**Title: Which has more influence on perception of pseudo-therapies: the media's opinion or educational background?**

**Subtitle: Qualitative and quantitative study in the Spanish context.**

**1. Introduction and literature review**

Social debate regarding complementary, natural or alternative therapies arose decades ago in all Western countries with three clearly differentiated focuses (Ballvé, 2003; Dalcanale & Filice de Barros, 2008; Moreno & Cano, 2016; De Miguel, 2017). First, a controversial political discourse has been generated that is limited to the area of governance that generates proposals for the regulation of these practices. Second, there is an intense social debate related to journalistic information, that is, how the use and knowledge of these therapies are socially incorporated, whether through their dissemination by the media, through the teachings of educational collectives, the oral transmission of friends and acquaintances or intergenerational oral tradition (Cortiñas-Rovira & *al.*, 2015; Cano-Orón, 2016; Moreno & Lopera, 2016). Third, there is an epistemic debate regarding the lack of scientific evidence substantiating these therapies that clinical trials have not shown to be effective. That is, compared to evidence based medicine, these practices are not officially endorsed in many Western public health systems (Ballvé, 2003; Hess, 2004; Barry, 2006; Keshet, 2009; Cámara, Muñoz van den Eynde, & López Cerezo, 2017). Nonetheless, in the majority of Latin American and Asian countries, popular (traditional) knowledge is incorporated in the health habits of many populations that resist Western official medicalization and choose to use traditional methods (Dalcanale, 2008; OMS, 2013; Bautista, &*. al*., 2014; Perdomo, 2014 & 2016; Cruz, 2016). One of the most interesting and paradigmatic examples may be that of Mapuche medicine practiced in Chile's public health system, which provides coverage to the entire Mapuche community (Estomba, Ladio & Lozada, 2006).

This study however, centres on the Spanish case, although it takes into account the existing cosmovision regarding the use of and habits pertaining to natural therapies in other countries. In order to contextualize the current situation, some of the most relevant dates that have been related to complementary or alternative therapies in the last decade and that illustrate the parliamentary debate, will be highlighted. In the Royal Decree 1277/2003 of October 10th, through which the general principles regarding the authorization of centres, services and health facilities were established (BOE, 2003: 37893), it was published that, standing out among the different care units that could be integrated into health or non-health centres were the U.101, referred to as: “Non-conventional therapies” defined as: “a care unit in which the physician treated different pathologies using natural medicine or homeopathic medicine, or peripheral stimulation techniques that use needles or other methods shown to be safe and effective” (BOE, 2003: 37902). Both in Andalusia and Catalonia these units have been integrated into public health. As concerns state legislation, Law 16/2003, of May 28th on the cohesiveness and quality of the National Health System established that: “the basic minimum guarantees of safety and quality that should be required for Autonomous Communities' regulation and authorization of the opening and functioning of the centres, services and health establishments, will be determined. Among these were included non-conventional therapy units” (BOE, 2003: 20577). A few years later, in December 2007, the Congress of Deputies' Ministry of Health and Consumer Affairs approved the ''Proposal Not of Law'' for the creation of a working group between the Ministry of Health and Consumer Affairs and the Autonomous Communities. The working groups' directives were the drafting of a report for the future governance of natural therapies in Spain. The ''Proposal Not of Law'' used the term ''natural therapies'' to designate the combination of techniques also known as ''alternative therapies or medicine'', ''complementary therapies or medicines'', ''non-conventional therapies or medicines'', ''traditional medicine'', ''integrative medicine'' etc. After intense debate, the term ''natural therapies'' proved to be the most endorsed by the speakers and that which was used throughout the work sessions due to its adoption in the Proposal Not of Law (Diario de Sesiones, 2007:10). Throughout 2007, the Agency for Health Technology Assessment (*Agencia de Evaluación de Tecnologías Sanitarias* - AETS) of the Carlos III Health Institute (*Instituto de Salud Carlos III*) had drafted a report reviewing scientific evidence of the effectiveness and safety of complementary and alternative medicines, from which the following techniques or procedures were gathered: “acupuncture”, “homeopathy” and “manual” and “physical therapies”. The Andalusian Agency for Health Technology Assessment (*La Agencia de Evaluación de Tecnologías Sanitarias de Andalucía* -AETSA) has also drafted a report on the situation of alternative medicines in Andalusia. In 2008, three reports had been published on the effectiveness of using “acupuncture” to treat different illnesses. Also in 2008, the Ministry of Health, Social Policy and Equality decided to review the available documentation regarding these therapies and request representatives of the Autonomous Communities to form a working group for analysing their situation.

However, it was in 2011 that the Ministry of Health, Social Policy and Equality made public a document entitled *Natural therapies,* which concluded that: a) “Homeopathy”, “acupuncture” and “chiropracty” were the therapies in highest demand by Spanish citizens; b) that no Western country had effected a global regulation of natural therapies, even though some had regulated partial aspects. In some countries a tolerant attitude towards these practices was adopted, despite the fact that no specific legislation regulating them had been effected; c) In France, Belgium, southern European countries, Canada and the United States, only physicians could provide health care. All other cases were considered to be unqualified practice. In Belgium, diagnosis, treatment, prescription, surgery and preventative medicine were considered the exclusive domain of physicians. To the contrary, Nordic countries, Germany and the United Kingdom only reserved certain interventions for physicians alone. The report reveals that in almost all Western countries, training regarding natural therapies was provided even though its degree of officialness varied. Some countries had specialities for physicians, as was the case with Germany in University. Others offered graduate programs, also in University, as was the case with Italy. In other instances, training was provided in schools or private centres, as was the case with Canada and Sweden (Ministerio de Sanidad, Política Social e Igualdad, 2011).

