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New Water Culture *versus* the Traditional Design and Validation of a Questionnaire to Discriminate between Both

Alicia Benarroch *, María Rodríguez-Serrano and Alejandra Ramírez-Segado

Departamento de Didáctica de las Ciencias, Facultad de Ciencias de la Educación y del Deporte de Melilla, Universidad de Granada, 52071 Melilla, Spain; mariarodriguez@ugr.es (M.R.-S.); alermzsgd@ugr.es (A.R.-S.)
* Correspondence: aliciabb@ugr.es

Abstract: This article addresses the process of designing and validating a questionnaire on the New Water Culture, which aims to collect information on various issues related to water, such as its management, savings, and consumption. The questionnaire was subjected to a double validation process: an evaluation by a panel of experts, including members of the New Water Culture Foundation, and a pilot study, which allowed us to estimate the validation of the content as well as the corresponding internal consistency of the questionnaire. The construction and validation process resulted in a questionnaire consisting of 27 items with a total of 71 variables distributed in four sections: the first is related to scarcity, quantity, and distribution of water; the second collects questions about the different dimensions of water; the third analyses the different ways of carrying out water management; and the fourth and last section is related to personal actions associated with water. The reliability study showed a Cronbach alpha of 0.913, which demonstrates the development of a robust and reliable instrument allowing the identification of the most problematic issues associated with the New Water Culture.

Keywords: new water culture; validation; questionnaire

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1. Introduction

Humanity is facing an unprecedented water crisis [1], which means that more than 40% of the world's population is suffering from water shortages, the most severe being in the world's most impoverished countries. As a result of this situation, these populations are forced to consume or live with contaminated water, with the consequent risk to health, which also reduces the options for these families to get out of poverty [2].

The water crisis that threatens the planet is actually the outcome of a complex interaction of anthropogenic factors. On the one hand, there are factors that cause an increase in demand, such as the increase in population, and on the other hand, no less important, those factors that cause a decrease in water availability due to their destructive effect on aquatic ecosystems and the water cycle, among which are deforestation, climate change, and pollution [2].

In a crisis scenario such as this, it is of the utmost priority that countries commit to water management strategies that guarantee the population's access to sufficient quantities of quality fresh water.

In the mid-20th century, in response to the increase in water demand as a result of population growth and the expansion of agriculture and industry, water management policies based on "supply" strategies began to be developed, so called because they were designed to meet the growing demand for water by increasing the amount available for consumption. This materialised in the construction of large hydraulic works, such as dams, transfers, desalination plants, deviation of flows, over-exploitation of aquifers, etc., which encouraged the domination and the uncontrolled exploitation of aquatic ecosystems with the consequent environmental repercussions. In parallel, water supply and sanitation services in many countries subsequently became dependent on the private sector, which

imposed tariffs that were subject to the market laws of supply and demand, thus these services were no longer universally accessible but available only to those who could afford them.

This classic or traditional model of water management, based on supply strategies and the neoliberal principles of privatisation, has detrimental effects on the environment as well as on the economy and the society, which has led certain population groups to question the validity of these unsustainable management models [3,4].

At the end of the 20th century, a change of paradigm in the conception of water and its management emerged. The New Water Culture (NWC) is presented as an alternative model that understands water as an eco-social asset and is committed to management based on principles of environmental sustainability, economic rationality, and participatory governance [5]. NWC advocates a profound shift towards new social and environmental sensibilities that ensure the sustainability of aquatic ecosystems and effective access to drinking water and basic sanitation and promotes a form of participatory governance as well as the establishment of universal rights in a global citizenship [6]. Under this model, water should be managed from a holistic perspective focused on the application of the principles of the European Water Framework Directive (Directive 2000/60/EC of the European Parliament and of the Council) under the prism of ethics [7–9].

It should be noted that NWC is a population demand that arises specifically in the Iberian Peninsula [10–12], although its basic principles transcend this geographical scope [13–15]. The problem of water scarcity is not new, and considerable progress has already been made in the technical means for detecting water leaks [16–18] and for the detection of pollution [19] in distribution networks as well as the intermittent supply of water [20]. However, in addition to technological advances, the participation of other sciences from humanities and social sciences is required to place water at the centre of a new sociological perspective [15].

In a notable new tack, NWC proposes an in-depth examination of the priority of water uses according to the qualities that each use requires and to apply specific management criteria appropriate to the various ethical categories at stake. The European Declaration for a New Water Culture [21] proposes classification of water uses in four ethical categories for its management. Thus, each dimension is related to a set of water functions and rights of society, according to which there will be a certain management strategy and a different level of priority. These four ethical categories are:

- Vital water. This refers to water used in functions necessary for the survival of both humans and other living beings; therefore, from an ethical point of view, it is of the highest priority compared to other water uses. This category includes the basic quotas of drinking water and sanitation services that human beings require to live a healthy and dignified life. Access to this minimum vital quota, estimated at between 50 and 100 litres per person per day, was acknowledged as a human right by the United Nations in 2010 [22] and, as such, must be guaranteed universally and free of charge. This category also includes the water needed to produce basic foodstuffs for the survival of populations, as it falls within the scope of human rights, in this case, the human right to food.
- Citizenship water. This refers to water employed in activities of general interest to society, such as urban water supply and sanitation services, and therefore occupies a second level of priority after life water. These services are linked to basic citizenship values, such as public health, social cohesion, and equity, thus they are deemed citizens' rights and, consequently, their management should be public. As a citizen's right, it must be associated with a series of civic duties related to responsible consumption and efficient use of the services provided. The fact that water supply and sanitation services are recognised as citizens' rights implies, on the one hand, that they must be accessible to all and, on the other, that they are linked to a series of duties, which are embodied in the payment of tariffs for them. To this end, the institutions charged with

managing these services should be able to design these fees without infringing the right of citizens to enjoy them.

- Economy water. This refers to water used in productive activities for profit, such as agriculture or industry. It is linked to each individual's aspiration to improve their financial situation and is therefore far removed from human rights and citizens' rights. From an ethical standpoint, it is placed on a third level of priority, behind vital water and citizenship water. This means that the over-exploitation of any aquatic ecosystem for economic purposes is not justified, as vital water takes priority over economy water. In this category, the function of water is lucrative and therefore responsible and rational economic criteria should be applied to allow full cost recovery of both financial outlay (investments, maintenance, management) and environmental costs, thus the increase in water prices that this system would entail would lead to a more efficient and responsible use of water. Although farming has always been considered a sector of general interest, is in fact a business that generates important economic benefits for those who manage it, which, coupled with the strong polluting impact of the sector, makes it necessary to dissociate the agricultural sector from the general interest to consider it a lucrative activity. In consequence, a new approach to the farming sector is needed with new social criteria and the requirement for good environmental practices, which will make it possible to determine which agricultural activities could truly be considered economic activities of general interest.
- Crime water. This is water exploited in illegitimate productive activities, because of either their social or environmental consequences. These activities must be outlawed, prosecuted, and prevented. To this end, it is necessary to identify the economic uses of water that go beyond the limits of legality and belong to the area of crime water. The main solution to such uses is not to sanction but to prevent them from occurring and to pursue them effectively by applying the law.

Thus, in the NWC, the different dimensions of water make it susceptible to being used by human beings in very diverse ways, which have different associated costs both economically and environmentally and which lead to a series of realities that must be considered when carrying out management plans in order to achieve a balance between the economic use of water, its environmental function, and its social value [23].

In this polyhedral context, we must be able to distinguish between old and new water culture. We must leave behind the misconceptions interested and strongly unjust with nature inherited from classic water management and move towards new models that involve respect and care for it. NWC emerges as a fundamental tool in the solution of so-called water problems, which transcend hydrological knowledge and affect all human behaviour, in which the key may be sensitivity to environmental values.

