la Conducta Pública,* Díaz de Santos, Madrid, 1992.

[26] PÉREZ ROMERO, Luis Alfonso, *Marketing Social: Teoría y Práctica*. Pearson Educación, México, 2004.

[27] KOTLER and ROBERTO, *op. cit.*; KOTLER, Phillip, ROBERTO, Ned and LEE, Nancy, *Social Marketing: Improving the Quality of Life*, Sage Publications, Thousand Oaks, CA, 2002; KOTLER, Phillip and LEE, Nancy, *Social Marketing: Influencing Behaviors for Good,* Sage Publications, Los Angeles, 2008.

[28] ANDREASEN, Alan R., "Marketing Social Marketing in the Social Change Marketplace", *Journal of Public Policy & Marketing,* vol. 21, nº 1, 2002, pp. 3-13; ANDREASEN, Alan R*., Marketing Social Change: Changing Behavior to Promote Health, Social Development, and the Environment,* Jossey-Bass, Washington, DC, 1995.

[29] EVANS, Dave, *Social Media Marketing,* Sybex, New York, 2008.

[30] MERINO, Angel, *El Anuncio Verde. Marketing y Comunicación Ambientales,* Expansión Deusto, Bilbao, 1993.

[31] PÉREZ ROMERO, *op. cit.*

[32] DEMOSS, Michelle and NICHOLSON, Carolyn, "The Greening of Marketing: An Analysis of Introductory Textbooks", *Journal of Education for Business,* vol. 80, nº 6, 2005, pp. 338-346.

fundamental objectives: to transmit information, to generate awareness, and to lead to action in addition to reminding the public of the campaign's themes[33]. Kotler and Roberto address the conditions that contribute to changing values and that lead to behaviour modification regarding environmental issues[34]. They propose four ways to adopt new ideas or actions. Moreover, Rotshschild[35] suggests three types of actions for behaviour change, which were subsequently applied to the environmental field[36].

At the same time, the area of environmental communication grew out of the work of a number of communication scholars[37]. The study of environmental communication covers a wide range of topics. One of the broadest areas of study is from rhetorical communication[38]. In this sense, it is described as:

> the many ways and the forums in which citizens, corporations, public officials, journalists, and environmental groups raise concerns and attempt to influence the important decisions that affect our planet. They and others realize that our understanding of nature and our actions toward the environment depend not only on science but on public debate, media, the Internet, and even ordinary conversations[39].

Environmental communication is also described as public participation in environmental decision making[40]. In this sense, environmental communication can be defined as "the selection and strategic use of communication processes and media to facilitate decision-making, public participation and the completion of projects to achieve sustainable development"[41].

Environmental communication has grown substantially as a field. It is becoming more and more important[42]. In 2011, scholars and practitioners establish the International Environmental Communication Association (IECA) to coordinate research and activities to find new and better ways to communicate about environmental issues[43].

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[33] KOTLER and LEE, *op. cit.*

[34] KOTLER and ROBERTO, *op. cit*.

[35] ROTHSCHILD, Michael, "Carrots, Sticks, and Promises: A Conceptual Framework for the Management of Public Health and Social Issues Behavior", *Journal of Marketing,* vol. 63, nº 10, 1999, pp. 24-37.

[36] BINNEY, Wayne, HALL, John and SHAW, Mike, "A Further Development in Social Marketing: Applicatiion of the MOA Framework and Behavioral Implications", *Marketing Theory,* vol. 3, 2003, pp. 387-403.

[37] COX, J. Robert, *Environmental Communication and the Public Sphere*, Sage Publications, Thousand Oaks, CA, 2013.

[38] Cfr. COOPER, Marilyn M., "Environmental rhetoric in an age of hegemony: Earth first! and the nature conservancy", in HERNDLS, Carl George and BROWN, Stuart Cameron (eds.), *Green Culture: Environmental Rhetoric in Contemporary America,* University of Wisconsin Press, Madison, WI, 1996, pp. 236-260.

[39] COX, *op. cit*., p. 11.

[40] Cfr. GRUNIG, Larissa, *Environmental Activism Revisited: The Changing Nature of Communication Through Organizational Public Relations, Special Interest Groups, and the Mass Media,* North American Association for Environmental Education, Troy, OH, 1989.

[41] OEPEN, Manfred, *Communicating the Environment. Environmental Education, Communication and Sustainability,* Peter Lang Publishers, New York, 2000.

