Impact of cultural transformation campaigns around energy savings in hotels. Study in Bucaramanga and Valledupar, Colombia

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Abstract. The study focused on evaluating the impact of an educational campaign aimed at transforming attitudes and practices around the saving of water and energy in regular customers of two hotels, located in two touristic cities of Colombia, with very different idiosyncrasy: Valledupar and Bucaramanga. The development of the campaign was framed in the principles of the rational and efficient use of Energy Program (PROURE), and addressed three areas: information, the promotion of rational use practices and, increase in the awareness of the care of the environment. The proposed design was quasi-experimental, pretest / posttest. The sample was for convenience, involving a total of 180 people among employees and customers (100 in Bucaramanga and 80 in Valledupar). Participants responded to a survey of attitudes and practices, before and after participating in the campaign that lasted for 6 months. The results indicate that in the city of Bucaramanga the changes obtained in the posttest were significant, around the reflection and awareness (attitudes) of the saving of water and energy, by the guests. In the case of Valledupar, there are more changes in the employees than in the guests, especially in the attitudes they have regarding the importance of energy saving. In general, the study made it possible to demonstrate the importance of programs and processes of education and culture that promote these attitudes and practices which can result in significant impacts to the care of the environment.

1. Introduction
The concern for issues related to the care of the environment and the promotion of a culture of care is recent in the world, in general and particularly, in Colombia [1]. Until a few years ago, policies, the design of educational campaigns and the promotion of saving behaviors have begun to be thought in function of a necessary cultural transformation, because in the country, the subject seemed to be far, given the abundance of natural resources and little social awareness to practices such as recycling, saving water or controlling energy consumption [2,3]. It can be said that for years, people have been related in an unaware and even irresponsible way to the natural resources.

Consequently, families, communities, cities and businesses are not focused on the promotion of water and energy saving habits, or on the dynamics of consumption [4]; perhaps because there have been other priorities and needs of poverty and limited socio-economic conditions.
This article presents the results of a joint investigation on the promotion of a culture of water and energy saving, in two hotels, in the cities of Bucaramanga and Valledupar, Colombia.

The existing literature about water and energy saving is related to three of the most important characteristic aspects of rational and efficient consumption: Efficient use of energy as an alternative to improve competitiveness and productivity in companies, promotion of sustainable consumption practices of resources and articulation of campaigns to promote sustainability.

Amell [5], Arroyave & Garcés [6] and Deming [7] addressed the efficient and rational use of energy as an alternative to improve competitiveness and productivity in companies. In Colombia Tobasura, Moreno, Aya & Mora [8] conclude in a study of energy and financial productivity in coffee farms, that there is a direct relationship between these two variables, which contradicts the belief that industrialized and more specialized production systems are more financially efficient. Hartley [9] in Argentina defines that Eco-efficiency as an administrative philosophy that drives productive activities in the search for environmental improvements and economic benefits [10]. Efficiency, in this sense, is approached from the use of natural resources, under the premise of producing more with less.

Salgado-Beltrán and Beltrán-Morales [11] investigated the factors that influence the sustainable consumption of organic products in Mexico; consumer behavior (health behaviors), and demographic aspects (schooling) exert a positive effect on sustainable consumption, which shows a directly proportional relationship between these two variables: marketing strategies (ecological communication and price) encourage the sustainable consumption.

In relation to the development of communicative campaigns to promote sustainable consumption, the United Nations Environment Program [12,13] highlights the importance of these campaigns in the promotion of sustainable development and the need to make them accessible and understandable. For the success of the same, the content, communicator, tone and means of communication are fundamental; highlighting the determining factors for the effectiveness of the campaigns and the need for studies that can define the associated factors [14,15].

In the Latin American context, the Energy Efficiency Network has been created, which brings together the agencies of all countries, facilitating the exchange and dissemination of technical, legal and regulatory information among interested institutions and professionals. Some of the member countries have made important advances in the development of programs for Rational Use of Energy (RUE) implemented methodologies and promotion campaigns [16,17].

In Colombia there is not a policy that integrates the energy efficiency programs, the actions developed have been conjunctural, without been coordinated by a central entity that channels them[18]. Sustainable production and consumption policies cover aspects such as urban environmental management, national biodiversity policy for the development of ecotourism, environmental education, among others, but it does not refer to an energy efficiency policy [19].

In Colombia the development of RUE has been relatively inefficient, being necessary to determine the weaknesses of policies and programs to propose new strategies [20,21].