In the Spanish case, until the academic year 2015-2016, some universities had been imparting their own degrees (official degree studies) that offered graduate courses on non-conventional therapies, almost always within the Health Sciences area framework and with the admission requirement that applicants have undergraduate degrees in Medicine (Ródenas, 2001; Solá-Rodríguez, 2015, Calduch, 2017). In the majority of Spanish universities these studies are imparted in university clinical hospitals or in medical colleges. Some centres where own degrees in complementary therapies have been offered include, among others, the Complutense University of Madrid's (*Universidad Complutense de Madrid*), *Master's degree in Acupuncture: Diagnosis and Treatment* and the title of *Expert in Mindfulness (Attention and Full Consciousness), in Health Contexts*;the University of Valencia (*Universitat de València*), with the Master's degree in *Natural Medicine, Acupuncture and Homeopathy;* or in the Pompeu Fabra University (*Universitat Pompeu Fabra*), with the *Master's degree in Osteopathy*; y *Master's degree in Art therapy*, endorsed by the Spanish Association of Art Therapists (*Asociación Española de Arteterapeutas* - ATE); BAAT (British Association of Art Therapists) and AATA (American Art Therapy Association). The aforementioned courses are a small sampling of the graduate degrees that have been imparted by Spanish universities for approximately the last two decades (Ródenas, 2001; Solá-Rodríguez, 2015; Calduch, 2017). However, beginning in the academic year 2016-2017, different professional groups and scientific associations rallied for these degrees to be deactivated in Spanish universities due to lack of scientific evidence. Three Spanish pharmaceutical scientific societies expressed their disapproval of the sale of homeopathic products in pharmacies: the Spanish Society of Family and Community Pharmacy (*Sociedad Española de Farmacia Familiar y Comunitaria* - SEFACT), the Spanish Society of Hospital Pharmacy (*Sociedad Española de Farmacia Hospitalaria* - SEFH) and the Spanish Society of Pharmacists and Primary Care (*Sociedad Española de Farmacéuticos de Atención Primaria* - SEFAP). Through the media, the following news headlines were recorded for 2016: “The University of Barcelona strikes down its master's degree in homeopathy” (Ansede, 2016); “Homeopathy will no longer be taught at the University of Barcelona” (López, 2016); “UV eliminates its master's degree in reiki due to lack of students and teachers” (Salinas, 2016) and “The University of Valencia's Master's in Homeopathy cancels its edition for the coming academic year” (Ortuño, 2016). This is the current situation of therapies in Spain as concerns the regulatory framework and professional degrees - a controversial map of regulatory and educational non-legality.

Despite this, the use of these therapies is growing within the Spanish population. This is also the case for other Western countries, especially when individuals suffer from serious chronic illnesses or devastating adverse effects caused by therapeutic and drug treatments (Evans & *al.*, 2006; Vapiwala & *al*., 2006; Balneaves, Weeks, & Seely, 2008; Tautz & *al*., 2012; Thomson, & *al.*, 2014).

Public opinion polls reveal very significant use of these therapies (Muñoz van den Eynde, & Lopera, (2014). According to the *Libro Blanco de la Homeopatía* [White Book of Homeopathy] (2013), published by the Boiron Chair of Research, Teaching and Dissemination of Homeopathy at the University of Zaragoza, 33% of Spaniards have used homeopathy once and 27% used it on a regular or occasional basis. Eight out of ten people who had used homeopathic products stated that they were “very satisfied”, and 87% would recommend it to their relatives. The report recorded that in Spain approximately 10,000 health professionals (4,400 paediatricians, 700 gynaecologists and 4,300 general physicians) used homeopathy to treat patients, either on its own or in combination with other treatments (Boiron, 2013 & 2016). This data has been recently updated. In 2017 the Spanish Foundation for Science and Technology (*Fundación Española para la Ciencia y la Tecnología* - FECYT) published the results of the VIII Survey on Social Perception of Science and Technology in Spain, including data gathered during 2016 that indicated that more than half of Spaniards trusted that homeopathy functioned in the treatment of certain illnesses and pathologies (FECYT, 2017). This signified that more than half of the individuals surveyed, specifically 52.7%, agreed (“a lot”, “very much” or “somewhat”) with the following statement: "Indicate whether you identify with this statement: homeopathic products work". Individuals with higher levels of formal education were those who most trusted in the effectiveness of these products. Furthermore, among the most significant data was the finding that the groups whose trust towards homeopathic preparations was above the average were women, individuals who self-identified as ideologically centre-left, and city dwellers. Businessmen and followers of "other religions" considered, to a larger extent, that homeopathic products were useful (De Miguel, 2017; Salas, 2017). Furthermore, according to the FECYT (2017) survey in which more than 6,300 Spaniards were interviewed, 59.8% of those surveyed trusted “a lot”, “very much” or “somewhat” in acupuncture. There were also other interesting data related to anti-scientific practices. According to the survey, almost 28% of Spaniards believed in numerology and lucky amulets, and 22.9% trusted healers to treat their illnesses. Also, an additional 22.5% of citizens believed in paranormal phenomenon or in the prognosis of horoscopes (14.7%) (De Miguel, 2017).