[42] FLOR, Alexander G., *Environmental Communication: Principles, Approaches and Strategies of Communication Applied to Environmental Management*, University of the Philippines-Open University, Diliman, Quezon City, Philippines, 2004.

[43] http://environmentalcomm.org

3. *Materials and methodology*

We proceeded in two stages (see Table1). The first, of a qualitative nature, took the form of three focus groups with young people of between 16 and 18 years of age in two spanish cities: Barcelona and Málaga. The participants came from: IES Politécnico Jesús Marín in Málaga, IES Poblenou in Barcelona and Residence Oreig. The objectives of this qualitative phase were as follows:

(i)   To determine participants' perceptions concerning the subject of recycling in general and the recycling of aluminium packaging in particular, and to identify their preferred means of communication for receiving messages promoting recycling.

(ii)   To determine how the young people use their cell phones and their willingness to receive SMS messages promoting recycling.

(iii)   To edit SMS messages promoting the recycling of aluminium packaging that are appropriate to their cultural level, style of language, etc. A number of these messages were subsequently used during the campaign of sending SMS messages.

The age profiles of the participants in the first two groups matched the target profile that we wanted to examine in this study. In the third group, some of the participants were slightly older (18-22 years); we decided to analyse this group separately because their other characteristics, such as gender, socioeconomic profile and religious beliefs, did not match those of the other groups. We then compared the results from this group to those of the other two groups.

Regarding the socio-economic profile and interests of each group, assistants from IES Jesús Marín were high school students who spent their time studying. In the IES Poblenou group, the assistants were students who combined their studies with paid employment. In the Oreig group, the assistants were students who also worked in the residence itself.

The focus groups were held on the following dates: December 1, 2009, in IES Jesús Marín; December 16, 2009, in IES Poblenou; April 21, 2010, in Residence Oreig. In total, there were 34 students: 13 from the IES Poblenou, 12 from the IES Jesús Marín and 9 from Residence Oreig.

An initial script was designed for use during the focus group[44]. The sessions were designed to last 90 minutes. A voice recorder was used, and photographs were taken in all sessions. Seats in the rooms were arranged in a U or circle. A small activities room was used at the Institute of Málaga; part of the computer room was used at the Institute of Barcelona; and a TV room was used in the Barcelona residence. The environment was designed to allow students to "disconnect" from the classroom environment and to debate as if they were with a group of friends outside of school.

In the second phase, of a quantitative nature, two questionnaires were produced[45]: one for use before the SMS message campaign (Q1), and one for use after the campaign (Q2) had been conducted. Both questionnaires were completed by pupils attending 4 different schools imparting secondary or vocational-type education between 14 and 18 years of age in the Spanish city of Málaga[46]. The schools were: IES Politécnico Jesús Marín, IES La Rosaleda, IES Manuel Alcántara e IES Mare Nostrum.

The questionnaire used open questions (without any structure or association of concepts) and closed questions (dichotomous, multiple choice, scale of importance and

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[44] The script designed for the focus group can be found in the Appendix I.

[45] The Delegation of Education of the Province of Málaga and the Head of the Production of Social Statistics Statistical of the Institute of Catalonia validated the questionnaire.

[46] The sample description is in the Appendix II.

rating scale). In addition, questions that might show knowledge and questions of action, intention and opinion were included, as were filter questions that if answered in the negative prompted a non-sequential move to another question[47].

The objectives of this phase were as follows:

(i)   To assess the effectiveness of SMS messages for promoting the recycling of aluminium packaging.

(ii)   To analyse the awareness, attitudes and predisposition of the young people concerned toward the subject of recycling in general, and the recycling of aluminium packaging in particular.

(iii)   To determine the methods of communication preferred by the young people concerned for receiving information concerning recycling campaigns.

(iv)

The first questionnaire was completed by 291 young people, with 6 invalid responses, between November 2009 and January 2010; the second by 163 youngsters between April and May 2010, of whom 107 had also completed the first questionnaire. Of these 107 participants, only 35 had received the campaign of SMS messages, although the total number of youngsters who received the messages was 103.

Table 1. Time, techniques and sources

Fieldwork phases			
Phase	Time	Research technique	Research sources
Iª Phase: qualitative research	Home fieldwork	Focus group	34 students
IIª Phase: quantitative research	Before the workshops and the SMS message campaign	First questionnaire (Q1)	285 students
	After the workshops and the SMS message campaign	Second questionnaire (Q2)	163 students

Sources: own production.