A broad level of citizen collaboration is essential to successfully develop the proposals associated with NWC. Proactive citizen participation should be encouraged through ongoing information initiatives that should begin at school. These programmes must be complemented by critical monitoring of public policies to feed the process of information, understanding and citizen participation that the Water Framework Directive itself advocates.

The intention in this work is to design a valid and reliable questionnaire to identify citizens' and future teachers' conceptions related to water issues and their degree of association with the new and/or traditional cultural conception of water. We need to know what citizens think and whether they acknowledge the value water has in our lives and if they consider the need for sustainable management as the only way to control and improve the current water crisis situation. To achieve this objective, it is essential to identify the contexts that differentiate the two concepts and then generate the items that make up the questionnaire. The following section is dedicated to this end.

2. Old Water Culture vs. "New" Water Culture

The main ideas that allow us to distinguish between the traditional vision of water, known as the old water culture, and the vision of sustainable development promoted by the NWC, can be summarised in the following contexts (see Table 1):

Table 1. Contexts that differentiate old water culture and the NWC.

Contexts	Old Water Culture	New Water Culture
1	Water imbalance • Water is scarce. The fresh water on Earth is insufficient. • Water scarcity is due to water imbalance. • There are desertified areas that require the transfer of water from more water-rich areas.	Natural balance • Water is not scarce; if we look after it, it will be sufficient. • Occasional water scarcity is due to mismanagement and abuse in its use and consumption. • In desertified areas, it is necessary to implement technologies and economic activities adapted to the available water.
2	Water as productive factor • Water is a commodity, an economic asset. • Water is a basic resource.	Water as eco-social asset • Water is not only an economic good but is also fundamental to the survival and the future of our planet. • Water has different functions; a very small part is a basic resource, but all of it has a heritage value.
3	Water governability • The responsibility for water falls to institutional managers and governments.	Water governance • The responsibility for water falls to all citizens. Educational programmes are required, starting in schools.
4	Supply management • It is necessary to increase the amount of fresh water available. • Hydraulic works (reservoirs, transfers, desalination plants, etc.) are necessary to achieve more water.	Demand management • We must reduce consumption and not try to achieve more water. • Hydraulic works are harmful to the environment. It is better to concentrate all efforts on controlling water demand.
5	Cost–benefit • The water tariff regime is deficient and must be subsidised with public money. • Polluters do not pay. • The convenience of use in productive activities is not taken into account.	Cost–effectiveness • The water tariff regime must cover the costs of supply and contamination. • Polluters pay. • The cost of water is inversely proportional to the convenience of the outlay.
6	Water as a human right • Water is a human right that must be ensured by government.	Water as a human duty • Only a small part of water is vital water. The rest have obligations of responsibility for savings and costs.
7	Consumerism • Consumption of goods and feeding habits do not affect water consumption. • Water saving is not a priority.	Responsible consumer behaviour • Consumption of goods and eating habits are intimately related to water consumption. We must be responsible consumers. • Water saving is a priority at all levels, domestic, agricultural, industrial, etc.

- *Context 1. Water imbalance vs. natural balance* As a consequence of the uneven rainfall among the different territories, the concept of water or hydrological imbalance came into being, which, together with other concepts such as scarcity or limited availability of the resource, has encouraged the development of a feeling of injustice among the less favoured areas with respect to the more humid zones. This gave rise to the need for governments to rectify this natural "disorder" and provide the necessary means, mainly through dams, transfers, reservoirs, etc., to the driest areas in order to avoid water shortages and favour its availability [24]. However, in the NWC, it is considered that the hydric singularity of each territory should be understood as the result of a natural balance that should be altered as little as possible by anthropomorphic activities. Water is not scarce, or it should not be if it is properly managed. Occasional water scarcity is never natural but is the consequence of bad management, inefficient infrastructure, high consumption, inappropriate economic activities, and irresponsible uses, which have ended up irremediably affecting both the quality and the quantity of water available [25]. Water, far from being scarce, is sufficient to satisfy human needs, although to do so, it is necessary to control the demand and use it responsibly and efficiently.
- *Context 2. Productive factor vs. eco-social asset* The management approaches of the old water culture considered this natural element as an economic asset. This perspective focused on a principle of economic rationality in which water was used as though it were a financial asset, ignoring any social and environmental context. However, the NWC defends the need to value water as an eco-social asset, a concept that considers that water not only has a productive value but also a social and an environmental value or function, as it is not only essential for the development of life but is also necessary for future economic and social progress [26].
- *Context 3. Water governability vs. water governance* Water management has traditionally been exclusively from a limited set of sectors— the government and the corresponding responsible institutions, technicians (mainly engineers), large user associations such as irrigation communities, and companies in charge of supply or hydroelectric plants—leaving the citizens out of the decision-making process. Water, on the other hand, as the heritage of all and therefore of common interest, must be managed with transparency and with the participation of all the parties involved and all people concerned. Opening up the management of water resources to society as a whole, as proposed by the NWC, would mean moving from a governance approach (focused on government action) to a new model of participatory governance, in which case, responsibility in the decision-making process is not only public but is collective and shared [7]. The United Nations World Water Development Report [27], Agenda 21, and the United Nations Development Programme [28] all recognise the need for citizen participation in addressing water-related issues in order to ensure a sustainable future.
- *Context 4. Supply management vs. demand management* The traditional water management model has been based on correcting the hydrological imbalance based on large hydraulic works to satisfy the growing demand from the population as well as the needs of agricultural and energy sectors. Consequently, water management has become a business, which has not only sought to provide a service but to sell as much water as possible, leading to excessive and irresponsible consumption of this element. In contrast, the NWC maintains that sustainable water management must be based on the control of water consumption [26], in terms of both quantity and quality, thus we must favour forms of life and activities that involve responsible water use and do not lead to over-exploitation of water resources [29].
- *Context 5. Cost–benefit vs. Cost–effectiveness* The NWC considers that the cost–effectiveness balance should be applied in water resources management, a criterion whereby water management should not be conditioned by the monetary balance involved in a cost–benefit analysis, but rather it should guarantee the full recovery of costs, selecting those measures that are less costly and are adapted to the different economic, social,

and environmental benefits [2]. Therefore, each user must answer for the costs of the services related to the water they use, differentiating between urban, industrial, and agricultural uses. In the event that a scarcity situation should arise, what is known as the opportunity cost must be applied, that is, the value that a resource acquires when its availability is less than the demand. Currently, this cost is not only not applied to productive activities, but they are also subsidised [30].

- *Context 6. Water as a human right vs. human duty* Water, unlike other natural resources, has multiple functions that give it added value, specifically, social, economic, and environmental purposes. In addition, it is also linked to ethical ranges of different levels, the classifications being vital water, citizen water, economy water, and crime water. Vital water is key not only to the survival of the human race but of all living beings, and access to basic quotas of drinking water must be guaranteed as a human right as well as for the sustainability of ecosystems [30]. According to the World Health Organisation (WHO), between 50 and 100 litres of water per person per day are needed to ensure that the most basic and health-related needs are met [31]. Likewise, citizen water must be guaranteed by our administrations to meet the needs of supply and sanitation, but this water already carries with it the obligations for citizens of adequate consumption and costs. It therefore entails rights and duties. The same cannot be said for economy water, which is intended for productive purposes and cannot be considered a human right [6].
- *Context 7. Consumerism vs. responsible and sustainable consumption* The current consumerist society, in its eagerness to improve its quality of life, is not aware of the repercussions that consumerist habits have on water resources, nor are the majority of citizens usually aware of the relationship between our eating habits and water needs [32]. Traditional supply-based water management strategies do not encourage savings or efficiency in water use [33]. On the other hand, in demand management, there is an incentive to increase efficiency to help reduce consumption, save water, and encourage natural regeneration and conservation of the resource [2].

