

# The Effectiveness of a Cognitive-Behavioral Program to Develop the Awareness of Secondary School Students in Mainstream Schools About Methods of Rationalizing Water Consumption as An Input to Achieving the Goals of Sustainable Development

Nagafa Rezk Abd Elgleel Abd Elnaby<sup>1</sup> and Fadya Rezk Abd elgalil Abdelnaby<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of Home Economics College of Education - Najran University, KSA

<sup>2</sup>Assistant Professor, Department of Special Education, College of Education Najran University, Najran, KSA

nrabdelnaby@nu.edu.sa<sup>1</sup> and frabdalgilel@nu.edu.sa<sup>2</sup>

## ABSTRACT

The aim of the research is to identify "the extent of the effectiveness of a cognitive behavioral program to develop the awareness of secondary school students in integration schools of methods of rationalizing water consumption as an input to achieve the goals of sustainable development. The experimental approach was used and applied to (40) students, 20 of the ordinary students and 20 of the students with hearing disabilities integrated in the stage. The secondary school students were divided into 4 groups, 2 experimental and 2 control groups, each consisting of 10 students. The tools included a questionnaire of awareness of methods of rationalizing water consumption, consisting of eleven dimensions, and these dimensions, in order, are: showering, using the toilet, brushing teeth, washing clothes, in the kitchen, using The faucet in general, cleaning the house, watering the garden plants, washing the car, at school, water recycling, and a cognitive-behavioral program to develop the awareness of secondary school students in integration schools about methods of rationalizing water consumption. The results indicate the effectiveness of the program in developing the awareness of ordinary secondary school students and those with hearing disabilities in mainstream schools about methods of rationalizing water consumption. In the post and follow-up measurement, the two researchers recommended several recommendations, including the need to include methods of rationalizing water consumption, goals and the importance of sustainable development in the curricula.

**Keywords:** Program - integration schools - women with hearing disabilities - ways to rationalize domestic water consumption - sustainable development.

## INTRODUCTION

Water is considered one of the most important natural resources on earth. It is the lifeblood and the secret of its survival. Without it, life would not exist and its pulse would stop. Therefore, the United Nations celebrates World Water Day annually on March 22 as a way to focus attention on the importance of water,

especially fresh, potable water, and call for sustainable management of it as a resource that matters. All countries of the world and present and future generations.

It is known that most of the water resources on Earth (97%) are salty water, while only 3% is fresh water, and more than two-thirds of fresh water resources are in frozen form, while the rest of non-

freezing fresh water resources are found in groundwater, or in the form of lakes, rivers and water vapor.

The Middle East and North Africa region is considered the most water scarce in the world - some countries depend heavily on groundwater, while others depend heavily on trans boundary rivers - more than 60% of its population lives in areas with high or very high levels of surface water stress, compared to the global average of about 35%. Although the challenges of water scarcity in the region have been evident for thousands of years, there are new challenges that add other risks and complications. The complexities of the water-food-energy nexus, climate change, droughts and floods, water quality, trans boundary water management, and water management in situations of fragility, conflict and violence all exacerbate the challenge of water scarcity. Addressing these challenges will depend on improving water resource management as much as it depends on increasing and improving available resources or investments in infrastructure or technologies. (World Bank, 2017).

Most regions of the Arab world suffer from water scarcity, due to its location in the arid and semi-arid regions of the globe. With the growth of the population in the Arab world, the problem of scarcity is exacerbated as a logical consequence of the increasing demand for water to meet domestic, industrial and agricultural needs. It is estimated that the per capita share of specific water resources in the Arab world does not exceed 1150 cubic meters per year, which is much lower than the average per capita share at the global level, which amounts to more than 7600 cubic meters per year. Thus, the per capita share at the national level is less than the poverty

line. water, which is estimated at 1200 cubic meters per year. (Hmaidan and Khalaf, 2006) Despite this scarcity, we find that the consumption of water by households in the Middle East for domestic uses is 19% more than the consumption of households in Europe (Krinner et al. 1999).

The Kingdom of Saudi Arabia has limited reserves of exploitable non-renewable groundwater, as well as low recharge rates, due to the arid climatic conditions. The Kingdom's water requirements (estimated at 24.8 billion cubic meters in 2015) are witnessing a steady annual increase of 7%. In light of the high dependence on desalination (60% of the total water supply in the urban sector), in addition to the current subsidies, this sector imposes many burdens on the national economy, and the relatively high unit cost of production is also high due to the high transportation costs during pumping water from the coasts to inside. The sector also relies heavily on fuel. In addition, desalination leaves a vast environmental footprint. (Ministry of Environment, Water and Agriculture, 2018).