The workshops[48] were held in four centres in Málaga, in the same location as the first questionnaire was administered; some of the students who had previously answered this questionnaire came to the workshops. The workshops were held during the month of February 2010 and had an average duration of 100 minutes. The number of participants ranged from 20 in IES Manuel Alcántara to nearly 60 in IES Mare Nostrum. The workshops included some of the features highlighted by several authors, such as the following:

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[47] Cfr. BERGANZA, Mª Rosa & RUÍZ, José A, *Investigar en Comunicación. Guía Práctica de Métodos y Técnicas de Investigación Social en Comunicación*, McGraw-Hill, Madrid, 2005.

[48] In this article we follow those authors who refer workshop as a meeting emphasizing interaction and exchange of information that increase people's knowledge and awareness about the environment. Cfr. DISINGER, John F., *Environmental Education's Definitional Problem*, ERIC Information Bulletin #2, Clearinghouse for Science, Mathematics and Environmental Education, Columbus, OH, 1983; HUNGERFORD, Harold, PEYTON, R. Ben and WILKE, Richard, "Goals for Curriculum Development in Environmental Education", *The Journal of Environmental Education,* vol. 11, nº 3, 1980, pp. 42-47; GONZÁLEZ, María, "La Educación Ambiental y la Formación del Profesorado", *Revista Iberoamericana de Educación,* vol. 16, 1998, pp. 13-22; PAUL, Gina and VOLK, Trudi L., "Ten Years of Teacher Workshops in an Environmental Problem-Solving Model: Teacher Implementation and Perceptions", *The Journal of Environmental Education,* vol. 33, nº 3, 2002, pp. 10-20.

–A discussion of the starting point according to the answers to the initial questionnaire[49].

–An explanation of the importance of recycling and the provision of basic knowledge about recycling[50]. The emphasis was on basic vocabulary, collection containers, and the aluminium lifecycle. The workshops gave examples such as the following: Over 75% of the aluminium produced over 100 years ago is currently being recycled, and recycling one aluminium can saves the amount of energy needed to operate a computer for one hour[51].

–A period in which the students spent time experiencing and designing activities that raise awareness among their peers[52].

–A presentation by an expert in aluminium recycling to resolve the doubts of the students[53].

The campaign of SMS messages consisted of a series of 5 SMS messages promoting the recycling of aluminium packaging and sent over a 2-week period to those who had provided their cell phone number in the first questionnaire. The insights gained in the focus groups and workshops were used to write the SMS messages based on the messages written by young people to promote the recycling of aluminium cans. Four SMS messages were drafted; three communications agencies in Barcelona were then consulted about the effectiveness of these messages. A fifth and final SMS message was also included, thanking young people.

The SMS texts sent were as follows[54]:

(i)   IT'S TIME TO ALUMINIZE! RECYCLE @LUMINIUM NOW! Help us win – throw it in the yellow bin

(ii)   Be in the 1st million to save aluminium! RECYCLE @LUMINIUM NOW! Help us win –throw it in the yellow bin

(iii)   Play it cool –u know the rule! Throw yr metal away the right way today RECYCLE @LUMINIUM NOW! Help us win –throw it in the yellow bin

(iv)   Don't make the planet carry the can! RECYCLE @LUMINIUM NOW! Help us win –throw it in the yellow bin

(v)   FINAL MESSAGE: Thx to all for yr patience and participation RECYCLE @LUMINIUM NOW! Help us win – throw it in the yellow bin

The statistical methodology used consisted of three different types of analysis. First, there was a description and verification of the knowledge and recycling habits of the

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[49] ARMENTEROS, Bartolomé, "¿Cómo Trabajar la Educación para el Respeto del Medioambiente y en Particular la Necesidad de Reciclar en Educación Secundaria Obligatoria?", *Transversalidad Educativa,* nº 11, 2009, pp. 31-37.

[50] GUTIÉRREZ QUESADA, María Belén, "Talleres en la Educación", *Enfoques Educativos,* nº 14, 2008, pp. 92-97.

[51] GUZMÁN CASAS, María Dolores, "¡Qué divertido es reciclar!", *Transversalidad Educativa,* nº 11, 2009, pp. 107-114.