2. RUE approximations

By efficient use of energy is understood the improvement in the capacity of the processes of utilization and transformation without needing to reduce the demand of useful energy. Energy saving means a reduction of the final energy demands caused by net reductions in the useful energy requirements, that is, of the energy service requirements of the society and the industry. The term rational use of energy sometimes covers the above aspects plus the creation of energy sources with a low percentage of carbon [22].

2.1. The attitudes and the attitude change

Attitudes are our evaluating feelings, are affective or emotional and refer the favorable of our feelings towards a particular objective. In that sense, an attitude is a state of mind. If we want to influence the behavior of others, one way to do this is to influence the mood of the people [23].
Social Psychology defines three components of attitude: the cognitive, affective and behavioral element \[23,24\]. Attitudes are powerful engines that provide the energy for the behavior and direct it. But this is not always the case; many studies reveal a lack or low correspondence between verbally expressed attitudes and behavior \[25\].

The attitudes that we form on the basis of our direct experience are more reliable for predicting our actions than those that we form indirectly \[26\] maintain that although the attitude we have towards an object influences our general pattern of response to it, it does not allow us to predict our specific action with respect to the object \[27\].

Attitudes towards the energy problem are not so related to informed conservation behavior but specific beliefs and personal consequences of using less energy \[28\].

The communicative campaigns for attitudinal change and, in short, behavioral, consider not only what is going to be communicated, but also how to communicate it. Among the important factors for success are the content, the communicator, the choice of tone and the media \[12\].

3. Methodology
A quantitative study with a descriptive scope was carried out. The research design used was quasi-experimental, with no control group, pretest / posttest \[29\]. A convenience sample was used, consisting of 180 employees and clients of two hotels, one located in the city of Valledupar and the other in the city of Bucaramanga; two touristic cities of Colombia, with very different idiosyncrasy, (the sample was 100 in Bucaramanga and 80 in Valledupar).

The instruments that were used were two: a survey of attitudes and practices, instrument designed for the researchers, and validated by two experts in instrument validation, which contained aspects of information, care practices and attitudes in relation to savings culture and, a campaign to promote attitudes and practices around saving energy and water in the hotels \[30\]. This campaign included audiovisual material, informative spaces that were implemented during 6 months in each hotel.

4. Results
The data about the employees of the hotel in Bucaramanga, showed that there is no significant difference in the variables attitudes and practices pre and post-test; based on the results of the application of the \(t\)-student statistic (suitable for the size and distribution of this sample) with the software EZanalyze v. 3.0, and applying the concept of p-value or probability value or asymptotic significance, with a reference value of significance of 0.05; with \(p\) values of 0.64 and 0.92 respectively, higher than the reference value. These results are shown in Tables 1 and 2.

| Table 1. Results report - paired t-test of pre-e/b attitudes with post-e/b attitudes. |
|---------------------------------------------------------------|
|                Pre-E/B ATTitudes       |                Post-E/B ATTitudes       |
| Mean:           | 83.889            | 82.111            |
| Std. Dev.:      | 12.683            | 5.134             |
| N Pairs:        | 9                 |                   |
| Mean Difference:| 1.778             |                   |
| Se Of Diff.:    | 3.730             |                   |
| Eta Squared:    | 0.025             |                   |
| T-Score:        | 0.477             |                   |
| P:              | 0.646             |                   |

The analysis of results in the Bucaramanga guests, starting shows a significant difference in the Attitudes, with a value of \(p\) of 0.03, lower than the reference value of 0.05; which reveal an increase of the variable in the post test, meaning a positive impact of the intervention in this sample of the study population, Figure 1 illustrates the results found and Table 3 the results of the applied statistic.
Table 2. Results report - paired t-test of pre- e/b practices with post- e/b practices.

|                      | Pre- E/B PrActicEs | Post- E/B PrActicEs |
|----------------------|--------------------|--------------------|
| Mean:                | 84.125             | 83.750             |
| Std. Dev.:           | 9.877              | 11.474             |
| N Pairs:             | 8                  | 8                  |
| Mean Difference:     | 0.375              | 0.375              |
| Se Of Diff.:         | 3.826              | 3.826              |
| Eta Squared:         | 0.001              | 0.001              |
| T-Score:             | 0.098              | 0.098              |
| P:                   | 0.925              | 0.925              |

Figure 1. Comparative Pre-test/Post-test Attitudes for guests in Bucaramanga.