The problems of fresh water shortage in the Kingdom are not limited to being an environmental problem that can be faced with economic methods, but rather it is a set of complex data that resulted in a complex problem that needs to be confronted by all segments of society, so the Kingdom of Saudi Arabia faces a great challenge due to the unsustainable use of water resources as well as about the limited stock of non-renewable groundwater. Despite this, many individuals waste water without awareness of the fact that it is permeable, as water depletion results in many dangers that threaten development plans and the lives of individuals in the

present and future. Clark and Finley (2007) demonstrated that awareness of future water shortages and a positive environmental attitude have a significant impact on water conservation behaviour. Willis et al (2011) found a significant positive relationship between general environmental attitudes and water conservation behaviour.

The negative behavior of individuals, intentionally or unintentionally, and during their daily dealings with water affects the exacerbation of the problem of fresh water shortage and changes in its quality in a way that impedes full use of it, and these negative behaviors of individuals result from their lack and low awareness of water consumption (Al-Maalouli, 2013). Therefore, the only way to address the water problem is to educate citizens at all levels of culture and age of the importance of rationalization in the use of water by various means to urge and work to change the pattern of consumption (Al-Obeidi, 2011). Therefore, rationalizing the consumption of the available water and raising the efficiency of its use as a necessity of life must be worked on in order to meet the needs of the growing population. Rationalization of water consumption is the individual's consumption of the amount of water he needs in a conscious and efficient manner so as to reduce waste from the water he uses without affecting his water share or his basic needs (Arabiyat and Mazahrah 2010). The various stakeholders are making great efforts to raise the levels of awareness and positive behavior. The study of Ghoneimi and Cleo (2009) recommended the development of a plan to rationalize water consumption and follow up the implementation of the mechanisms of this plan accurately,

sincerely, without complacency and in a sustainable manner, as well as the development of an integrated rationalization media plan that addresses the conscience of every citizen and expatriate to rationalize consumption Water as a national and religious duty.

Preserving water wealth is an essential part of preserving the environment and sustainable development, which is the way to protect resources for the benefit of current and future generations. The Kingdom's vision statement in the National Water Strategy 2030 is: "A sustainable water sector that develops and preserves water resources, preserves the environment, and provides safe supply and high-quality services." Quality and efficiency contribute to economic and social development. The study of Gue, et al (2019) indicated that the sustainable development of water resources includes several research areas, including the efficient use of water resources, and this requires changing water management practices to ensure a better level of service delivery and the sustainability of water uses.

Among the sectors that are being focused on is the domestic water sector - and as it is known - the basic uses of domestic water include drinking water, cooking, washing utensils, clothes, cleaning, showering and toilet drainage, as well as using it outside the home to irrigate the home garden, wash the car, in swimming pools, and others. Of entertainment. Of course, the quantities used for each of these uses vary. In general, the water consumed in irrigation of home gardens takes center stage, followed by the uses of washing clothes, showering, and toilet drainage in varying proportions. The pure water required for drinking and cooking

does not exceed more than ten liters per person per day. (Saleh, 2018).

Studies have indicated that bad consumer habits, which are predominantly wasteful and extravagant in the use of drinking water other than what is allocated for it, have negatively affected water consumption in society (Abdullah, 2010) It was found that the socio-demographic characteristics of the household and the individual can significantly influence household water consumption. Influencing factors include income, age, belief, gender, number of family members, etc. Many scholars have studied the relationship between household income and water consumption. It turns out that the higher the income, the higher the water consumption (Otaki, et al, 2017). Higher-income families often own more water equipment, such as dishwashers, washing machines, swimming pools, and outdoor garden watering facilities, than lower-income families (Lam, 2006). Age, family composition and education also affect water use. Studies show that the water consumption of families with many adolescents is generally high, mainly because the water consumption of adolescents to pursue more comfortable living habits is much greater than that of the elderly (Nauges and Thomas.2000).

Therefore, attention must be paid to spreading awareness of the rational use of water and methods of rationalization (Abd El-Latief, Saleh, 2020). Where the awareness of the population to save water has a significant impact on the conservation of water resources that flow from the tap and can be recycled to flush the toilet (Dong, et al, 2022). In this regard, several studies recommend the use of water-saving devices and the development of water management

strategies using various tools, means and programs that control water consumption, such as water-saving plumbing fixtures, rainwater collection and wastewater recycling as much as possible (Ali, et al 2020). (Damanhour, 2012).