[52] Cfr. GUTIÉRREZ QUESADA, *op. cit.*; GUZMÁN CASAS, María Dolores, "Los Talleres y su Implicación Educativa en el Proceso de Enseñanza-Aprendizaje," *Ciencia y Didáctica,* vol. 18, 2009, pp. 67-77; RENTERÍA, Yunia, "Estrategias de Educación Ambiental de Institutos Descentralizados en el Sistema Educativo Colombiano en Medellín", *Revista Facultad Nacional de Salud Pública,* vol. 26, nº 1, 2008, pp. 90-98; QUIVA, Dayli, MONTERO, Daleisy, GONZÁLEZ, Emilba, CABRERA, Maritza and GUEVARA, Alejandra, "Diseño de un Arte con Latas para Incrementar el Reciclaje en la Universidad Dr. José Gregorio Hernández", *I Congreso Internacional de Calidad e Innovación en Educación Superior*, Caracas, Venezuela, 9-13 April 2007.

[53] The expert was José Miguel Benavente who is CEO of ARPAL.

[54] English translations approximately reproducing the content and style of the Spanish originals.

population based on their overall tabulation (Analysis 1). This analysis was used to understand the behaviour and recycling habits of students in Málaga. The second analysis was based on the identification of significant differences between actions before and after the communication (independent samples); this analysis was used to determine whether the communication techniques had an impact but was not used to determine which technique was most effective (Analysis 2). Finally, we studied the differences between the individuals common to both questionnaires (related samples) before and after the communication activities were carried out. This analysis was used (a) to rigorously determine the degree of impact of the communication techniques and (b) to quantify the effect of each of the two techniques employed (Analysis 3). Below are the results for the group of individuals common to both questionnaires.

4. *Results*

Only 35 of the teenagers who participated in the SMS sending campaign completed both questionnaires. This sample does not allow for even a non-parametric comparison of contingency tables that could cross-tabulate values from before and after the campaign. We shall therefore undertake an analysis of an exploratory nature. By any measure, observation of the relevant tables suggests a change in awareness and behaviour on the part of the youngsters concerned in relation to their approach to recycling aluminium.

Six different aspects have been analysed, detailed as follows:

a)   Awareness of the location of a yellow refuse container near their home.

b)   Awareness of which materials are to be deposited in the yellow containers.

c)   Awareness of the colour of the containers in which aluminium cans are to be deposited.

d)   Participation in the recycling of aluminium packaging and aluminium foil.

e)   Reasons for recycling.

f)   Who benefits from recycling.

g)   Evaluation of the methods of communication used in recycling campaigns.

Before the SMS campaign, roughly 8 out of every 10 pupils knew the location of a yellow container (for depositing metal packaging, Tetra-Briks and plastic) near their home or school. After the informative campaign, this number increased to 9 out of every 10.

Before the campaign, roughly 60% of the youngsters replied that the yellow container was for plastic packaging, and very few mentioned that metal, aluminium or cans could be deposited in it (only 2 out of 31, see Table 2). After the campaign, 11 youngsters out of this group of 31 gave the correct answer. Thus 10 youngsters had learned new information. Although the sample is insufficient for a statistical comparison that can confirm the change between before and after the campaign, it would however appear that the trend is clear.

Table 2. Contingency table for the question "Which materials go in the yellow container?", comparing times prior to and subsequent to the SMS campaign

		After		
		Omit aluminium	Include aluminium	Total
Before	Omit aluminium	19	10	29
	Include aluminium	1	1	2
	Total	20	11	31

Source: own elaboration.

The degree of awareness of the colour of the container for recycling aluminium packaging was high before the campaign (20 out of 23 youngsters responded correctly). The three who gave the wrong answer responded correctly after the campaign (Table 3).

Table 3. Contingency table for the question "Which container does aluminium packaging go into?", comparing times prior to and subsequent to the SMS campaign

		After			
		Yellow	Green	Blue	Total
Before	Yellow	20	0	0	20
	Green	2	0	0	2
	Blue	1	0	0	1
	Total	23	0	0	23

Source: own elaboration.

The material most often recycled by the teenagers was paper/cardboard (80% of youngsters recycled them), followed by batteries, glass and plastic (between 60% and 70%). Between 45% and 50% recycled Tetra-Briks and drink cans. A similar proportion to that of youngsters who recycled paper or aluminium packaging (Table 4).

Table 4. Contingency table for habits concerning recycling aluminium packaging/foil, comparing times prior to and subsequent to the SMS campaign

		After		
		Don't recycle	Recycle	Total
Before	Don't recycle	22	7	29
	Recycle	0	17	17
	Total	22	24	46

Source: own elaboration.