The advance towards a new water culture requires modification of the perception that society has about this water resource, which involves a previous exercise of reflection on the diverse factors—environmental, social, economic, political, etc.—that intervene on the issue of water [8]. In this change of paradigm, the school plays a fundamental role as an institution that promotes education in values and the development of critical thinking of the citizens of the future, especially in secondary education, during which the students begin to build their own ethical principles based on the critical evaluation of reality. For this reason, for years, it has been advocated that environmental education be implemented in secondary schools with special attention paid to the issue of water [34]. However, the reality is that students continue to have a very reductionist perception of it, because they consider water to be a resource that should be exploited for human benefit, but they are completely unaware of how it is managed and, therefore, the environmental and the social problems derived from economic and political interests at stake. In addition, various studies show that students are collectively unconcerned about saving and using water responsibly [35]. They are not aware of the number of people who do not have access to drinking water, nor are they aware of the water problems that may exist in their own city [36], thus they are unaware of the management of water and the conflicts that arise from it [37].

Melilla is the city from which this study is carried out. It is a Spanish city in North Africa, occupying an area of 12.3 km^2 with a population of 87,076 inhabitants [38]; it thus has the highest population density in Spain, with 6868 inhabitants per square kilometre. The entire region is under strong human pressure, both from the urban growth of the city itself and by the influence of the nearby Moroccan environment. Melilla is a place where Berber, European, Hebrew, and Hindu cultures coexist. Each of these cultures professes a different religion, and thus we have Islam in the Berber culture, Catholicism mainly in the European culture, Hinduism in the Hindu culture, and Judaism in the Hebrew culture. The main

religious reference for its historical rooting is Catholicism; however, in the last 30 years, this predominance is shared with Islam. To meet the water demand of the population, Melilla's water supply system has several sources: surface water collection from the Rio de Oro (currently without water) and from two springs located in Morocco (600 m^3/day output), groundwater collection from three aquifers (water supply 15,000 m^3/day), and a seawater desalination plant (water supply 15,000 m^3/day), in addition to the Adelfas reservoir through which rainwater is collected. The population growth supported by the city has led to a general increase in the water supply needed to meet urban uses. In 2018, the water consumption of the people of Melilla was 340 litres per inhabitant per day [39], a figure that is almost triple the average national consumption of 133 litres per inhabitant per day [40].

The NWC has a socially relevant grounding and needs to reach out to schools. To this end, it is essential to have suitable university education as well as teachers well versed in these contents, as they will be the group responsible for transmitting the appropriate knowledge and promoting awareness in future generations.

3. Materials and Methods

3.1. New Water Culture Questionnaire Initial Design

The instrument chosen to investigate the conceptions of citizens and future teachers about the NWC was a questionnaire. It is one of the most widely used instruments in quantitative research due to the advantages it provides in obtaining a relatively rapid overview of information and allowing direct comparison of individuals or population groups [41].

The questionnaire was designed in two phases, each with a different methodology (see Figure 1). Phase I was determined by a selective methodology, characterised by a medium level of internal control [42,43], whose purpose was to design the initial questionnaire. The Phase II methodology was *ex post facto* correlational [44], as the study variables were not intentionally manipulated. The aim was validation of the questionnaire.

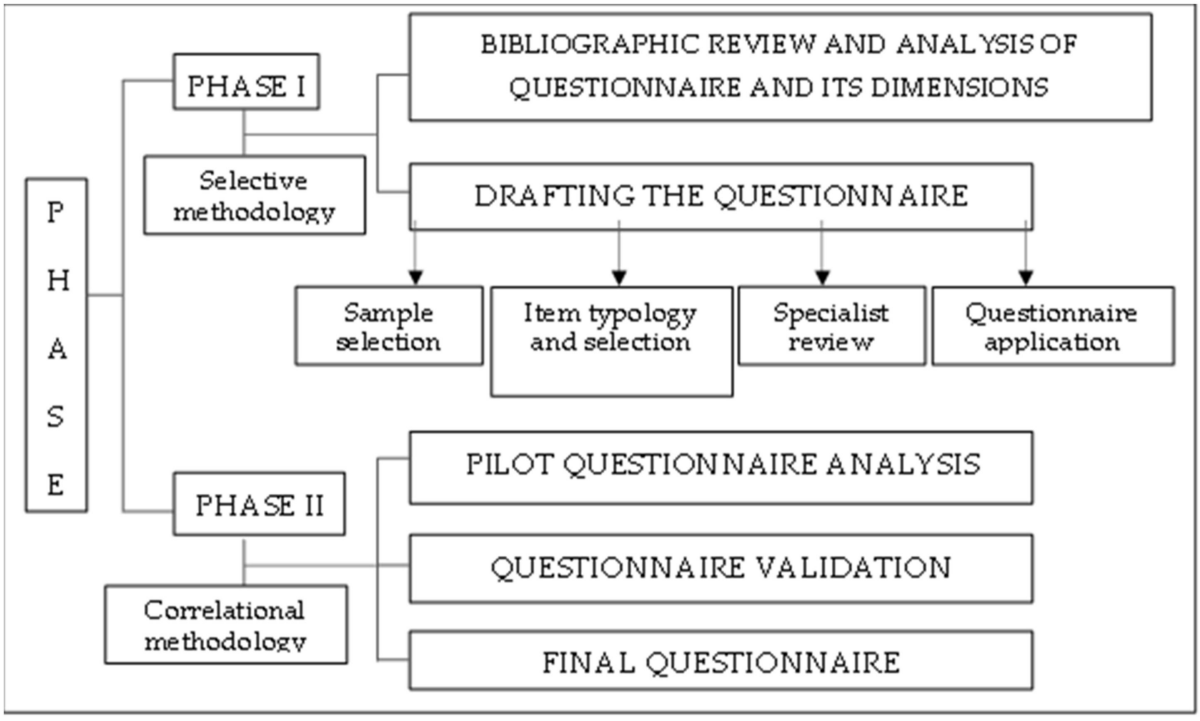

Figure 1. Questionnaire development phases.

Phase I was conditioned by the search for sources, bibliographic references, theoretical framework used, and a thorough review of different questionnaires on water issues. Each of the works found [35,37,45] had a specific influence on the initial questionnaire. However, none of them had been constructed with the aim of researching the culture of water in its entirety, thus it was decided to develop a new questionnaire.

The questionnaire should consider the contexts that characterise the NWC and distinguish it from the more traditional cultural view. Based on the theoretical background, four contextual blocks were considered. These were:

- Block 1: Water resource protection Related to water scarcity, quantity, and distribution. In this block, the aim is to determine the interviewees' knowledge of the water situation in Spain and in the closer context of Melilla. This block is closely related to the first context in Table 1.
- Block 2: Water dimensions Water, from the NWC standpoint, has different dimensions or values from patrimonial, ethical, social, and environmental points of view. This is a novel feature in comparison to the more traditional view that considers water as a productive resource with an exclusively economic dimension. It also includes the requirement to open up water management to proactive citizen participation. This block is closely related to contexts three and four in Table 1.
- Block 3: Water management Another of the most important differences between the traditional vision and NWC is associated with economic management. NWC prioritises control of water demand with the aim of modifying water sources as little as possible. From this perspective, the reuse of water, its purification, and high costs in the face of high consumption should be encouraged. In more traditional management, the key was to meet the demand, increasing the water supply, with little consideration to the environmental damage caused. With this block, we must obtain information on the options defended by the respondents about water management. This block is associated with contexts two and six of Table 1.
- Block 4: Personal water-associated actions This block is related to the knowledge about saving, consumerism, and food (contexts five and seven of Table 1). The aim is to ascertain the relationship between personal behaviour and water availability.