One of the main factors in ensuring sustainable water supply is the preservation of water at the household level (Savari, et al, 2022). However, Muhammad's study (2020) showed that there is a lack of awareness among citizens of the need to rationalize water consumption in all their life uses. Thus, there is a general weakness in the culture of rationalization in water consumption (Al-Shatnawy, 2020).

Therefore, attention must be paid to spreading the culture of rationalizing water consumption in life matters through educational institutions. Education is one of the most basic and necessary ways, whether to inculcate and consolidate a culture of rationalization, or to develop environmental and water awareness, or to achieve sustainable development goals. Secondary education is one of the most important appropriate educational environments that possess Many advantages for students to acquire these knowledge, concepts, trends and values, which contribute to achieving sustainable development of water resources (Atris, 2020). Encouraging water conservation in schools is one of the potential mechanisms for changing people's awareness and attitudes towards water (World Bank, 2017).

In integration schools, there are ordinary female students with people with disabilities, including hearing impairment, who have lost their sense of hearing as a result of genetic or health conditions or problems with pregnancy and childbirth

and have severe hearing impairment of 70 decibels or more to the point that they cannot hear the spoken language and do not hear the pronunciation to different degrees and use communication. The totality of sign language, lip reading, the alphabet, and body language to communicate with others (Al-Zahrani et al. 2022). Inclusion includes receiving education in the same place as their hearing peers, while providing them with additional services and individual programs according to their abilities and needs (Burked & Sutherland, 2004).. Recent studies have proven that there is no difference between the deaf and the normal individual in the characteristics of physical growth in terms of growth rate, i.e. the speed of growth and physical changes in height and weight in all stages of development that the deaf child goes through, so he is just like his normal counterpart (Al-Nubi, 2018).

Thus, women with hearing disabilities are considered as ordinary women in need of knowledge and information that helps them in the practices of daily life, and to meet their needs. Among the resources that are dealt with on an ongoing basis is water. Therefore, it is necessary to inculcate in them the knowledge and skills of rationalizing water consumption and developing their water awareness and its role in sustainable development. And introducing them to the positive behaviors that must be followed when dealing with water, and that rationalizing water is a civilized aspect, and a legitimate duty for every taxpayer. And that the positive behaviors of a person for a Muslim prevent wasting water and spoiling its quality (Abdullah 2022).

And since the school curricula do not give the issue of rationalizing water

consumption the greatest importance, Al-Shatnawy ( 2020). Therefore, must develop the awareness of secondary school students in integration schools of methods of rationalizing domestic water consumption while bathing, using the toilet, brushing teeth, washing clothes, in the kitchen, using the tap in general, cleaning the house, watering home garden plants, washing the car, at school And how to recycle water as an entry point for sustainable development through a behavioral knowledge program.

#### **Research Aims:**

The research mainly aims to identify "the effectiveness of a cognitive-behavioral program to develop the awareness of secondary school students in mainstream schools about methods of rationalizing water consumption as an entry point to achieving the goals of sustainable development." The following objectives branch out from it:

- 1- Planning and implementing a cognitive behavioral guidance program to develop the awareness of secondary school students in integration schools about methods of rationalizing water consumption.
- 2- Designing a measure to develop students' awareness of methods of rationalizing water consumption.
- 3- Detecting the extent of the effectiveness of the cognitive-behavioral program in developing the awareness of ordinary secondary school students in integration schools of methods of rationalizing water consumption in post-measurement.
- 4- Verifying the continuity of the cognitive-behavioral program in developing the awareness of ordinary secondary school students in integration schools of methods of rationalizing

water consumption after applying the program in follow-up measurement.

- 5- Exposing the extent of the effectiveness of the behavioral cognitive program in developing the awareness of secondary school students with hearing disabilities in integration schools of methods of rationalizing water consumption in post-measurement.
- 6- Verifying the continuity of the cognitive-behavioral program in developing the awareness of secondary school students with hearing disabilities in integration schools of methods of rationalizing water consumption after applying the program in follow-up measurement.

#### **Methodology and Procedures:**

This part deals with the study procedures, starting with the study curriculum, the community to which the study was applied, the study tool and its construction, and the statistical methods by which the validity and reliability of the scale were calculated, and finally comes the statistical methods used in the study, which are used to answer the questions of this study.

#### **First - Research Methodology:**

The current research relies on the semi-experimental approach as an experiment aimed at identifying a program based on behavioral cognitive counseling (independent variable) to develop awareness of water consumption rationalization methods (dependent variable) for ordinary students with hearing disabilities integrated in the secondary stage, in addition to using the experimental design with two equal groups ( Experimental and control) to find out the effect of the program (post-measurement) on the research variables, as well as using the one-group design to find out the

continuity of the effect of the program after the follow-up period (follow-up measurement of the experimental group).