There is no indication that the campaign affected the reasons that lead youngsters to recycle. The importance given to "I am concerned about the environment" (84% considered this important or very important) and "I recycle because it's in fashion" (10% considered this important or very important) stayed at the same levels. Nevertheless, a slight increase in importance was given to "I recycle, but to tell the truth I've never thought about why I do so" after the campaign (see Table 5). The SMS communication campaign aroused participants' conscience, leading them to reflect on their reasons for recycling.

Table 5. Contingency table for the reply giving the reason for recycling "I recycle, but I've never stopped to think about why", comparing times prior to and subsequent to the SMS campaign

| | | After | | | |
		Not important	Important	Very important	Total
Before	Not important	2	2	0	4
	Important	0	14	3	17
	Very important	0	0	0	0
	Total	2	16	3	21

Source: own elaboration.

Finally, it was shown that SMS messages are not considered as the ideal method for a campaign of sensitisation to recycling aluminium (Table 6), although the response after the campaign was more favourable than before it.

Table 6. Contingency table for the question "SMS messages are a suitable means of communication for transmitting information to the public about recycling", comparing times prior to and subsequent to the SMS campaign

| | | After | | | |
		Unsuitable	Suitable	Highly suitable	Total
Before	Unsuitable	17	4	3	24
	Suitable	1	2	0	3
	Highly suitable	0	0	1	1
	Total	18	6	4	28

Source: own elaboration.

Another aspect observed was the improvement detected after the campaign in the perception of those who benefit from recycling as being somewhat nearer to the participants' experience.

Finally, preferences were analysed concerning the preferred method for campaigns of sensitisation. It was observed that TV/radio were unequivocally stated to be the preferred media (Figure 1). This figure compares the percentages of preferences for different media in the two questionnaires: the one completed before the SMS were sent and the one completed afterwards. It was observed that after the campaign, the level of "preference" for cell phones increased considerably, although it remained far behind that of TV/radio.

Figure 1. Method preferred by youngsters for receiving information about recycling (pre- & post-campaign)
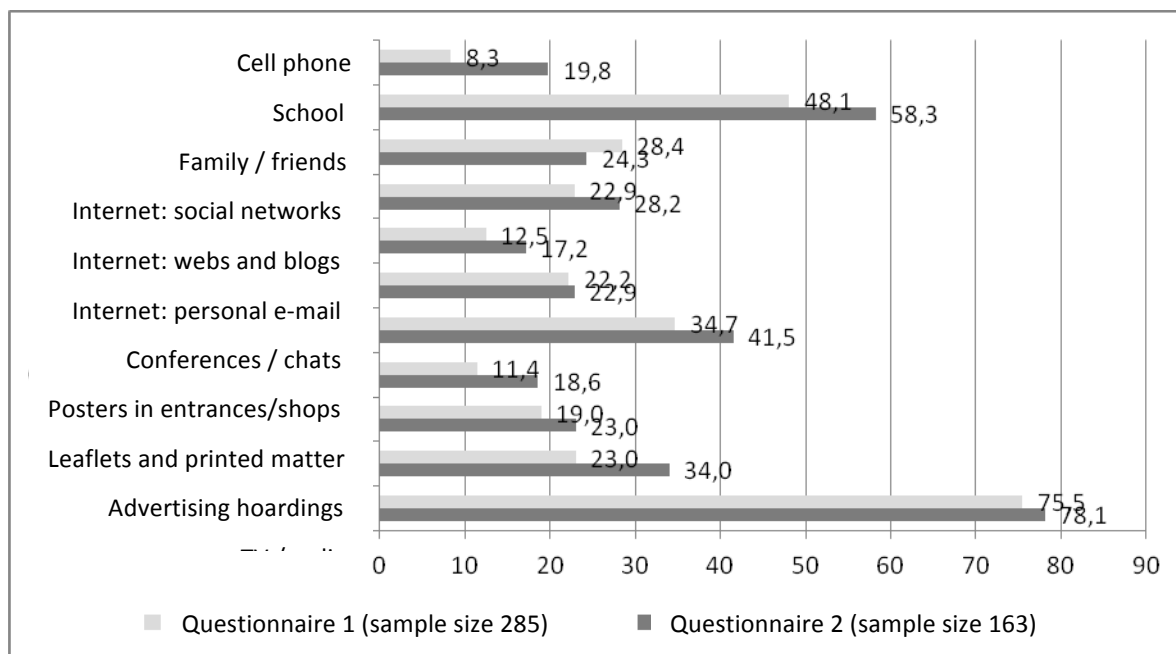
Source: own elaboration.