Table 2 describes the initial questionnaire structure.

Table 2. NWC questionnaire initial structure.

Contexts	Block	Items
1	Block 1: Water resource protection	1, 2
2, 3	Block 2: Water dimensions	3, 4, 5, 6, 7
4, 5	Block 3: Water management	8, 9, 10, 11, 12, 13, 14
6, 7	Block 4: Personal water-associated actions	15, 16, 17, 18, 19, 20

The initial questionnaire on NWC consisted of twenty items that were answered according to the degree of agreement of the respondent on a Likert scale with a response grade of one to four points. By adopting an even number of possible categories, the intention was to avoid the neutral views of respondents. Of the total items in the questionnaire, nine had different alternatives, thus the questionnaire was made up of a total of 51 variables.

Table 3 describes the items in column two and, in column three, the number of variables associated with each item. Finally, column four describes the possible response categories, which in all cases are the four established by the Likert scale just described.

Table 3. NWC initial questionnaire description.

	Block 1: Water Resource Protection		
	Items	Nº Variables	Categories
1	Our country suffers from water shortage problems	**1**	1: Totally disagree 2: Disagree 3: Agree 4: Totally agree
2	Melilla suffers from water shortage problems	**1**	
	Block 2: Water Dimensions		
	Items	Nº Variables	Categories
3	The water problem should be solved by: (a) Government (b) The citizens (c) Everyone (d) Others	4	1: Totally disagree 2: Disagree 3: Agree 4: Totally agree
4	Rainfall has decreased lately in our country	1	
5	Water consumption affects the environment	1	
6	Waste of water creates an environmental problem	1	
7	The following solutions applied to water scarcity affect the environment: (a) Water transfers (b) Dam building (c) Reservoir construction (d) Desalination plants	4	
	Block 3: Water Management		
	Items	Nº Variables	Categories
8	If you were a water manager in your city, you would opt for: (a) More reservoirs to ensure supply (b) Water transfers to ensure supply (c) Controlling water demand and applying stringent costs to those that consume the most (d) Controlling water manned and, if necessary, cutting off supplies	4	1: Totally disagree 2: Disagree 3: Agree 4: Totally agree
9	I would resolve the water scarcity problem in Melilla by: (a) Installing more desalination plants (b) Saving water (c) Extracting more water from wells (d) Building more reservoirs (e) Other (please state how)	5	
10	The water I use at home comes from: (a) Wells (b) The sea (c) Rainfall (d) Reservoirs (e) Others	5	
11	The water we have used goes to: (a) The sea (b) The river (c) To the treatment plant (d) Others	4	
12	Water is treated before reaching my home	1	
13	The water that comes from my home must receive treatment	1	
14	I consume a daily water amount of: (a) Less than 50 litres (b) Between 51 and 100 litres (c) More than 150 litres	3	

Table 3. *Cont.*

Block 4: Personal Water-Associated Actions			
	Items	Nº Variables	Categories
15	There are millions of litres of water worldwide, so saving it is not so important	1	1: Totally disagree 2: Disagree 3: Agree 4: Totally agree
16	In Spain we must save water	1	
17	In Melilla we must save water	1	
18	I save water in my daily routine	1	
19	Water can be saved by: (a) Turning off the tap when I brush my teeth or soap up (b) Using a dishwasher (d) Showering instead of bathing (e) Reusing the water from washing food to water the plants (f) Reusing water from the air conditioner to wash the dishes (g) Using the water from fountains (h) Placing glass or plastic bottles in cisterns	7	
20	The following actions affect water consumption: (a) Buying a lot of clothing (b) Frequently changing mobile phone, tablet PC, computer, etc. (c) Using plastic bags(d) Pruning many trees	4	
	Total variables	**51**	

3.2. Procedure

The validation of the questionnaire aims to determine the usefulness of the measurement instrument used. The procedure used in this research was to submit the questionnaire to expert scrutiny. This method is characterised by having the review and the opinion of a number of judges or experts who evaluate the questionnaire items and issue an assessment on the degree of matching between the items and the dimensions to be evaluated [46].

Each of the experts was sent the original questionnaire and a form, which included a brief explanation of the purpose of the research and the necessary instructions for validation. In addition, they had a section where they could make any suggestions they deemed appropriate.

The procedure for evaluation of the items by the experts consisted of assessing and judging each of the items that made up the questionnaire according to previously established evaluation dimensions [47]. Specifically, the suitability of the instrument's content was evaluated based on the following two dimensions: (i) clarity—the item must be easily understood; (ii) relevance—the item should have a logical and coherent relationship with the construct being assessed. All the questionnaire items were evaluated for both dimensions based on a Likert type scale with a response graduation from one to five points, in which the extreme values took the following meaning: 1 = minimal clarity or relevance and 5 = maximum clarity or relevance for each of the issues raised. This decision was justified by the recommendations of certain authors [48], according to the degree of agreement/disagreement of the experts.

After collecting the judges' assessments, the following procedures were carried out:

1. Analysis of interjudge consistency. For this purpose, the analyses referring to the frequency statistics (mean and standard deviation) were carried out to examine the homogeneity obtained in the assessments issued by the panel of experts.
2. Analysis of the suitability of the questionnaire items. To gauge the suitability of the items according to the content validity criteria used, Aiken's coefficient of validity ***V*** [49,50] was applied, which makes it possible to measure the relevance of each item, taking into account not only the number of dimensions assessed by the judges but also the number of experts taking part, thus achieving an overall assessment of the

instrument designed [51]. This statistic is therefore useful for making decisions on the need to modify or discard the items. This coefficient was calculated using the algebraic modification proposed by Penfield and Giacobbi [52] of Aiken's coefficient of validity V:

$$V = \frac{X - l}{k}$$

where X is the mean of the judges' ratings in the sample, l is the lowest possible value (in our case, 1), and k is the range of possible values of the Likert scale used (in our case, 4).

The resulting coefficient can obtain values between zero and one; as the value approaches one, the item will have a greater content validity [53]. Therefore, one would indicate a perfect agreement between the experts and zero that there is no agreement. The interpretation of the coefficient and the determination of the statistical significance obtained can be evaluated using the tables of critical values published by Aiken in 1985. These tables show that, for a number of twenty questions in which two dimensions have been evaluated, items with an Aiken's V above 0.75 can be accepted as valid ($p < 0.021$).

The criteria for review of the items were: (i) mean values below 4.0 and high standard deviation values; (ii) Aiken's V values below 0.750 [53]; (iii) qualitative observations provided by the judges on the need to change or modify the item.

For the data analysis, the statistical analysis software Microsoft Excel version 2010 and IBM SPSS version 26 were used.

3.3. Participants

The selection of experts is a key element in establishing content validation [51], and therefore the following professional groups were considered suitable for this study: teachers from the Didactics of Science area with research experience on the uses and the consumption of water, professionals from the scientific field related to the environment in general, and, better, to water in particular, and technical staff associated with water management. Finally, the panel of experts consisted of ten Spanish judges, including two professional experts in water technologies, five active members of an environmental NGO, and three university lecturers working on water research.

4. Results

4.1. Content Validation Analysis

Better results were obtained for relevance (M = 4.36; SD =1.01; Aiken's V = 0.84) than for clarity (M = 3.93; SD = 1.19; Aiken's V = 0.75). The items whose clarity values were low also obtained qualitative ratings from the judges to improve its drafting.