#### **Secondly, the Research Community:**

The research community consists of all female students in the secondary stage in the Najran region.

#### **Third, the Study Sample:**

1- An exploratory sample: The exploratory sample consisted of (30) ordinary female students in the secondary stage and those with hearing disabilities, and a measure of awareness of methods of rationalizing water consumption was applied to them to calculate the psychometric characteristics of the scale. Their age ranged between (15-18) years, with an average age of ( 16.34) and standard deviation (1.16).

2- Final sample: which consisted of (40) normal students and those with hearing disabilities integrated in the secondary stage. The sample was divided randomly into four groups (10) as an experimental group of normal girls, (10) as an experimental group of women with hearing disabilities, and (10) as a control group of Ordinary female students and (10) as a control group of female students with hearing disabilities integrated in the secondary stage, their ages ranged between (15-18) years, ordinary students in the secondary stage, with an average age of (16.15) and a standard deviation (1.18). The ages of the integrated students with hearing disabilities in the secondary stage ranged between Between (15-18) years, with an average age of (16.80) and a standard deviation (1.10).

Fourth - Equivalence between the members of the experimental and control groups:

Equal for ordinary students

The equivalence between the experimental and control groups was conducted among female students of normal age and awareness of methods of rationalizing water consumption, for the members of the

experimental and control groups before applying the program, using the Mann-Whitney test to verify the equivalence of the two groups in each of the following:

**Table (1):** The significance of the differences between the averages of the chronological age ranks and methods of rationalizing water consumption among ordinary female students, the experimental and control groups

Variables	groups	n	Rank average	Total ranks	U value	Z value	significance level
chronological age	Experimental	10	10,40	104,00	49.000	-	0.937
	Control	10	10.60	106.00		0.079	
Awareness of ways to rationalize water consumption	Experimental	10	12.1	121	34.000	-	0.216
	Control					10	

□ The tabular value of (Z) at the level of significance (0.01) is equal to (2.57). □ The tabular value of (Z) at the level of significance (0.05) is equal to (1.96).

It is clear from Table (1) that the calculated Z value is less than the tabular value (1.96), which indicates that there are no statistically significant differences between the averages of the chronological age ranks and awareness of methods of rationalizing water consumption, for members of the experimental and control groups of ordinary female students at the secondary stage.

2-Equivalence of integrated students with hearing disabilities

Equivalence was conducted between the experimental and control groups for students with hearing disabilities who are integrated in chronological age and awareness of methods of rationalizing water consumption, for the members of the experimental and control groups before applying the program, using the Mann-Whitney test to verify the equivalence of the two groups in each of the following:

**Table (2)** The significance of the differences between the averages of the chronological age ranks and the methods of rationalizing water consumption among the integrated students with hearing disabilities, the experimental and control groups.

Variables	groups	n	Rank average	Total ranks	U value	Z value	significance level
chronological age	Experimental	10	8.90	89.00	34.000	-1.258	0.209
	Control	10	12.1	121.0			

				0			
Awareness of ways to rationalize water consumption	Experimental	10	12.4	124	31.000	-1.453	0.146
	Control	10	8.6	86			

□ The tabular value of (Z) at the level of significance (0.01) is equal to (2.57).

□ The tabular value of (Z) at the level of significance (0.05) is equal to (1.96).

It is clear from Table (2) that the calculated Z value is less than the tabular value (1.96), which indicates that there are no statistically significant differences between the averages of the chronological age ranks and awareness of methods of rationalizing water consumption, for members of the experimental and control groups of female students with hearing disabilities integrated in the secondary stage.

**Fifth: Study Tools:**

The two researchers prepared the following tools:

- 1- Awareness of methods of rationalizing water consumption.
2. A cognitive-behavioral counseling program to develop students' awareness of methods of rationalizing water consumption as an entry point to achieving the goals of sustainable development.

A questionnaire of awareness of methods of rationalizing water consumption.

It consists of (57) phrases distributed over eleven dimensions that express awareness of methods of rationalizing water consumption for female students, and these dimensions, in order, are: showering (8) phrases, using the toilet (5) phrases, brushing teeth (3) phrases, washing clothes (5) phrases (8) statements, in the kitchen, using the tap in general (6) house cleaning statements (5) statements - watering the

garden plants (3) statements - washing the car (3) statements, at school (5) statements, water recycling ( 5) Phrases The questionnaire is suitable for individual or collective application. Ease and clarity have been taken into account in the formulation of the phrases, and their suitability for students. There are three levels to answer each of the phrases (yes, to some extent, no).