Another important factor was that those who received messages on their cell phones reduced their level of appreciation for receiving information about recycling through personal e-mails; we may be observing here a transfer of preferences from e-mail to cell phones.

To study in greater depth the methods of communication that youngsters considered suitable for promoting recycling in society, a socio-demographic relationship was established between the questions "Methods considered most suitable for society at large" and "Methods of communication preferred by young people". Before the campaign, only a small proportion of the teenagers who considered cell phones as an interesting method for receiving information themselves (fewer than 10%) thought that it was also suitable for society in general. After the SMS communication campaign, this proportion rose to almost 20% for the reply "Highly suitable". Furthermore, the 60% of teenagers who before the campaign did not think that cell phones were suitable for themselves rejected its use for other people. This figure fell to 25% after the SMS communication campaign.

In summary, this research demonstrated that SMS messages may be a suitable channel for this type of campaign, and may give good results. In fact the sending of SMS messages led to an increase in awareness of the place where recycling points are located and of the colour of the container for recycling aluminium. It also made it possible to generate a more rational awareness of recycling and to perceive that those benefiting were closer to the participants. Finally there was a favourable modification of behaviour with respect to the recycling of aluminium packaging and foil (Table 4). While SMS messages are worth for a sensitization campaign to recycling aluminium, the workshops are more efficient in order to change behaviour.

It was, however, also observed that excessive frequency in the sending of SMS messages may lead to their rejection. Nevertheless, if the content received is of interest to them, informative, or includes a gift of some kind, young people accept the information willingly. In actual fact, Rau et al. (2011) have also concluded that attitudes

towards SMS messages depend on the content of the messages received[55]. Paradoxically, the perception of cell phones as a means of environmental communication also improved among youngsters who did not receive SMS messages directly. There may have been a possible "show me" effect, or their interest may have been aroused when their friends received their SMS messages.

On the other hand, the results from qualitative methodology are the following: SMS messages are among the most widely used communication functions and in some cases the most widely used function, by young consumers; young people dislike of cell phone advertising, at least as it is currently referred; social networks are very important to a generation of youngsters and their preference depend of their geographical place; SMS messages are greatly appreciated as a means of communication by young consumers; young people know very little about aluminium and its potential; and mass media are their favourite channels for a campaign of sensitization to recycling aluminium.

5. *Conclusions and future lines of research*

The objective of this research was to analyse the effectiveness of SMS messages for use in campaigns to promote the recycling of aluminium packaging among teenagers. An additional aim was to determine young people's perception of this new method of communication. The study that was conducted in two qualitative and quantitative stages showed that SMS messages are an effective method of environmental communication for use among teenagers, since they provide a focus of information and promote sensitisation to, and participation in, recycling campaigns.

It is important to provide more information about aluminium and its potential uses, and where it should be deposited for recycling, given that the qualitative research study indicated that the young people surveyed knew very little about the subject (except in relation to drinks cans, which represent the form of packaging that can be made of aluminium that has the highest market share, representing about 65% of the products in this sector).

Increased awareness of the need to recycle aluminium packaging has also been pointed to by the quantitative research conducted. It can be stated that the SMS for recycling, while no similar reaction was noted among those who did not receive the messages. Furthermore, among those who did not receive the SMS messages there was a reduction of 24% in the value they accorded to their participation in recycling. We can affirm that the SMS communication campaign was instrumental in generating a more rational awareness in order to incite the youngsters to examine more rigorously their own real motives for recycling and to maintain the perception that their individual participation in recycling is important. This conclusion fully coincides with that reached by other authors such as Martinportugués, Ortiz and Mendieta, who affirm that the extent to which people feel that their actions may or may not affect the end result is what influences their participation[56]. Finally, the influence of the SMS messages was also demonstrated in relation to the perceived benefits of recycling. The youngsters who

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[55] RAU, Pei-Luen Patrick, ZHANG Ting, SHANG, Xiaoli and ZHOU, Jia, "Content Relevance and Delivery Time of SMS Advertising", *International Journal of Mobile Communications,* vol. 9, nº 1, 2011, pp. 19-38.
[56] MARTIMPORTUGUÉS GOYENECHEA, Clara, CANTO ORTÍZ, Jesús María and HOMBRADOS MENDIETA, María Isabel, "Habilidades Pro-Ambientales en la Separación y Depósito de Residuos Sólidos Urbanos", *Medio Ambiente y Comportamiento Humano,* vol. 8, nº 1, 2007, pp. 71-92.

received the messages had an increased perception of being more closely involved by the benefits. We can, therefore, affirm that the SMS messages helped to create an awareness of the benefits obtained for the whole community, and not merely at an individual level. This aspect is fundamental for obtaining participation on the part of the general public, as has been indicated by various authors[57].