Each item was analysed individually by the authors based on their findings of relevance and clarity as well as on the qualitative assessments of the expert panel. An example is shown in Table 4 for Item 10. This item was given a low value for clarity (M = 3.80; SD = 1.03; Aiken's V = 0.70) and high for relevance by the expert panel (M = 4.70; SD = 0.68; Aiken's V = 0.93). The qualitative assessments indicate that the problem resided in the "from the rain" response option, as all water comes from rain. Therefore, it was decided to modify the wording of this option to "directly from the rain".

A similar analysis to that of item 10 was conducted for all items in the initial questionnaire. The suggestions of the panel of experts on the margin of the items were also considered. Finally, four items were discarded, modifications were made to the wording of others, and eleven new items were added. The final questionnaire consisted of a total of 27 items (see Table 5). Of the total number of items in the questionnaire, 11 were presented as multiple choice questions with four, five, and six answer options, thus the questionnaire was made up of a total of 71 variables. The structure of the final questionnaire, indicating the number of variables and response categories for each variable, is shown in Table 6.

Table 4. Expert ratings and proposed changes for Item 10.

Initial draft: *The water I use at home comes from:* *Wells* *The sea* *Rainfall* *Reservoirs* *Others*	
Quantitative evaluation:	
Clarity: Mean: 3.80 Typical deviation: 1.03 Aiken's ***V***: 0.70	Relevance: Mean: 4.70 Typical deviation: 0.68 Aiken's ***V***: 0.93
Qualitative assessments: EXP (JAG) I'm not quite clear about questions 10 and 11. All water comes from rainfall (including this option is a triviality) and then we use it from the aquifers, sea, reservoirs, wells. The answers overlap, as the structures mentioned are intermediate between those not mentioned and the house. EXP (JC): It depends on whether several options can be answered or only one. In Melilla it comes from the sea and the wells and to a certain extent in a small percentage from the rain and we should therefore leave at least two options. EXP (BM): Also including canals? EXP (JCZ): The tap, may be the most common answer, otherwise, the question can be made more specific EXP (FNCA): Put "directly from rain", because indirectly they all come from rain except for marine desalination.	
Amendments made: Quantitative assessments are taken into consideration with respect to clarity and therefore the wording of the item is modified. On the other hand, as regards the multiple response options, the EXP (NACF) assessment is taken into account in changing the response option "from rain" to "directly from rain".	
Final draft: *The water I use at home comes from:* *Wells* *The sea* *Directly from rain* *Reservoirs* *Others (please state where)*	

Table 5. NWC questionnaire final structure.

Contexts	Block	Items
1	Block 1: Water resource protection	1, 2, 3, 4, 5, 6, 7, 8, 9
2, 3	Block 2: Water dimensions	10, 11, 12, 13, 14
4, 5	Block 3: Water management	15, 16, 17, 18, 19, 20, 21
6, 7	Block 4: Personal water-associated actions	22, 23, 24, 25, 26, 27

Table 6. NWC final questionnaire description.

Block 1: Water Resource Protection			
	Items	Nº Variables	Categories
1	The fresh water on Earth is insufficient	1	1: Totally disagree 2: Disagree 3: Agree 4: Totally agree
2	Water scarcity is due to water imbalance	1	
3	Freshwater is not scarce. There is enough for the Earth's inhabitants	1	
4	Water scarcity lies in the quality of available water due to pollution and degradation of the natural environment	1	
5	Reservoirs, desalination plants, dams . . . Enable us to get more water	1	
6	There are desertified areas that require the transfer of water from more water-rich areas	1	
7	In desertified areas, it is necessary to implement technologies and economic activities adapted to the available water	1	
8	The main problems affecting water in Spain are: (a) Scarcity (b) Poor management of water supplied (c) Dumping of waste waters without treatment (d) Poor water quality (e) Environmental degradation	5	
9	The main problems affecting water in Melilla are: (a) Scarcity (b) Poor management of water supplied (c) Dumping of waste waters without treatment (d) Poor water quality (e) Environmental degradation	5	
Block 2: Water Dimensions			
	Items	Nº Variables	Categories
10	The water problem should be solved by: (a) Central Government (b) Local Government (c) The concessionary companies (d) The citizens	4	1: Totally disagree 2: Disagree 3: Agree 4: Totally agree
11	Industrial facilities used to obtain more water damage the environment	1	
12	With climate change, water resources will become increasingly scarce	1	
13	When I am in locations without water problems, I don't mind wasting water because it won't affect the environment	1	
14	The following solutions that are often used to get the water we consume are harmful to the environment: (a) Water transfers (b) Dam building (c) Reservoir construction (d) Desalination plants (e) Construction of independent rainwater collection systems	5	

Table 6. *Cont.*

	Block 3: Water Management		
	Items	Nº Variables	Categories
15	If you were a water manager in your city, you would opt for: (a) More reservoirs to ensure supply (b) Water transfers to ensure supply (c) Controlling water demand and applying stringent costs to those that consume the most (d) Raising citizen awareness to reduce personal, family and professional consumption (e) Reducing leakage in the water networks (f) Reusing treated water	6	1: Totally disagree 2: Disagree 3: Agree 4: Totally agree
16	If you were responsible for water management in Melilla, you would opt for: (a) Building another desalination plant (b) Encouraging water saving (c) Extracting more water from wells (d) Building more reservoirs (e) Reducing leakage in the water networks (f) Reusing treated water	6	
17	The water I use at home comes from: (a) Wells (b) The sea (c) Directly from rain (d) Reservoirs	4	
18	The water we have used goes to: (a) Directly to the sea (b) Directly to the river (c) Irrigation water, after treatment (d) As drinking water, after treatment	4	
19	Water is treated before reaching my home	1	
20	The water that comes from my home must receive treatment	1	
21	Water consumption in Melilla is much higher than the national average	1	
	Block 4: Personal Water-Associated Actions		
	Items	Nº Variables	Categories
22	Given the amount of water on Earth, I don't think it is important to save water	1	1: Totally disagree 2: Disagree 3: Agree 4: Totally agree
23	In Spain we must save water	1	
24	In Melilla we must save water	1	
25	We could save water in homes by: (a) Turning off the tap when brushing my teeth or soaping (b) Using a dishwasher (c) Consuming foods of mainly vegetable origin (d) Reusing shower water for the toilet (e) Buying fewer clothes (f) Consuming less meat	6	
26	In our urban environment we could save water by: (a) Adapting crop types to water availability (b) Adapting ornamental plants to water availability (c) Building independent rainwater collection systems (d) Increasing the production of necessary products instead of importing them (e) Doing away with golf courses (f) Eliminating private swimming pools	6	
27	The following actions affect water availability: (a) Buying a lot of clothing (b) Frequently changing mobile phone, tablet PC, computer, etc. (c) Using plastic bags (d) Cutting down many trees	4	
	Total variables	**71**	

4.2. Psychometric Characteristics of the Final Questionnaire on the New Water Culture

To verify the reliability of the questionnaire applied, it was decided to carry out an analysis of its internal consistency using Cronbach's alpha coefficient and to consider the concurrent criteria validity by means of the corrected total correlation of elements (corrected homogeneity index).

For this analysis, we used a sample of university students who were part of a pilot study. The sample consisted of 56 students who were studying at the Melilla Campus (a small university campus) belonging to the University of Granada (Spain). The sample was slightly feminine (55.4% women), most of them coming from a bachelor's degree course in Humanities and Social Sciences (71.4%), studying for different undergraduate degrees, among which the Bachelor's degree in Primary Education stands out (33.9%), and all of them identified with European culture (100%), although the questionnaire offered other options (for example, Berber culture). The age range was broad, between 19 and 39 years, and the most frequent age was 21 years (21.4%).

The study of internal consistency obtained by the Cronbach's alpha statistic for the whole of the pilot questionnaire yielded an alpha value of 0.913, which represents excellent internal consistency according to the criteria established by George and Mallery [54] (See Table 7).