Sixth: Psychometric characteristics to identify awareness of ways to rationalize water consumption. In order to reach the final picture, a questionnaire of awareness of methods of rationalizing water consumption was applied. On an exploratory sample of (30) ordinary students and those with hearing disabilities integrated in the secondary stage with interpretation using sign language for women with hearing disabilities.

**Validity of the Scale:**

**1-The Veracity of the Arbitrators:**

To ensure the validity of the tool, it was presented to (11) professors to seek their opinion about the formulation of the phrases and to choose the best appropriate phrases to measure the students' awareness of the methods of rationalizing water consumption. The required modification was made by adding or deleting some phrases and obtaining approval as a viable tool.

- 2- Veracity of the vocabulary (the correlation of the word with the total score of the dimension to which it belongs after deleting the score of the word.



Correlation coefficients were calculated between the score of each item and the total score of the dimension to which it

belongs after deleting the score of the item from the total score of the dimension, and Table (3) shows this:

**Table (3):** Pearson correlation coefficients between the paragraphs of the research tool and the total score of the dimension (n = 30)

m		correlati on coefficie nt	m		correlatio n coefficien t	m		correlati on coefficie nt	m		correlati on coefficie nt
Bathing	1	0,823**	Use the toilet	9	0,804**	brushing teeth	14	0,874**	clothes washing	17	0,805**
	2	0,721**		10	0.682**		15	0,674**		18	0,796**
	3	0,824**		11	0,842**		16	0,674**		19	0,741**
	4	0,536**		12	0,945**	36	0,874**	20		0,842**	
	5	0,845**		13	0,841**	37	0,703**	21		0,710**	
	6	0,795**	Use the tap in general	30	**0,847	House cleaning	38	0,757**	garden water	41	0,657**
	7	0,443**		31	**0,842		39	0,537**		42	0,674**
	8	0,874**		32	0,645**		40	0,884**		43	0,847**
In the kitchen	22	0,678**	Use the tap in general	33	0,851**		Water recycling	52	0,574**	Car wash	44
	23	0,874**		34	0,841**	53		0,487**	45		**0.812
	24	0,984**		35	0,709**	54		0,847**	46		**0.808
	25	0,705**	At school	47	0,845**	55		0,641**			
	26	0,674**		48	0,847**	56	0,890**				
	27	0,847**		49	0,947**	57	0,887**				
	28	0,564**		50	0,847**						
	29	0,407*		51	0,847**						

\*\*

Correlation coefficients at the level of (0.01) \* Correlation coefficients at the level of (0.05)

It is clear from Table (3) that the values of the correlation coefficients are high and a function at the level (0.01), except for the values of the correlation of the expressions (7, 29, 21), a function at the level (0.05), and thus the scale expressions are characterized by reliable validity.

**Table No. (4)** Correlation coefficients between the degree of each dimension and the total degree of awareness of water consumption rationalization methods. (n=30)

4- Internal consistency (dimensions with the overall score of the scale)

Correlation coefficients were calculated between the score of each dimension and the total score of the questionnaire of awareness of water consumption rationalization methods. After deleting the dimension score from the total score, Table No. (4) shows this:

Dimensions	correlation coefficient	significance level
Bathing	0,853**	0,01
Use the toilet	0,801**	0,01
brushing teeth	0,852**	0,01
clothes washing	0,798**	0,01
In the kitchen	0,735**	0,01
Use the faucet in general	0,763**	0,01
House cleaning	0,834**	0,01
Watering home garden plants	0,737**	0,01
Car wash	0,745**	0,01
At school	0,864**	0,01
Water recycling	0,873**	0,01

\*\*

Correlation coefficients at the level of (0.01) \* Correlation coefficients at the level of (0.05)

It is clear from Table (4) that the values of the correlation coefficients are high and significant at the level (0.01), which indicates the validity of the dimensions of the questionnaire of awareness of methods of rationalizing water consumption.

### Second: Stability of the Scale:

1-The stability of the method of the Alpha Cro Nabach coefficient, and the half-partition method to identify awareness of methods of rationalizing water consumption.