The actual participation of the young people concerned in the recycling of aluminium packaging and foil has also increased since receiving the SMS messages.

An additional conclusion of interest drawn from the research is the demonstration that the SMS messages also helped the youngsters to familiarise themselves with this method of communication and to evaluate it as a means of transmitting messages about recycling, both for society at large and more specifically for themselves.

After the SMS campaign there was an increase in the percentage of the youngsters who believe that cell phones can be useful for disseminating messages about recycling to society at large. In particular there was a notable increase (from 8.3% to 19.8%) in the number of teenagers who indicated that they wish to receive information about recycling through their cell phones. There was, moreover, an increased willingness to participate in this type of campaign, even among those youngsters who did not receive the messages.

On the other hand, it was also demonstrated that there can be an effect of rejection of this method of communication if the SMS messages do not correspond to teenagers' expectations. The qualitative research conducted highlighted their unanimous dislike of cell phone advertising because it brings them nothing that is of interest to them, such as, for example, exclusive information, tunes, free call-time top-ups, etc. It also confirmed that the messages about recycling would be welcome provided that they included interesting information or some kind of free "extra", and on the additional condition that their regularity should not exceed one message per week.

Reflecting on the possible causes that might have produced a possible rejection effect and might have led to the SMS messages being considered as an unwelcome interference (although research needs to be conducted in greater depth into this aspect), one possibility may well be the frequency of the messages sent (twice a week) or the fact that no addition free gift was offered.

The research undertaken made it possible to identify new lines of research that could provide deeper insights into this aspect. The possible research lines suggested include studying in greater depth the possible rejection effect towards the SMS messages identified for a given item in the questionnaire. It would be important to determine whether this type of rejection is real, and, if so, to verify the factors that produced it (frequency, content of the message, etc.). It is also suggested that the research could be extended to a larger sample in the city of Málaga in order to obtain a larger number of relevant samples and thus to be able to carry out an analysis of statistical dimensions (in terms of Habits, Personal Involvement and Opinions). One limitation of the quantitative phase is that it was performed in Málaga since more research will be required in order to apply in other geographical area.

Moreover, it would also be interesting to carry out similar studies in other cities elsewhere in Spain or in other European countries, so as to determine in a scientific manner the reaction of young Spaniards or other young Europeans to messages sent by cell phone forming part of campaigns to promote the recycling of household refuse. In

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[57] Cfr. VICENTE and REIS, *op. cit*.; FREY, Bruno S. and STUTZER, Alois, "Environmental Morale and Motivation," Working paper 288, Institute for Empirical Research in Economics - University of Zurich, 2006.

this way future campaigns to promote recycling among teenagers would be more effective.

Finally, we believe that this research study has opened up an important aspect: the study of a new method of communication such as SMS messages and their effectiveness in campaigns to promote the recycling of household packaging. It achieved this by focusing on teenagers, in their capacity as the quintessential users of cell phones and their applications, and as a sector of the population that is traditionally difficult to communicate with through the classic methods of communication. In this way, extremely relevant aspects such as the new digital communication methods and the need to win over a teenage audience have been brought together around a subject like the recycling of household waste that is both contemporary and essential.

The conclusions that have been reached will be useful for designing more effective communication campaigns that can encourage teenagers to participate in the recycling of their waste materials, and thus to collaborate in the construction of a more sustainable society.