In view of the above, the main objective of this study is to understand the perception, habits and uses of two student collectives, which are strongly linked to the social implications of complementary and alternative therapies. One collective was made up of students who held Master's degrees in Pre-school and Primary School Education, future teachers that can transmit their point of view or focus regarding these therapies. The other consisted of students with Journalism degrees who would become social communicators, and to a great extent, disseminators of values and principles related to scientific knowledge. Through the students, data and perceptions of great interest for the results of the study have come to our attention.

**2. Material and method**

This quantitative and qualitative study delves further into the study of Journalism and Education students' discursive arguments in order to understand how they perceive complementary and alternative therapies, and in order to determine whether their educational background or the media has a greater influence on their use and perception of this combination of techniques that are not regulated and the subject of public controversy. This study uses qualitative research methods based upon a design of 12 discussion groups. The discussion groups were made up of Journalism students (six groups) and Education students (six groups) from the University of Valencia and Florida Universitaria. The six groups were mixed in nature, built around the following indicators: a) age groups and b) academic year. The makeup of the Education discussion groups was the following: 18-19 years old (Group 1E), 1st year Education; 19-20 years old (Group 2E), 2nd year Education; 20-21 years old (Group 3E), 3rd year Education; 22-23 years old (Group 4E), 4th year Education; 21-37 years old (Group 5E), 4th year Education; and 21-45 years old (Group 6E), 4th year Education. The six Education discussion groups were made up of a total of 48 participants (39 women and 9 men), maintaining the proportion with the number of students that study at this level (73% women and 27% men) at Florida Universitaria where these discussion groups were formed and recorded during the academic year 2016-2017. The makeup of the Journalism discussion groups was the following: 18-19 years old (Group 1J), 1st year Journalism; 19-20 years old (Group 2J), 2nd year Journalism; 20-21 years old (Group 3J), 3rd year Journalism; 22-23 years old (Group 4J), 4th year Journalism; 21-26 years old (Group 5J), 4th year Journalism; and 21-46 years old (Group 6J), 4th year Journalism. The six Journalism discussion groups consisted of a total of 54 participants (27 women and 27 men), maintaining the proportion with the number of students that study at this level (51% women, 49% men) at the University of Valencia where these discussion groups were formed and recorded during the academic year 2016-2017. Table 1 shows the questions formulated in the research groups.

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| Table 1. List of questions formulated in the discussion groups |
| Q.1. The idea that the body has natural powers, which enable you to cure yourself if you want to. What do you think of this? Have you heard of complementary and natural medicines or therapies? |
| Q.2. Is physical and mental health maintained due to the strength or energy that we have as people? Do you think that it is an energy that keeps us healthy? |
| P. 3. Have you heard of our have you used homeopathy? Has anyone here treated himself or herself with homeopathy? |
| P.4. Have you heard of acupuncture? |
| P.5. Have you ever used medicinal herbs? |
| P.6. Have you heard of yoga? Do you know what its practice consists of? |
| P.7. Have you heard of bio dance? |
| P.8. Have you heard of mindfulness, of meditation? |
| P.9. Have you heard of any other type of therapy? For example, reiki? |
| P.10. Do you know what osteopathy is? |
| P.11. Of all of the therapies, which do you trust the most? |
| P.12. Are you afraid to try complementary therapies? |
| P.13. Do you think that complementary therapies have adverse effects? |
| P.14. Do you think that complementary therapies are as recognized as conventional medicine? |
| P.15. Do you think that complementary and alternative therapies deserve as much recognition as conventional medicine? |
| P.16. Do you think that complementary therapies contain ideas and methods that could be used in conventional medicine? |
| P. 17. Do you think that scientific medicine can learn something from complementary therapies? Do you think it would be good for patients to integrate both types of knowledge? |

Once the sessions were recorded and the answers of each discussion group transcribed, discourse analysis was conducted using a corpus linguistics software (T-LAB. 9.1.) that allowed word clusters to be distinguished and correlations and frequency patterns between therapies and their use to be established. This software creates maps of individual discourses and then compares them. It is capable of performing disambiguation and eliminates words that have no value in the discourse, such as articles or prepositions. The results obtained by the software allowed the Journalism and Education discussion groups to be compared in order to determine whether there were significant differences, or whether there were differences between those who had a favourable versus an unfavourable attitude towards these therapies.

In order to complete this qualitative study a survey was conducted with 718 students. The students interviewed in the discussion groups also took this survey six months before making the recordings. For this survey, students were selected from different degree programs (Education, Journalism, Medicine and Nursing) in order to evaluate whether educational background influences perception and use of complementary therapies. The questionnaires were completed during the academic year 2016-2017 at the University of Valencia (UV), Florida Universitaria, and at Jaume I University (*Universitat Jaume I* - UJI).