The stability coefficient was calculated to identify awareness of water consumption rationalization methods. , using the alpha-Crow-Nabach coefficient, and the split-half method to study the internal consistency of the dimensions of the scale, and this is shown in Table (5)

**Table (5):** The stability coefficients were evaluated using the alpha-Cro-Nabach method and the Jutman half-partition method to identify awareness of water consumption rationalization methods. (n=35)

Dimensions	Alpha-Cronbach	Half segmentation
Bathing	0,931	0,961
Use the toilet	0,916	0,904
brushing teeth	0,839	0,809
clothes washing	0,984	0,907
In the kitchen	0,814	0,878
Use the faucet in general	0,737	0,727
House cleaning	0,662	0,618
Watering home garden plants	0,745	0,738
Car wash	0,824	0,814
At school	0,864	0,844
Water recycling	0,737	0,795

Total	0,909	0,931
-------	-------	-------

Cronbach's alpha  $\square$  weak  $< (0.5)$   $\square$  moderate between  $(0.5-0.7)$   $\square$  high  $> (0.7)$   
It is clear from Table (5) that all the values of the stability coefficients are within the acceptable level, which makes us confident in the stability of the awareness-raising questionnaire of water consumption rationalization methods.

The final image of the questionnaire of awareness of methods of rationalizing water consumption.

And since the statements of the questionnaire of awareness of methods of rationalizing water consumption are all characterized by validity and stability, none of them were excluded. And by defining the response system on the items of the questionnaire in the light of a three-graded scale (yes, to some extent, no) and grades are given (3, 2, 1) in the case of positive statements and vice versa in the case of negative statements, and the high degree indicates that the student has a high degree of awareness of methods rationing water use.

#### **Indicative Program:**

A cognitive-behavioral program has been prepared to develop the awareness of secondary school students in mainstream schools about methods of rationalizing water consumption as an input to achieving the goals of sustainable development.

Techniques used in the program:

Many techniques were used, including cognitive reconstruction, problem-solving method, role-playing, modeling, homework, and reinforcement.

#### **Program Objectives:**

Program objectives can be divided into:

1- A guiding goal: the program aims to develop awareness of methods of

rationalizing water consumption for the members of the experimental group by using the cognitive-behavioral counseling techniques used in the program.

2- A preventive goal: by providing the experimental group with some behaviors that enable them to confront wrong practices that help in wasting water.

#### **Key Features of the Program:**

1- The number of sessions in the program: The current program includes (12) sessions, and the program is applied at the rate of (3) sessions per week over a period of time (4) weeks.

2- The method of counseling used: The program was applied in a (collective) manner on the members of the counseling group.

3- Session time: The time for one session ranges from (45-60) minutes, depending on the topic of the session, the techniques used, and the conditions of the sample.

4- The language of the program: The program is presented in an easy language ranging from colloquial to classical, to make it easier for them to understand and benefit from the sessions.

5- Stages of implementing the program: It was carried out in five stages: preparation, preparation, initiation, implementation, evaluation, and follow-up.

Exploratory Study: An exploratory study was conducted for the program used in the current research on a number of female students in integration schools who meet the same conditions as the experimental sample. The appropriate duration for each session, the appropriate number of

sessions to achieve the goal, and the techniques used were identified.

Location of the sessions: The program was implemented in the integration schools affiliated to the Ministry of Education in Najran.

The content of the sessions: The content of the counseling sessions was selected based on the general and procedural objectives that were identified for the program and the practical procedures, including the techniques, the counseling method and the material means used.

**Table (6):** program sessions

<b>Session type and time</b>	<b>Session Title</b>	<b>Objective of the session</b>	<b>The techniques used</b>
1session (45-60) minutes	Introduction and acquaintance between the researchers and the guide group and the definition of the program The concept of development The concept of sustainable development The concept of rationalization	- Achieving familiarity, familiarity, affection and trust between researchers and sample members. Defining the sample members the reason for their presence in the advisory group Introducing the program and giving a comprehensive idea about it and the main steps in light of which the counseling sessions take place Understanding the concept of development -Understanding the concept of sustainable development - Understanding the concept of rationalization	lecture -Discussion Presentations - reinforcement - homework
1session session time (45-60) minutes	Water and sustainable development	- Water and sustainable development -Recognizing the importance of water for the human body -Recognizing the importance of water in development -The multiplicity of water resources in the world Remember the sources of water in the Kingdom of Saudi Arabia Explain the relationship between sustainable development and rationalization of water consumption	lecture -Discussion Presentations - reinforcement - homework
1session session time	Rationalization of household water consumption	- The versatility of domestic water -Understanding the concept of rationalizing water consumption	lecture Discussion Presentations