Table 7. Internal consistency statistics of the questionnaire.

Cronbach's Alpha	Nº of Elements	Mean	Variance	Typical Deviation	Alpha Range if Item Is Removed
0.913	71	214.36	500.670	22.376	0.910→0.915

To obtain the definitive questionnaire, the decision was taken to modify or eliminate those items that showed an increase in Cronbach's alpha when eliminating those items and which had a low homogeneity index ($r < 0.30$) (See Table 8). As shown in Table 8, thirteen items caused a slight increase, in the order of thousandths, of Cronbach's alpha when discarded. These are items 1, 2, 14e, 15b, 15c, 16c, 17c, 17d, 18a, 18b, 19, 22, and 24. Nevertheless, given the loss of information arising from their elimination as well as the very small gain in reliability, it was finally decided to keep all the items of the questionnaire.

Table 8. Statistics relating each item to the total scale.

Item	a*	b**	c***	Item	a*	b**	c***	Item	a*	b**	c***
1	497.116	0.054	0.915	14 a	481.891	0.481	0.911	18 d	478.919	0.453	0.911
2	499.434	0014	0.915	14 b	482.773	0.475	0.911	19	498.839	0.051	0.914
3	483.558	0.380	0.912	14 c	485.111	0.379	0.912	20	490.399	0.232	0.913
4	492.016	0.260	0.913	14 d	487.677	0.355	0.912	21	491.906	0.273	0.913
5	496.191	0.140	0.913	14 e	496.306	0.070	0.915	22	497.481	0.077	0.914
6	495.755	0.147	0.913	15 a	488.646	0.281	0.913	23	497.053	0.201	0.913
7	494.439	0.232	0.913	15 b	492.395	0.185	0.914	24	499.361	0.024	0.914
8 a	494.046	0.197	0.913	15 c	490.410	0.200	0.914	25 a	491.671	0.461	0.912
8 b	488.119	0.375	0.912	15 d	484.773	0.539	0.911	25 b	484.618	0.345	0.912
8 c	491.000	0.413	0.912	15 e	487.325	0.443	0.912	25 c	488.016	0.256	0.913
8 d	487.008	0.311	0.912	15 f	484.134	0.511	0.911	25 d	473.817	0.667	0.909
8 e	487.901	0.508	0.911	16 a	489.345	0.266	0.913	25 e	472.253	0.571	0.910
9 a	482.525	0.492	0.911	16 b	488.615	0.518	0.912	25 f	473.034	0.540	0.910
9 b	486.977	0.408	0.912	16 c	494.670	0.132	0.914	26 a	481.406	0.624	0.910
9 c	485.252	0.446	0.911	16 d	493.070	0.189	0.913	26 b	483.145	0.537	0.911
9 d	485.397	0.456	0.911	16 e	489.272	0.472	0.912	26 c	487.000	0.542	0.911
9 e	477.688	0.677	0.910	16 f	486.670	0.544	0.911	26 d	482.220	0.439	0.911
10 a	487.457	0.420	0.912	17 a	491.268	0.207	0.913	26 e	478.899	0.485	0.911
10 b	485.543	0.433	0.912	17 b	479.288	0.401	0.912	26 f	479.090	0.488	0.911
10 c	485.413	0.379	0.912	17 c	491.737	0.173	0.914	27 a	479.245	0.439	0.911
10 d	483.422	0.351	0.912	17 d	491.701	0.167	0.914	27 b	475.470	0.502	0.911
11	481.122	0.640	0.910	18 a	492.364	0.158	0.914	27 c	478.192	0.608	0.911
12	488.891	0.337	0.912	18 b	496.897	0.067	0.915	27 d	475.145	0.694	0.910
13	489.261	0.301	0.912	18 c	487.039	0.329	0.912				

a*. Variance of the scale if the element is removed; b**. Total correlation of items corrected; c***. Cronbach's alpha if the item is removed.

Therefore, the 27 items (71 variables) described in Table 6 for the final questionnaire are maintained in the final questionnaire as well as their organisation in the four content blocks described in Table 5.

5. Discussion and Conclusions

In a system of democratic governance over water policies, citizens are required to be knowledgeable about water and the challenges posed by the new paradigm called "New Water Culture". This knowledge should begin to be acquired in schools, where the subject of water could be introduced as a socio-scientific controversy [55] capable of contributing to the acquisition of basic skills.

After twenty years of existence of the NWC, we ask ourselves whether anything of this new philosophy and conceptualisation of the importance of this element has reached schools and citizens. To this end, in this work, we proposed the design and the validation of a questionnaire that serves not only to investigate knowledge about water, but, above all, to discriminate whether or not this knowledge is in accordance with the conceptions advocated by the NWC. The road to this has not been easy. Water is a complex subject with strong conceptual, procedural, and attitudinal (especially emotional) interrelationships.

As a subject of social scientific controversy, the first problem was the identification of theoretical contexts that could serve to distinguish between the old and the NWC. Summarising the most valuable dichotomous options to discriminate between the two conceptions is not a simple task but is rather quite risky. In section two of this work, a proposal is made in which seven theoretical contexts were differentiated based on the Water Framework Directive [7–9] and from which, in its aspect of the new culture, water must be appreciated as what it is—the most important substance of nature and essential for human survival of all living beings and of the planet. We must take care of every last drop of it and manage its demand in an appropriate way to sustain our needs without having to resort to expanding the supply. The theoretical contexts are:

- Context 1. Water imbalance vs. natural balance
- Context 2. Productive factor vs. eco-social asset
- Context 3. Water governability vs. water governance
- Context 4. Supply management vs. demand management
- Context 5. Cost–benefit vs. cost–effectiveness
- Context 6. Water as a human right vs. human duty
- Context 7. Consumerism vs. responsible and sustainable consumption

These contexts were grouped into four blocks: (i) water resource protection; (ii) dimensions of water; (iii) water management; and (iv) personal actions associated with water. This theoretical framework has allowed the design of an initial questionnaire as a tentative proposal to satisfy the intended objectives of evaluating knowledge about the NWC. Nevertheless, the judgement of experts has been of great help in the process of evaluating and making proposals for improvement on the quality and the relevance of the items. We fully agree with other authors [51] on the importance of the appropriate choice of judges, especially in such specific areas as this. In addition, having the items associated with the theoretical blocks and contexts has obvious advantages in identifying the most problematic aspects associated with NWC.

The questionnaire finally drawn up has 27 items and 71 variables to be answered in a Likert scale with values between 1 and 4.

This questionnaire is a useful tool to investigate the knowledge of citizens in the city of Melilla about water culture. However, it has limitations for use in other contexts. For example, items 9, 10, 16, 21, and 24, related to Melilla, should be suitably adapted. Likewise, items 8, 15, and 23, related to Spain, should be reformulated when the questionnaire is administered in another country. Nevertheless, the structure of the four blocks and the theoretical contents underlying their construction are useful tools for any context.

A pilot study on 56 students from Melilla indicated good psychometric results with regard to internal consistency (Cronbach's alpha = 0.913) and criteria validity.

This work is a first step towards achieving our ultimate goal, which is to contribute to improving water culture, which should help reduce water consumption and enable a more equitable water consumption. Although previous questionnaires were available to investigate students' water knowledge [35,37,45], in no case had the questionnaire been designed from the broad perspective provided by the new water culture, and the instrument used had not been validated.

This questionnaire is now being applied to a much larger sample of citizens and university students to inquire into their knowledge of the NWC. We advance, however, that it would be an illusion to think that achieving the new water cultures is a simple task. Profound changes are needed that explain associations between water and sustainability [56] and a thorough cultural revolution such as that advocated by Mayor Zaragoza [57].