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| Table 2. Total number interviewed, according to degree program | | | |
| **Interviewed** | **Frequency** | **Percentage** | **Valid percentage** |
| Education | 231 | 32.2 | 32.2 |
| Journalism | 233 | 32.4 | 32.4 |
| Medicine | 130 | 18.1 | 18.1 |
| Nursing | 124 | 17.3 | 17.3 |
| Total | 718 | 100.0 | 100.0 |

The survey has been conducted using a Complementary and alternative medicine Health Belief Questionnaire (CHBQ), that was designed and validated by Lie & Boker in 2004 at the University of California for the study of respondents' perceptions, opinions and beliefs regarding complementary therapies. The CHBQ has also been used in multiple intercultural studies and can be used as an instrument to survey patient collectives for the purpose of evaluating their attitude towards complementary therapies and improving communication with the physician and health personnel (Lie & Boker, 2006; Nicolais & Stern, 2014). This questionnaire shows a list of ten closed-ended answers Likert scale items, each having seven possible responses, 1 being “in complete disagreement”, 2 “disagrees very much”, 3 “disagrees ”, 4 “neither agrees nor disagrees ”, 5 “agrees”, 6 “agrees very much” and 7 “in complete agreement”. Therefore, the maximum score possible is 70 and the minimum is 10. In order to measure the questionnaires and obtain the results we add the items, such that the maximum score that it was possible to obtain in one response was 70, this being the pro complementary and alternative medicines score. A sum of 40 points would indicate a neutral position with regard to these therapies, whereas a score of 10 would indicate an anti alternative medicine position (Nicolais & Stern, 2014). The CHBQ is supplemented by a series of questions aimed at gathering socio-demographic data on the respondents (sex, place of birth, age and the degree the individual is currently pursuing) and a table containing two columns with 23 complementary therapies (Ministry of Health, Social Policy and Equality, 2011). In the left hand column respondents are asked to indicate which complementary therapies they are familiar with. The right hand column contains the same list of therapies and respondents are asked to place a mark next to those that they have used. This allows a distinction to be made between knowledge and use of complementary and alternative therapies. The results obtained from this survey have allowed the Journalism and Education responses to be differentiated from one another and compared with the qualitative data. The 24.0.0. version of the SPSS program has been used for the entire survey process.

**Results and discussion**

The results obtained with the T-LAB program revealed significant differences between Education and Journalism students. In the analysis of the discussion groups, the relations between occurrences and co-occurrences were studied both with specific association indices and multi-dimensional statistical techniques such as cluster, cluster analysis and correspondence analysis. The relationships between words proved very significant and provided very interesting data for this study. There were 216 context units from the Education discussion groups and 140 from the Journalism groups. The reason that the results were so dispersed is because the Education students showed themselves to be open and favourable to therapies, largely in comparison to the Journalism students who even though they had heard of therapies, regarded them sceptically. The latter hardly responded to questions or their responses were monosyllabic, and they did not tell personal stories, as did the Education students. For example, a standard response in Group 6E (Subject 7-woman): “Now we have the debate regarding whether homeopathy is a placebo effect. I always say that I don't know. A child, in my case my son, who is one and a half - he doesn't realize that by taking some little pellets he will be cured. He isn't aware of the placebo effect and to the contrary, I've seen his fever go down”. In the case of the Journalism groups’ responses such as the following were found in Group 3J (Subject 4-man): “I am totally against them. I would keep them totally out of the health system”. The program automatically selected 82 key words from the Education groups and 47 from the Journalism groups. From these, words were selected that were used on at least eight occasions by the sum of all of the discussion groups.

Image 1. Thematic nuclei of Education

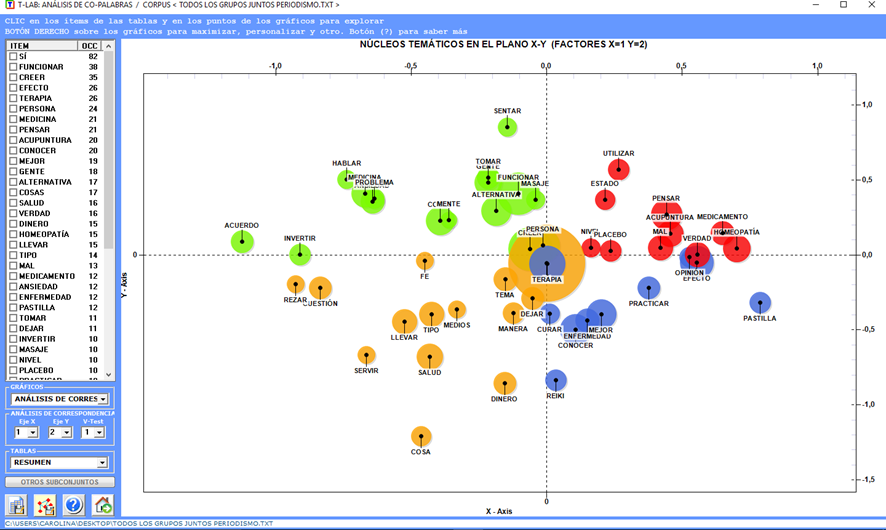


Image 2. Thematic nuclei of Journalism

Analysis of the thematic nuclei showed a very significant grouping, as shown in images 1 and 2. The therapies and different motives were grouped differentially in the Education and Journalism discussion groups. In Education, the grouping responded to the following groups:

1. Osteopathy, with relaxation, reiki and massage.

2. Acupuncture, with yoga and anxiety, in the same discourse as physical therapy.

3. Homeopathy, with placebo, pain, Ibuprofen, pills and medicine.

4. Medication, psychologist and cancer.

In Journalism, the grouping responded according to the following criteria:

1. Homeopathy, acupuncture, placebo.

2. Reiki, cure, therapy.

3. Health, faith, pray, money, the media.

4. Alternative, massage, medicine, talk.

In the cluster analysis it was detected that 10 clusters formed from the Education groups and only 6 clusters formed from the Journalism groups. Results point to a much more fluid discourse between Education students, with a greater number of exemplifications and more balanced participation among all participants as compared with the Journalism students. The latter barely correlated therapies with illnesses, nor did they share personal case studies or the case studies of acquaintances. The Education students showed greater communication effectiveness, as suggested by Ferrés & Masanet (2017) in their study, open to the communicative potentials of emotion. Now, in both discussion groups students indicated that they knew of these therapies through friends, family and acquaintances. The media was only cited by Journalism students. They especially cited social media and blogs.

As concerns the survey results (N=718), one of the most significant items of global data was the existing difference between the knowledge and use of complementary therapies, as set out in the following table.

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| Table 4: Percentage surveyed who know of and use natural therapies N=718 | | | |
| Knowledge of therapies |  | **Use of therapies** |  |
| Acupuncture | 97.1 | Acupuncture | 21.6 |
| Aromatherapy | 60.7 | Aromatherapy | 7.7 |
| Biofeedback | 8.1 | Biofeedback | 0.8 |
| Bio dance | 70.7 | Bio dance | 18.9 |
| Digit puncture | 19.4 | Digit puncture | 2.9 |
| Hypnotherapy | 63.5 | Hypnotherapy | 2.8 |
| Homeopathy | 81.3 | Homeopathy | 23.2 |
| Magnetism | 31.2 | Magnetism | 4.7 |
| Massage | 94.7 | Massage | 64.8 |
| Meditation | 86.4 | Meditation | 22.6 |
| Music therapy | 79.2 | Music therapy | 16.3 |
| Naturopathy | 18.1 | Naturopathy | 0.2 |
| Prayer/ Mental healing | 53.4 | Prayer/ Mental healing | 8.1 |
| Osteopathy | 56.2 | Osteopathy | 12.6 |
| Chiropracty | 68.2 | Chiropracty | 10.8 |
| Reiki | 49.1 | Reiki | 9.4 |
| Treatment with nutritional and vitamin supplements | 18.3 | Treatment with nutritional and vitamin supplements | 6.1 |
| Tai chi | 80.2 | Tai chi | 7.3 |
| Relaxation techniques | 83.5 | Relaxation techniques | 34.8 |
| Herbal therapy | 47.5 | Herbal therapy | 14.3 |
| Artistic therapy or art therapy | 28.5 | Artistic therapy or art therapy | 2.9 |
| Therapeutic touch | 11.8 | Therapeutic touch | 1.2 |
| Yoga | 93.7 | Yoga | 26.5 |

Regarding knowledge, six techniques stood out from the rest: “acupuncture” (97.1%), “massage” (94.7%), “yoga” (93.7%), “meditation” (86.4%), “relaxation techniques” (83.5%) and “homeopathy” (81.3%). As regards use, the techniques that the respondents most used were: “massage“(64.8%), “relaxation techniques” (34.8%), “yoga” (26.5%), “homeopathy” (23.2%), “meditation” (22.6%), and “acupuncture” (21.6%). This is interesting because these same results were replicated in the discussion groups.

In the case of the Journalism students, the mean of each of the responses of the ten CHBQ questionnaire items was 2.60, practically the same as that of the Medicine students whose mean was 2.59; and compared to Nursing whose mean was 3.90. The most favourable were the Education students (4.70). These results were obtained by visualizing the means for the groups in homogenous subsets using a harmonic sample, given that the groups were different sizes. The response of the Journalism students had a special characteristic, which was that none of them marked 7 in the Likert scale for any of the ten questions. The highest score they marked was 6. Therefore, none of them were ''in complete agreement’’ with any of the responses.

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| Table 5. Analysis of variance: University studies. N=718 | | | | | |
| Degrees | N | Mean | Standard deviation | Minimum | Maximum |
| Education | 231 | 4.70 | 1.617 | 1 | 7 |
| Journalism | 233 | 2.60 | 1.647 | 1 | 6 |
| Medicine | 124 | 2.59 | 1.520 | 1 | 7 |
| Nursing | 130 | 3.90 | 1.577 | 1 | 7 |