Table 3. Results report - paired t-test of pre-h/b attitudes with post-h/b attitudes.

|                      | Pre-H/B Attitudes | Post-H/B Attitudes |
|----------------------|-------------------|--------------------|
| Mean:                | 114.889           | 156.222            |
| Std. Dev.:           | 56.412            | 16.724             |
| N Pairs:             | 9                 | 9                  |
| Mean Difference:     | -41.333           | -41.333            |
| Se Of Diff.:         | 15.739            | 15.739             |
| Eta Squared:         | 0.434             | 0.434              |
| T-Score:             | 2.626             | 2.626              |
| P:                   | 0.030             | 0.030              |

The study at the hotel in Valledupar reveals the following results. In the analysis of the employees of the hotel against the variable Attitudes, a significant difference is shown with a tendency to a decrease of the values for the arithmetic averages in the post-test, whose pre-test means were 162.1 and in the 147.6 post-test, revealing an inverse impact of the intervention performed; these data are illustrated in Figure 2 and Table 4.

Figure 2. Comparative Pre-test/Post-test Attitudes for the employees in Valledupar.
In these results, the means found were, in pre-test 162.1 and in post-test 147.6, the value of the variable Attitudes in the post test being lower; The statistical results are shown in Table 4.

Table 4. Results report - paired t-test of pre-e/v attitudes with post-e/v attitudes.

|                | Pre-E/V ATitudes | Post-E/V ATitudes |
|----------------|------------------|-------------------|
| Mean           | 162.111          | 147.667           |
| Std. Dev.      | 13.280           | 22.389            |
| N Pairs        | 9                |                   |
| Mean Difference| 14.444           |                   |
| Se Of Diff.    | 5.556            |                   |
| Eta Squared    | 0.429            |                   |
| T-Score        | 2.600            |                   |
| P:             | 0.032            |                   |

Regarding the variable Practices for the hotel employees of the hotel in Valledupar and the guests variables, the results do not reveal a statistically significant difference. Table 5 shows the results for the guests sample in Valledupar.

Table 5. Descriptive statistics, Valledupar guests.

|                | ATitudes | PrActicEs |
|----------------|----------|-----------|
|                | Pre-test | Post-test |
| Mean           | 333.9    | 337.0     |
| Std Dev.       | 17.5     | 20.2      |

5. Conclusions
The results of the study indicate that the campaign to promote a culture of saving energy and water in hotels, achieved significant changes in the attitudes that the guests of the Bucaramanga hotel showed. However, the practices did not show statistically significant changes after the campaign was applied. This is explained from the general theory of attitudes, since from Social Psychology the authors have shown how to obtain a general positive attitude towards a specific issue or situation (in this case the culture of saving water and energy), not necessarily accompanies practices that are coherent with these attitudes.

About the campaign in the hotel of Valledupar, the results confirm that attitudes can be transformed, but it is necessary to continue promoting concrete actions around an issue such as the culture of savings as the practices of both, employees and guests, did not show significant changes after participating in the campaign.

It is important to note that the applied pedagogical campaign addressed aspects related to attitudes and practices in relation to a water and energy saving culture, in an area such as hotels; although statistically the changes presented were not significant in the four groups (employees of the two hotels and guests of the two hotels), there were changes between the pre-test and post-test, although it cannot be stated categorically that the intervention was effective, it generated changes, meaning that attitudes and practices changed positively between the pre-test and the post-test.

References
[1] Vanegas J and Botero S 2012 Eficiencia energetica en microempresas de medellin: un estudio de valoracion de barreras Lecturas de Economia 77 1-33
[2] Gaona Pérez A 2000 Desarrollo sostenible y desarrollo solardo Comunicar 15 83–91
[3] Alonso L E, Fernández Rodríguez C J and Ibañez Rojo R 2011 Del consumismo a la culpabilidad: en torno a los efectos disciplinarios de la crisis economica Política y Sociedad 48 353–379
[4] Perez J A, Rosenkranz F, Chamy L and Elortegui Raffo2014 Proyectos de eficiencia energetica para instituciones de educacion superior (Santiago de Chile: ACHEE)
[5] Amell A 2007 Energía, economía y medio ambiente en procesos industriales (Bogota: Universidad Nacional de Colombia)
[6] Arroyave Rojas J A and Garcés Giraldo L F 2006 Tecnologías ambientalmente sostenibles *Prod. + Limpia* **1**(2) 78-86

[7] Deming W E 1989 *Calidad, productividad y competitividad: la salida de la crisis* (Madrid: Ediciones Díaz de Santos S. A.)