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References

1. World Economic Forum. Available online: http://www3.weforum.org/docs/WEF_Global_Risks_Report_2019.pdf (accessed on 30 December 2020).
2. Pérez, R. La Nueva Cultura del Agua, el camino hacia una gestión sostenible. Causas e impactos a la crisis global del agua. *Cuad. Trab. Hegoa* **2015**, *68*, 1–53. Available online: https://ojs.ehu.eus/index.php/hegoa/article/view/15672 (accessed on 17 February 2021).
3. Martínez, A.; Búrquez, A.; Calmus, T. Disyuntivas: Impactos ambientales asociados a la construcción de presas. *Región Soc.* **2012**, *3*, 289–307. Available online: https://dialnet.unirioja.es/servlet/articulo?codigo=4121723 (accessed on 17 February 2021).
4. Rodríguez-Estrella, T. The problems of overexploitation of aquifers in semi-arid areas: Characteristics and proposals for mitigation. *Boletín Geológico Min.* **2014**, *125*, 91–109.
5. Martínez, J. Los problemas del agua en España: Análisis de una realidad. *ECT* **2007**, *15*, 228–239. Available online: https://www.raco.cat/index.php/ECT/article/view/121179 (accessed on 17 February 2021).
6. Arrojo, P. El reto ético de la crisis global del agua. *Relac. Int.* **2009**, *12*, 33–53. Available online: http://hdl.handle.net/10486/678179 (accessed on 17 February 2021).
7. Kantauriko Urkidetza. El agua, Patrimonio de Todos. *Una Excursión por los Principios de la Directiva Marco del Agua.* Available online: https://www.kantaurikourkidetza.net/pdf/El_agua_patrimonio_de_todos.pdf (accessed on 30 December 2020).
8. Galván, L.; Pérez, J. Una propuesta educativa para trabajar el agua desde la educación ambiental bajo la perspectiva de la nueva cultura del agua y los servicios eco sistémicos. In Proceedings of the CONAMA 2014, Congreso Nacional del Medio Ambiente, Madrid, Spain, 24–27 November 2014; Fundación CONAMA: Madrid, Spain; pp. 1–24. Available online: http://www.conama2014.conama.org/conama2014/download/files/conama2014/CT%202014/1896711391.pdf (accessed on 17 February 2021).
9. Pérez, R. La Nueva Cultura del Agua, camino a la sostenibilidad en las aulas de enseñanza técnica superior. *Ikastorratza. e-Revista Didáctica* **2016**, *17*, 31–44. Available online: https://dialnet.unirioja.es/servlet/articulo?codigo=5761134 (accessed on 17 February 2021).
10. Tàbara, J.D.; Ilhan, A. Culture as trigger for sustainability transition in the water domain: The case of the Spanish water policy and the Ebro river basin. *Reg. Environ. Chang.* **2008**, *8*, 59–71. [CrossRef]
11. Bukowski, J. A "new water culture" on the Iberian Peninsula? Evaluating epistemic community impact on water resources management policy. *Environ. Plan. C Politics Space* **2016**, *35*, 239–264. [CrossRef]
12. Bukowski, J.J. The science-policy interface: Perceptions and strategies of the Iberian 'New Water Culture' expert community. *Water Altern.* **2017**, *10*, 1–21.

13. Vörösmarty, C.J.; Rodríguez-Osuna, V.; Cak, A.D.; Bhaduri, A.; Bunn, S.E.; Corsi, F.; Gastelumendif, J.; Green, P.; Harrison, I.; Lawford, R.; et al. Ecosystem-based water security and the Sustainable Development Goals (SDGs). *Ecohydrol. Hydrobiol.* **2018**, *18*, 317–333. [CrossRef]
14. Kerry, A.W.; Blackstock, K.L.; Tindale, S.J.; Juárez-Bourke, A. Governing Integration: Insights from Integrating Implementation of European Water Policies. *Water* **2019**, *11*, 598. [CrossRef]
15. Di Baldassarre, G.; Sivapalan, M.; Rusca, M.; Cudennec, C.; Garcia, M.; Kreibich, H.; Konar, M.; Mondino, E.; Mård, J.; Pande, S.; et al. Sociohydrology: Scientific challenges in addressing the sustainable development goals. *Water Resour. Res.* **2019**, *55*, 6327–6355. [CrossRef] [PubMed]
16. Lambert, A.O. International Report: Water losses management and techniques. *Water Supply* **2002**, *2*, 1–20. [CrossRef]
17. Gupta, A.; Kulat, K.D. A selective literature review on leak management techniques for water distribution system. *Water Resour. Manag.* **2018**, *32*, 3247–3269. [CrossRef]
18. Giudicianni, C.; Herrera, M.; Di Nardo, A.; Adeyeye, K. Automatic multiscale approach for water networks partitioning into dynamic district metered areas. *Water Resour. Manag.* **2020**, *34*, 835–848. [CrossRef]
19. Rathi, S.; Gupta, R.; Ormsbee, L. A review of sensor placement objective metrics for contamination detection in water distribution networks. *Water Supply* **2015**, *15*, 898–917. [CrossRef]
20. Ilaya-Ayza, A.E.; Martins, C.; Campbell, E.; Izquierdo, J. Implementation of DMAs in intermittent water supply networks based on equity criteria. *Water* **2017**, *9*, 851. [CrossRef]
21. Rebelion. Declaración Europea por una Nueva Cultura del Agua. Available online: https://rebelion.org/docs/12117.pdf (accessed on 30 December 2020).
22. United Nations. Internacional Decade for Action 'Water for Life' 2005–2015. Available online: https://www.un.org/waterforlifedecade/index.shtml (accessed on 4 February 2021).
23. Martínez, J. La nueva cultura del agua en un mundo de crisis. In *El Agua, Derecho Humano y Raíz de Conflictos*; Fundación Seminario de Investigación para la Paz, Ed.; Gobierno de Aragón, Departamento de Educación, Cultura y Deporte: Aragón, Spain, 2008; pp. 547–564. Available online: https://seipaz.org/wp-content/uploads/AguaDerechoHumano.pdf (accessed on 17 February 2021).
24. Arrojo, P. Hacia una Nueva Cultura del Agua coherente con el desarrollo sostenible. In *Ecología: Políticas y Perspectivas de Futuro*; Araujo, J., Ed.; Junta de Andalucía, Consejería de Medio Ambiente: Sevilla, Spain, 2001; pp. 118–162. Available online: http://www.juntadeandalucia.es/medioambiente/consolidado/publicacionesdigitales/40-590_ECOLOGIA-_PERPECTIVAS_Y_POLITICAS_DE_FUTURO/40-590/6_HACIA_UNA_NUEVA_CULTURA_DEL_AGUA_COHERENTE.PDF (accessed on 17 February 2021).
25. Arrojo, P. La Nueva Cultura del Agua del siglo XXI. In Proceedings of the Caja Azul de la Tribuna del Agua, Expo Zaragoza 2008, Zaragoza, Spain, 14 August 2008; pp. 1–46. Available online: https://www.zaragoza.es/contenidos/medioambiente/cajaAzul/palabras/Arrojo_ES.pdf (accessed on 17 February 2021).
26. Aguilera, F. Hacia una nueva economía del agua: Cuestiones fundamentales. *Polis* **2006**, *14*, 1–17. Available online: https://journals.openedition.org/polis/5044 (accessed on 17 February 2021).
27. WWDP. Informe Mundial de las Naciones Unidas Sobre el Desarrollo de los Recursos Hídricos 2006: El agua, una Responsabilidad Compartida. Available online: http://www.unesco.org/new/es/natural-sciences/environment/water/wwap/wwdr/ (accessed on 17 February 2021).
28. PNUD. Objetivos de Desarrollo Sostenible. Programa de las Naciones Unidas para el Desarrollo. Available online: https://www.undp.org/content/undp/es/home/sustainable-development-goals.htm (accessed on 30 December 2020).
29. Peñas, V.; Masip, I. Agua y desarrollo: El reto de la conservación del medio hídrico. *Cuadernos Bakeaz* **2010**, *97*, 1–16. Available online: http://centroderecursos.alboan.org/es/registros/5832-agua-y-desarrollo-el (accessed on 17 February 2021).
30. Arrojo, P. Crisis global del agua: Valores y derechos en juego. *Cuad. CiJ* **2010**, *168*, 3–31. Available online: https://www.cristianismeijusticia.net/es/crisis-global-del-agua-valores-y-derechos-en-juego (accessed on 17 February 2021).
31. Howard, G.; Bartram, J. Domestic Water Quantity, Service Level and Health. World Health Organitation, 2003. Available online: https://www.who.int/water_sanitation_health/diseases/WSH03.02.pdf?ua=1 (accessed on 4 February 2021).
32. Castelltor, A. Actividades que contribuyen a la promoción de una nueva cultura ambiental del agua. *Comunicações* **2015**, *22*, 363–389. Available online: file:///C:/Users/usuario/AppData/Local/Temp/2340-11783-1-PB-1.pdf (accessed on 17 February 2021). [CrossRef]
33. Casajús, L. Nuevos paradigmas en la gestión del agua en España. Crisis de gobernabilidad del agua en Aragón. Los Conflictos de Yesa y Matarraña. Ph.D. Thesis, Universidad Autónoma de Barcelona, Barcelona, Spain, 2009. (In Spanish).
34. Castelltort, A.; Sanmartí, N. Nuevos retos para educar a favor de una nueva cultura ambiental del agua. *Revista Educ@rnos* **2016**, *22–23*, 75–96. Available online: https://www.researchgate.net/publication/311986444_Nuevos_retos_para_educar_a_favor_de_una_nueva_cultura_ambiental_del_agua (accessed on 4 February 2021).
35. Fernández-Arroyo, J. La construcción del conocimiento sobre la gestión y la contaminación del agua. Concepciones del alumnado de Primero de Bachillerato. Ph.D. Thesis, Universidad de Sevilla, Sevilla, Spain, 2012. (In Spanish).
36. Jaén, M.; Palop Navarro, E. ¿Qué piensan y cómo actúan los alumnos y profesores de un Centro de Educación Secundaria sobre la gestión del agua, la energía y los residuos? *Enseñanza Cienc.* **2011**, *29*, 61–74. Available online: https://raco.cat/index.php/Ensenanza/article/view/243823/353426 (accessed on 17 February 2021).