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Appendix I. An initial script was designed for use during the focus group

1. To inform about the objectives:
–To know participants' perceptions concerning the subject of recycling in general and the recycling of aluminium packaging in particular, and to identify their preferred means of communication for receiving messages promoting recycling.
–To determine how the young people use their cell phones and their willingness to receive SMS messages promoting recycling.
–To edit SMS messages promoting the recycling of aluminium packaging that are appropriate to their cultural level, style of language, etc.
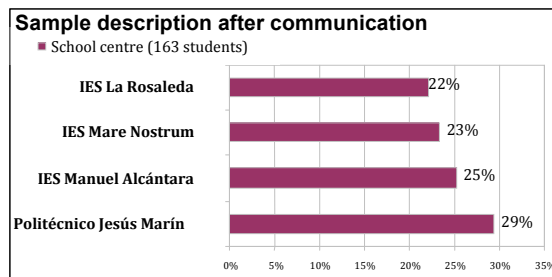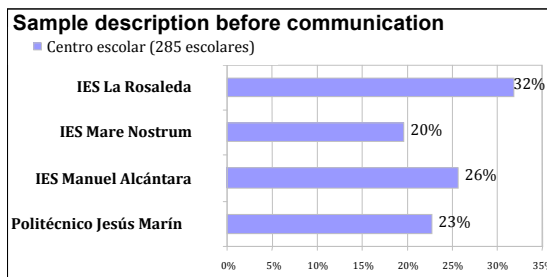
2. To inform about the rules of the workshops:
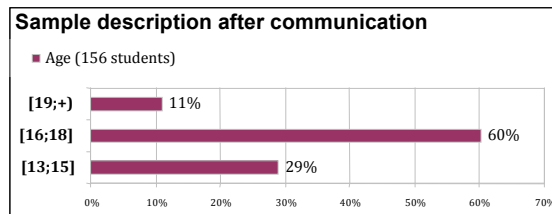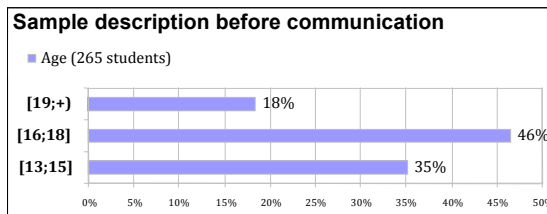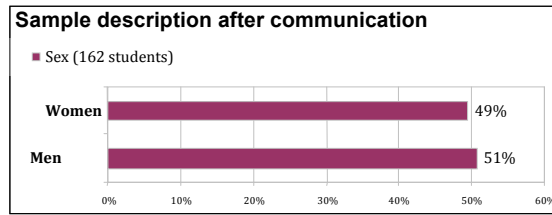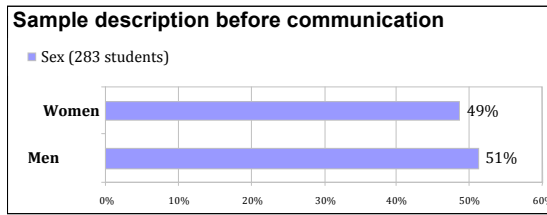–Participants are free to talk with other group members.
–A trained moderator conducts the session in an unstructured and natural way.
–Respondents are free to give views from any aspect.
–A voice recorder will be used and photographs will be taken in all sessions.

3. The subjects are:
–Cell phones: the different uses they make, the mainly use of cell phone, the time they spend, type of cell phone and their willingness to receive SMS messages promoting recycling.
–Recycling in general and the recycling of aluminium packaging in particular.
–The preferred method for campaigns of sensitisation and for receiving information about recycling: TV/radio, conferences, posters, leaflets, internet, e.mail, etc.

Appendix II: This section presents the results from the sample, both before and after the use of the communication techniques

Sample description before communication	Sample description after communication
Sex (283 students) — Women 49%, Men 51%	Sex (162 students) — Women 49%, Men 51%
Age (265 students) — [19;+] 18%, [16;18] 46%, [13;15] 35%	Age (156 students) — [19;+] 11%, [16;18] 60%, [13;15] 29%
Estudios (285 escolares) — Ciclo 16%, High School 39%, ESO 45%	Education level (163 students) — Cycle 12%, High School 48%, ESO 40%
Centro escolar (285 escolares) — IES La Rosaleda 32%, IES Mare Nostrum 20%, IES Manuel Alcántara 26%, Politécnico Jesús Marín 23%	School centre (163 students) — IES La Rosaleda 22%, IES Mare Nostrum 23%, IES Manuel Alcántara 25%, Politécnico Jesús Marín 29%
Zona de residencia (242 escolares) — Sur 22%, Centre 30%, CNorth 15%, North 16%, Remainder 17%	Place of residence (152 students) — South 26%, Centre 35%, CNorth 17%, North 10%, Remainder 12%

Source: Own elaboration.