(45-60) minutes		-Methods of wasting domestic water - Recognizing the importance of rationalizing domestic water consumption	reinforcement homework
1 session session time (45-60) minutes	Methods of rationalizing household water consumption (showering - when using the toilet).	-Multiple ways of wasting water while showering Remember the methods of rationalizing water consumption while showering Explain the practices that lead to wasting water when using the toilet Multiple methods of rationalizing water consumption when using the toilet - Getting to know the water-guiding shower	- Lecture -Discussion -Presentations - reinforcement - homework
1 session session time (45-60) minutes	Rationalizing water consumption while brushing teeth Reducing water consumption while washing clothes	- Explain the practices that lead to wasting water while brushing your teeth -Identify methods of rationalizing water consumption while brushing teeth Explain practices that lead to wasting water while washing clothes - Identify methods of rationalizing water consumption while washing clothes	- Lecture -Discussion -Presentations - reinforcement - homework
1 session session time (45-60) minutes	Rationalizing water consumption while using the tap in general	- Rationalizing water consumption while using the tap in general Identify the wrong practices followed by the research sample while using the faucet in general. -Learn about water rationalization methods while using the tap - Identify the water guide tap	- Lecture -Discussion -Presentations - reinforcement - homework
1 session session time (45-60) minutes	Reducing water consumption in the kitchen	- Explain practices that lead to wasted water in the kitchen -Identifying methods of rationalizing water consumption while washing vegetables and fruits - Identify methods of rationalizing water consumption while washing utensils	- Lecture -Discussion -Presentations - reinforcement - homework

The Effectiveness Of A Cognitive-Behavioral Program To Develop The Awareness Of Secondary School Students In Mainstream Schools About Methods Of Rationalizing Water Consumption As An Input To Achieving The Goals Of Sustainable Development

1 session session time (45-60) minutes	Rationalizing water consumption while cleaning the house	-Multiple practices used in house cleaning - Identify methods of rationalizing water consumption while washing the floors of the house	Lecture -Discussion -Presentations - reinforcement - modeling - homework
1 session session time (45-60) minutes	-Rationalizing water consumption while irrigating home garden plants -Rationalizing water consumption while washing the car	Learn about water-saving irrigation methods -Remember the methods of wasting water while washing the car at home Learn about water saving methods while washing the car at home	Lecture -Discussion -Presentations - reinforcement - modeling - homework
1 session session time (45-60) minutes	Rationalizing water consumption in the school	-Identifying practices that lead to wasting water during the school day - Multiple methods of water rationalization in the school	lecture -Discussion Presentations - reinforcement - modeling - homework
1 session session time (45-60) minutes	Water reuse (water recycling)	Understand the concept of water reuse Explain ways to recycle water	lecture -Discussion -Presentations - reinforcement - modeling - homework
1 session session time (45-60) minutes	Review and integrative view of the program. Closing calendar, day for fun	Review what has been accomplished in previous sessions -Remind the respondents of all the technicians, information and skills that they acquired through the program Standing on the strengths and weaknesses in the extent to which the program achieves its main objective -Review any shortcomings, defects, or any technical or session before ending the program Preparing the sample members to finish the program	lecture Presentations - reinforcement -

		<p>Evaluation of the effectiveness of the program in developing awareness of methods of rationalizing water consumption</p> <p>Thanking the respondents, celebrating them, and encouraging them to continue implementing and following up on what they learned through the program sessions</p>	
--	--	---	--

**Seventh:** The statistical methods used in the study:

In order to reach the results that achieve the objectives of the study, and analyze the data, a variety of statistical methods were used, by using the Statistical Package for Social Sciences (SPSS), after the data was encoded and entered into the computer, and the statistical methods that Used in this research are:

- 1- To calculate the psychometric characteristics, the correlation coefficient (Pearson), alpha Cro-Nabach, and half-partition were used using (Spearman's) equation.
- 2- The Mann-Whitney test, the Wilcoxon test, and the binary correlation coefficient of ranks, in order to verify the validity of the study hypotheses.

### THE RESULTS AND DISCUSSION:

Results of the first hypothesis: The first hypothesis states, "There is a statistically significant difference at the level of (0.05) between the mean scores of the experimental group and the control group in the post-measurement questionnaire on awareness-raising methods of water consumption rationalization for ordinary

secondary school students in favor of the experimental group.