[8] Tobasura I, Moreno F A, Aya S and Mora J 2012 Productividad energética y financiera en fincas campesinas del departamento de Caldas. Tres estudios de caso. *Revista Luna Azul* **34** 101–12

[9] Hartley Ballester R 2009 Eco-eficiencia una gestión empresarial ambiental *Revista Ciencias Económicas* **27**(1) 189-205

[10] Secretaria de Planeamiento Energético 2014 *Campaña Hagamos Click* (Argentina: Ministerio de Energía y Minería)

[11] Selgado Beltran L and Beltrán Morales L 2011 actores que influyen en el consumo sustentable de productos orgánicos en el noroeste de México *Universidad y Ciencia* **27** 265–79

[12] Futerra 2005 *Comunicando la sustentabilidad. Cómo producir campañas públicas efectivas* (Kenia. Programa de las Naciones Unidas para el Ambiente)

[13] Prias Caicedo O F 2010 *Programa de uso racional y eficiente de energía y fuentes no convencionales – PROURE* (Bogotá: Ministerio de Minas y Energía)

[14] Rubio M C 2010 UREE: Campaña de Uso Racional de la Energía Eléctrica implementada en la provincia de Río Negro *Voices en el Fenix* **2**(10) 44-49

[15] Aponte Gutierrez J C and Andrade Mahecha J F 2013 *Proyección de Demanda de Energía Eléctrica en Colombia* (Colombia: Ministerio de Minas y Energía)

[16] CORPOELEC 2013 Uso Racional y Eficiente de la Energía Eléctrica. Importancia de las políticas de uso racional y eficiente de la energía. Consulted on: http://www.corpoelec.gov.ve/uso-racional-y-eficiente-de-la-energia-electrica

[17] Pérez S 2013 Propuesta Metodológica de acción participativa para promover la intervención de la comunidad en la solución de los problemas ambientales. Caso de estudio: Trujillo - Venezuela *Agora Trujillo* **15**(29) 135-151

[18] Convenio UPME-MEN 2009 *Documento borrador. Introducción de la temática de energía y su uso racional en el programa educativo medio ambiental en Colombia* (Colombia: congreso de la Republica)

[19] Dirección de Desarrollo Sectorial Sostenible 2011 *Política Nacional de Producción y Consumo. Hacia una cultura de consumo sostenible y transformación productiva* (Bogotá: Ministerio de Ambiente, Vivienda y Desarrollo Territorial)

[20] Consorcio Bariloche – BRP 2007 *Consultoría para la formulación estratégica del plan de uso racional de energía y de fuentes no convencionales de energía 2007 – 2025* (Bogotá: Fundacion Bariloche)

[21] Bessudo S 2011 Acciones para la Sostenibilidad Ambienta. El gobierno articula iniciativas de Eficiencia Energética. *Mecanismos e Instrumentos Financieros para Proyectos de Eficiencia Energética en Colombia* (Bogotá: Ministerio de Energía) pp 12–3

[22] COLCIENCIAS 2005 *Plan estratégico programa nacional de investigaciones en energía y minería. Bases para una política de promoción de la innovación y el desarrollo tecnológico en Colombia* (Bogotá: Colciencias)

[23] Vander Zanden J W 1986 *Manual de psicología social* (Barcelona: Paidó)

[24] Perlman D, Cozby P C and Soto Suárez J N 1969 *Psicología social* (México: McGraw-Hill)

[25] Wicker A W 1969 *Attitudes versus actions: The relationship of verbal and overt behavioral responses to attitude objects* *Journal of Social* **25**(4) 41-78

[26] Abric J C, Moscovich S and Ibáñez Gracia T 1985 *Psicología social* (Barcelona: Paidó)

[27] LaPiere R T 2010 *Attitudes vs Actions* *International Journal of Epidemiology* **39** 7–11

[28] Rossetti R and Giacomini Filho G 2010 Comunicação, consenso social e consumo sustentável *Comunicacao Mídia e Consumo* **7** 153–69

[29] Hernández Sampieri R, Fernández Collado C and Baptista Lucio P 2014 *Metodología de la investigación* (Mexico: McGraw-Hill)

[30] Navarrete Cobo B 2011 La gestión sostenible y su comunicación en el sector hotelero de la ciudad de Málaga *Prisma Social* **6** 30-62