37. López, C. La Enseñanza-Aprendizaje del Agua en el Contexto de un Desarrollo Sostenible. Su Aplicación en la Enseñanza Secundaria. Ph.D. Thesis, Universidad de Valencia, Valencia, Spain, 2007.
38. INE. Melilla. Población por Sexos y Municipios. Available online: https://www.ine.es/jaxiT3/Datos.htm?t=2909#!tabs-tabla (accessed on 30 December 2020).
39. Oficina Técnica de Recursos Hídricos. *Estadísticas Agua Año 2018*; Consejería de Medio Ambiente y Sostenibilidad de la Ciudad Autónoma de Melilla: Melilla, Spain, 2018.
40. INE. Encuesta Sobre el Suministro y Saneamiento del Agua. Año. 2018. Available online: https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736176834&menu=ultiDatos&idp=1254735976602 (accessed on 30 December 2020).
41. Hopkins, D. *Investigación en el Aula. Guía del Profesor*; Promociones y Publicaciones Universitarias: Barcelona, Spain, 1989; ISBN 84-7665-512-6.
42. Anguera, M.T. Metodología observacional. In *Metodología de la Investigación en Ciencias del Comportamiento*; Arnau, J., Anguera, M.T., Eds.; Universidad de Murcia: Murcia, Spain, 1990; pp. 125–236. ISBN 84-7684-958-3.
43. Davidson, P.R.; Parker, K.C.H. Eye movement desensitization and reprocessing (EMDR). A meta-analysis. *J. Consult. Clin. Psychol.* **2001**, *69*, 305–316. [CrossRef]
44. León, O.G.; Montero, I. *Diseño de Investigaciones. Introducción a la Lógica de la Investigación en Psicología y Educación*, 2nd ed.; McGraw-Hill Interamericana de España: Madrid, Spain, 1997; ISBN 84-481-0171-5.
45. Roda, V.M.; Sánchez, M.D. ¿Qué saben los alumnos de Secundaria sobre la potabilización del agua? Elaboración de un cuestionario. In *La Didáctica de las Ciencias. Tendencias Actuales*; Universidade da Coruña, Servizo de Publicacións: A Coruña, Spain, 1999; pp. 449–462. Available online: https://ruc.udc.es/dspace/bitstream/handle/2183/10870/CC%2050%20art%2032.pdf?sequence=1&isAllowed=y (accessed on 17 February 2021).
46. Abad, F.J.; Olea, J.; Ponsoda, V.; García, C. *Medición en Ciencias Sociales y de la Salud*; Síntesis: Madrid, Spain, 2011; ISBN 978-84-975672-7-5.
47. Sireci, S.G. Gathering and analyzing content validity data. *Educ. Assess.* **1998**, *5*, 299–321. [CrossRef]
48. Osterlind, S.J. *Constructing Test Item: Multiple-Choice, Constructed-Response, Performance, and Other Formats*, 2nd ed.; Kluwer Academic Publishers: Boston, MA, USA, 1989.
49. Aiken, L.R. Content validity and reliability of single items or questionnaires. *Educ. Psychol. Meas.* **1980**, *40*, 955–959. [CrossRef]
50. Aiken, L.R. Three coefficients for analyzing the reliability and validity of ratings. *Educ. Psychol. Meas.* **1985**, *45*, 131–142. [CrossRef]
51. Pedrosa, I.; Suárez-Álvarez, J.; García-Cueto, E. Evidencias sobre la validez de contenido: Avances teóricos y métodos para su estimación. *Acción Psicológica* **2013**, *10*, 3–20. [CrossRef]
52. Penfield, R.D.; Giacobbi, P.R., Jr. Applying a score confidence interval to Aiken's item content-relevance index. *Meas. Phys. Educ. Exerc. Sci.* **2004**, *8*, 213–225. [CrossRef]
53. Escurra, L.M. Cuantificación de la validez de contenido por criterio de jueces. *Rev. Psicol.* **1988**, *6*, 103–111.
54. George, D.; Mallery, P. *SPSS for Windows Step by Step: A Simple Guide and Reference 11.0 Update*, 4th ed.; Allyn & Bacon: Boston, MA, USA, 2003.
55. Martínez, L.F.; Parga, D.L. *Discurso Ético y Ambiental Sobre Cuestiones Sociocientíficas: Aportes Para la Formación del Profesorado*; Universidad Pedagógica Nacional: Bogotá, Colombia, 2013; ISBN 978-958-8650-44-9.
56. Vilches, A.; Gil-Pérez, D. Agua y sostenibilidad: Dos términos inseparables. In *Agua y Sostenibilidad: Recursos, Riesgos y Remedios*; Moreno, A., López, C., Eds.; MECD: Madrid, Spain, 2009; pp. 183–230. Available online: file:///C:/Users/usuario/AppData/Local/Temp/Agua%20y%20sostenibilidad.pdf (accessed on 17 February 2021).
57. Mayor Zaragoza, F. *Un Mundo Nuevo*; UNESCO: Barcelona, Spain, 2000; ISBN 848109305X.