Results show that the Education students, along with the Nursing students, are those who presented the highest level of agreement concerning these therapies in comparison to the Medicine and Journalism students who agreed the least. As concerns Nursing, Fernández-Cervilla *et al*. (2013), complementary therapies absence from nursing curriculums was deemed a mistake due to the positive repercussions that this training could have in the quality of patient care. Thus, this study corroborates that, as shown in table 5, Education and Nursing would form a conglomerate (favourable attitude towards complementary therapies), as would Medicine and Journalism (unfavourable attitude towards complementary therapies). Based upon the study's premise regarding whether students perception was more influenced by educational background or communication, the response is that according to the data obtained, the educational environment could have more influence than the media environment. Information channels by which students have learned about therapies are ear to mouth, through networks of family, friends and acquaintances, and their digital equivalent, social media and blogs (especially in the case of Journalism students). The discourse of Journalism discussion groups was very sceptical, not at all narrative and biased (not objective). The Education students discourse was very personal. A lack of essential scientific knowledge essential for university students was detected in all of the groups, such as lack of knowledge regarding placebo and nocebo effects, reliability and reproducibility, and the boundaries and limits of science. Therefore, a lack of scientific knowledge in future educators and journalists has been revealed. Following the study results, the proposed line of action is to improve the scientific literacy of these professional collectives, both for the social implication this would have and the potential contribution to a more rigorous debate from all spheres, political, social, educational and in the media, minimizing uncertainty and social controversy.

**Bibliography**

Ansede, M. (2016). La Universidad de Barcelona fulmina su máster de homeopatía [The University of Barcelona eliminates its master's in homeopathy]. *Elpais.com*, 4/03/2016. (<https://goo.gl/sB95LP9>) (2017-08-28).

Ballvé Moreno, J. L. (2003). ¿Quién utiliza las medicinas no convencionales y por qué? [Who uses unconventional medicines and why?] *Humanitas, Humanidades Médicas*, 1 (2), 31-40. (<https://goo.gl/7gXW6v>) (2017-06-27).

Balneaves, L. G., Weeks, L., & Seely, D. (2008). Patient decision-making about complementary and alternative medicine in cancer management: context and process. *Current Oncology*, 15(2), 94–100. (<https://goo.gl/rkd8Za>) (2017-08-28).

Barry, C. A. (2006). The role of evidence in alternative medicine: Contrasting biomedical and anthropological approaches. *Social science & medicine*, 62(11), 2646-2657. <https://doi.org/10.1016/j.socscimed.2005.11.025>

Bautista, G., Sol-Sánchez, A., Velázquez-Martínez, A., & Llanderal, T. (2014). Diversidad de flora medicinal en los huertos familiares en el Ejido La Encrucijada, Cárdenas, Tabasco, México. Congreso Internacional de Investigación [Diversity of floral medicine in family orchards in the *Ejido* La Encrucijada, Cárdenas, Tabasco, Mexico. International Research Congress] *Academia Journals.com, Tabasco 2014 Villahermosa*. (<https://goo.gl/Kgm39Q>) (2017-08-21).

Boiron (2013). *Libro blanco de la homeopatía* [The white book of homeopathy]. Zaragoza: Cátedra Boiron de la Universidad de Zaragoza. (<https://goo.gl/SWVhJF>) (2017-08-27).

Boiron (2016). *Percepciones sobre salud y homeopatía en la población española* [Perceptions of health and homeopathy in the Spanish population]. Madrid: Boiron. (<https://goo.gl/SEV4au>) (2017-08-27).

Brossard, D., & Scheufele, D. A. (2013). Science, New Media and the Public. *Science*, 339(6115), 40-41. <https://doi.org/10.1126/science.1232329>

Calduch Farnós, R.M. (2017) Hacia una formación europea de la medicina china: su incorporación en el sistema universitario español [Towards a European training in Chinese medicine: it's incorporation into the Spanish university system]. Barcelona: Universitat Abat Oliba CEU. Tesis doctoral.

Cámara, M., Muñoz van den Eynde, A., & López Cerezo, J. A. (2017). Attitudes towards science among Spanish citizens: The case of critical engagers. *Public Understanding of Science*, 1-18. <https://doi.org/10.1177/0963662517719172>

Cano-Orón, L. (2016). Correlación entre las búsquedas sobre terapias complementarias en Google y su uso por parte de la población española [Correlation between Google searches for complementary therapies and the Spanish population's use of these therapies]. *Panacea*, 17(44), pp. 124-132. (<https://goo.gl/PmKMib>) (2017-06-27).

Cantó Doménech, J. C., De Pro Bueno, A., & Solbes, J. (2016). ¿Qué ciencias se enseñan y cómo se hace en las aulas de educación infantil? La visión de los maestros en formación inicial [What sciences are taught and how in childhood education? Teachers vision in initial training]. *Enseñanza de las ciencias: revista de investigación y experiencias didácticas*, 34(3), 25-50.<http://dx.doi.org/10.5565/rev/ensciencias.1870>

Congreso de los diputados (2007). Proposición no de Ley para la creación de un grupo de trabajo con la finalidad de iniciar un estudio y propuesta de regulación del sector de las terapias naturales en el plazo y tiempo necesarios [''Proposal Not of Law'' for the creation of a working group with the objective of beginning a study and proposal for regulating the natural therapy sector in the necessary period of time], *Diario de sesiones*, 964, (<https://goo.gl/4L4MwE>) (26/08-2017).

Cortiñas-Rovira, S., Alonso-Marcos, F., Pont-Sorribes, C., & Escribà-Sales, E. (2015). Science journalists’ perceptions and attitudes to pseudoscience in Spain. *Public Understanding of Science*, 24(4), 450-465. <https://doi.org/10.1177/0963662514558991>

Cruz, S. M. (2016). Medicina tradicional y fitoterapia una alternativa para el mejoramiento de la salud en Guatemala [Traditional medicine and fitotherapy an alternative for improving health in Guatemala]. *Ciencia, Tecnología y Salud*, 3(1), 81-90. (<https://goo.gl/J5B2Cv>) (2017-06-27).

Dalcanale Tesser, C., & Filice de Barros, N. (2008). Medicalização social e medicina alternativa e complementar: pluralização terapêutica do Sistema Único de Saúde. *Revista de Saúde Pública*, 42(5), 914-920. <https://dx.doi.org/10.1590/S0034-89102008000500018>

De Miguel, M. (2017). Uno de cada cuatro españoles confía en los curanderos para tratar sus enfermedades [One out of four Spaniards trusts healers to treat their illnesses], *El mundo.es*, 19/04/2017. (<https://goo.gl/FBJxHn>) (2017-08-22).

Estomba, D., Ladio, A., & Lozada, M. (2006). Medicinal wild plant knowledge and gathering patterns in a Mapuche community from North-western Patagonia. *Journal of Ethnopharmacology*, 103(1), 109-119. <https://doi.org/10.1016/j.jep.2005.07.015>

Evans, M., Shaw, A., Thompson, E., & Falk, S. (2006). Decisions to use complementary and alternative medicine (CAM) by male cancer patients: information-seeking roles and types of evidence used.  *BMC Complementary and Alternative Medicine*, 7, 25. <https://doi.org/10.1186/1472-6882-7-25>

FECYT (2016). *VIII Encuesta de percepción social de la ciencia y la tecnología* [VIII Survey of social perception of science and technology]. Informe de resultados. Madrid: FECYT. (<https://goo.gl/gpVBBJ>) (2017-08-13).-Fernández-Cervilla, A. B., Piris-Dorado, A. I., Cabrer-Vives, M. E., & Barquero González, A. (2013). Situación actual de las Terapias Complementarias en España en el Grado de Enfermería [Current situation of Complementary Therapies in Spain in Nursing degree programs], Rev. *Latino-Am. Enfermagem* 21(3):1-9. (<http://hdl.handle.net/10272/7619>) (201708-21).

Ferrés, J., & Masanet, M. J. (2017). La eficacia comunicativa en la educación: potenciando las emociones y el relato [Communicative efficacy in education: promoting emotions and story] . *Comunicar: Revista Científica de Comunicación y Educación*, 25(52), 51-60. <https://doi.org/10.3916/C52-2017-05>

Hess, D. J. (2004). Medical modernisation, scientific research fields and the epistemic politics of health social movements. *Sociology of Health & Illness*, 26(6), 695-709. <https://doi.org/10.1111/j.0141-9889.2004.00414.x>

Keshet, Y. (2009). The untenable boundaries of biomedical knowledge: epistemologies and rhetoric strategies in the debate over evaluating complementary and alternative medicine. *Health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine*, 13(2), 131-155. <https://doi.org/10.1177/1363459308099681>

Ley 16/2003, de 28 de mayo, de cohesión y calidad del sistema nacional de salud [Law 16/2003, May 28th, on cohesion and quality of the national health system]. *BOE*, 128: 20567-20588. (2003-05-29) (<https://goo.gl/uPpYMn>).

Lie, D. A., & Boker, J. (2006). Comparative survey of Complementary and Alternative Medicine (CAM) attitudes, use, and information-seeking behaviour among medical students, residents & faculty. *BMC medical education*, 6(1), 58. <https://doi.org/10.1186/1472-6920-6-58>

Lie, D., & Boker, J. (2004). Development and validation of the CAM Health Belief Questionnaire (CHBQ) and CAM use and attitudes amongst medical students. *BMC Medical Education*, 4(1), 2. <https://doi.org/10.1186/1472-6920-4-2>

López, A. (2016). La homeopatía ya no será una disciplina que se enseñe en la Universidad de Barcelona [Homeopathy will not be a discipline taught at the University of Barcelona]. *Elmundo.es*, 2/03/2016. (<https://goo.gl/rzp9rv>) (2017-08-28).

Ministerio de sanidad, política social e igualdad [Ministry of health, social policy and equality] (2011). *Análisis de situación de las terapias naturales* [Analysis of the situation of natural therapies]. Madrid: MSPSI. (<https://goo.gl/Cjb6ku>) (2017-08-27).

Moreno Castro, C. y Cano Orón, L. (2016). Las terapias no convencionales en los programas políticos y en los tuits publicados por los cabezas de lista de Ciudadanos, Podemos, PP, PSOE y Unidad Popular, durante la campaña de las Elecciones Generales de 2015 [Non-conventional therapies in political agendas and in tweets published by the heads of list of Citizens, ''We can'' (*Podemos*), PP, PSOE and *Unidad Popular* during the General Elections campaign of 2015] en Blanco Castilla, E. y Teruel Rodríguez, L. (Eds.)(2016) *Periodismo de Datos. Nuevas narrativas para el Periodismo Especializado*. Málaga: Repositorio Institucional de la Universidad de Málaga. (<https://goo.gl/EsALz1>) (2017-08-27).

Moreno-Castro, C. y Lopera-Parejo, E. (2016). Comparative study of the frequency of use of natural therapies among the Spanish population and their public image on digital media, *Book of Papers*, 14th International Conference on Public Communication of Science and Technology (PCST), Istanbul, Turkey, 26-28 April 2016, <http://pcst.co/archive/>, <https://goo.gl/FBfsfM> (24/08/2017).

Muñoz van den Eynde, A., & Lopera Pareja, E. H. (2014). *La Percepción Social de la Ciencia. Claves para la Cultura Científica* [Social perception of Science. Keys for Scientific Culture]. Madrid: La Catarata.

Nicolais, C., & Stern, M. (2014). Critical synthesis package: CAM health belief questionnaire (CHBQ). *MedEdPORTAL Publications*, 10, 9882. <http://doi.org/10.15766/mep_2374-8265.9882>

Observatorio de las terapias naturales [Natural therapy observatory] (2008). *Primer estudio sobre uso y hábitos de consumo de las terapias naturales en España* [First study in Spain regarding the use of natural therapies and corresponding consumption habits]. Madrid: COFENAT, CONAMAD y TENACAT. (<https://goo.gl/LmFYds>) (2017-08-27).

Olvera-Lobo, M. D., & López-Pérez, L. (2015). Science journalism: the standardisation of information from the press to the internet. JCOM: *Journal of Science Communication*, 14(3), 1-12. (<https://goo.gl/G2Ks5o>) (2017-08-27).

OMS (2013). Estrategia de la OMS sobre medicina tradicional 2014-2023 [WHO strategy for traditional medicine 2014-2023] . Ginebra: OMS. (<https://goo.gl/UaXNqU>) (2017-06-21-).

Ortuño, A (2016). El Master de Homeopatía de la Universitat de València cancela su edición para el próximo curso [The University of Valencia's Master's in Homeopathy cancels its first edition for the coming academic year] . *Valenciaplaza.com*, 6/04/2016. (<https://goo.gl/B2yNZQ>) (2017-08-28).

Perdomo Delgado, J. (2014). Cuba y la OMS actualizan sus estrategias de Medicina Tradicional [Cuba and the WHO update their Traditional Medicine strategies] *Revista Cubana de Plantas Medicinales*, 19(3), 264-266. <https://goo.gl/8o4wb5> (2017-08-28).

Perdomo Delgado, Johann. (2016). La Medicina Natural y Tradicional en el contexto de la educación médica superior [Natural and Traditional Medicine in the context of medical higher education]. EDUMECENTRO, 8(1): 1-4. (<https://goo.gl/9zkywG>) (2017-08-24).

Real Decreto 1277/2003, de 10 de octubre, por el que se establecen las bases generales sobre autorización de centros, servicios y establecimientos sanitarios [Royal Decree 1277/2003, October 10th, by which the general principles for the authorization of centres, services and health facilities are established] (2003). *BOE*, 254: 37893-37902.

Ródenas, P. (2001). Enseñanza de la medicina naturista en las universidades españolas [Teaching natural medicine in Spanish universities]. *Natura Med*, 19(5), 245-249.

Salas, J. (2017). La mitad de los españoles cree erróneamente que la homeopatía funciona [Half of Spaniards mistakenly believe that homeopathy works], El país.com, 19/04/2017. (<https://goo.gl/vctpQB>) (2017-08-22).

Salinas, V. (2016). La UV anula el máster de reiki por falta de alumnos y abandono del profesorado [UV eliminates the master's in reiki due to lack of students and teachers]. *Levante-emv.com*, 12/02/2016 (<https://goo.gl/wrovzC>) (2017-08-28).

Solá-Rodíguez, M.A. (2015). Chinese medicine studies in Spanish Universities, 2014-2015. Conference paper, 12th World Congress of Chinese Medicine. Barcelona, 24 al 26 de septiembre, 2015. (<https://goo.gl/dJ48ZK>) (2017-08-22).

Stocking, S. H. y L. W. Holstein (2009). Manufacturing Doubt: Journalists’ Roles and the Construction of Ignorance in a Scientific Controversy. *Public Understanding of Science*, 18 (1): 23. <https://doi.org/10.1177/0963662507079373>

Tautz, E., Momm, F., Hasenburg, A., & Guethlin, C. (2012). Use of complementary and alternative medicine in breast cancer patients and their experiences: A cross-sectional study. *European Journal of Cancer*, 48, 3133-3139. <https://doi.org/10.1016/j.ejca.2012.04.021>

Thomson, P., Jones, J., Browne, M., & Leslie, S. J. (2014). Why people seek complementary and alternative medicine before conventional medical treatment: A population based study. Complementary therapies in clinical practice, 20(4), 339-346. <https://doi.org/10.1016/j.ctcp.2014.07.008>

Vapiwala, N., Mick, R., Hampshire, M. K., Metz, J. M., & DeNittis, A. S. (2006). Patient initiation of complementary and alternative medical therapies (CAM) following cancer diagnosis. *Cancer Journal*, 12(6), 467-474. (<https://goo.gl/Hoi85Y>) (2017-08-27).