In order to verify the validity of this hypothesis, the Mann-Whitney test (U and the value of Z) were used as one of the non-parametric methods to identify the significance of the differences between the mean ranks of the scores of the two groups, the members of the experimental group and those of the control group in the post-measurement, in order to find out the significance of what might happen to the Awareness of methods of rationalizing water consumption for ordinary female students at the secondary level as reflected by their grades on a questionnaire of awareness of methods of rationalizing water consumption. I have ordinary female students in secondary school, and Table No. (7) shows this

**Table (7):** The values of (U, Z) and their significance for the differences between the mean ranks of the scores of the experimental group and the control group for the questionnaire of awareness of water consumption rationalization methods. For ordinary high school students in the dimensional measurement

Dimensions	Experimental		Control		U value	Z value	Sig
	M	TOTAL	M	TOTAL			
Bathing	14,50	145,00	6.50	65.00	10.000	3.245-	0.001
Use the toilet	14,10	141,00	6.90	69.00	14.000	3.033-	0.002
brushing teeth	14,70	147,00	6.30	63.00	8.000	3.376-	0.001

clothes washing	14,00	140,00	7.00	70.00	15.000	2.936-	0.003
In the kitchen	14,75	147,50	6.250	62.50	7.500	3.425-	0.001
Use the faucet in general	13,40	134,00	7.60	76.00	21.000	2.591-	0.010
House cleaning	14,00	140,00	7.00	70.00	15.000	2.936-	0.003
Watering home garden plants	14,30	143,00	6.70	67.00	12.000	3.130-	0.002
Car wash	15,50	155,00	5.50	55.00	0.000	4.147-	0.000
At school	15,20	152,00	5.80	58.00	3.000	3.831-	0.00
Water recycling	13,75	137,50	7.250	72.50	17.500	2.805-	0.005
<b>Total</b>	15,50	155,00	5.50	55.00	0.000	3.819-	0.000

- The tabular value of (Z) at the level of significance (0.01), equal to (2.57).
- The tabular value of (Z) is at the level of significance (0.05), equal to (1.96).

Table (7) shows the following: It is evident that the calculated Z value amounted to (3.819), which is greater than the tabular value (1.96), which indicates that there are statistically significant differences between the mean ranks of the scores of the two groups, the experimental group and the control group, on the scale of awareness of rationalization methods. Water consumption among ordinary secondary school students in the dimensional measurement, and that these differences are a function at (0.01) in favor of the averages of the experimental group. The researcher attributes this result to the exposure of the experimental group to the program and its effect on the control group. Also, the two researchers relied, during the sessions, on the use of various techniques, such as modeling through video, analyzing tasks into simple steps, as this contributed to developing awareness of methods of rationalizing water consumption among ordinary high school students. This result agreed with the study

of each of Seehamat et al (2016) and Damanhuri (2012).

### Results of the Second Hypothesis:

The second hypothesis states that "there is a statistically significant difference at the level of (0.01) between the mean scores of the experimental group in the pre and post measurements on the scale of awareness of methods of rationalizing water consumption for ordinary secondary school students in favor of the post measurement.

To test the validity of this hypothesis, the Wilcoxon test and the value of Z (Z) were used as one of the non-parametric methods to identify the significance of the differences between the mean ranks of the scores of the experimental group in the scale of awareness of methods of rationalizing water consumption among ordinary students in the secondary stage in the pre and post procedural standards. Table No. (8) shows that

**Table (8):** The significance of the differences between the mean scores of the pre and post scales to identify awareness of water consumption rationalization methods. For ordinary secondary school students in the experimental group



Dimensions	negative ranks		Positive ranks		Equality	Z value	Sig
	M	TOTAL	M	TOTAL			
Bathing	0.00	0.00	4.50	36.00	2	2.598	0.009
Use the toilet	0.00	0.00	4.00	28.00	3	2.53	0.011
brushing teeth	0.00	0.00	4.00	28.00	3	2.428	0.015
clothes washing	0.00	0.00	5.00	45.00	1	2.81	0.005
In the kitchen	0.00	0.00	4.50	36.00	2	2.64	0.008
Use the faucet in general	0.00	0.00	4.00	28.00	3	2.46	0.014
House cleaning	0.00	0.00	4.50	36.00	2	2.64	0.008
Watering home garden plants	0.00	0.00	4.00	28.00	3	2.53	0.011
Car wash	0.00	0.00	5.50	55.00	0	2.972	0.003
At school	0.00	0.00	3.00	15.00	5	2.07	0.038
Water recycling	0.00	0.00	3.50	21.00	4	2.449	0.014
<b>Total</b>	0.00	0.00	5.50	55.00	0	2.809	0.005

- The tabular value of (Z) at the level of significance (0.01), equal to (2.57).
- The tabular value of (Z) is at the level of significance (0.05), equal to (1.96).

It is clear from Table (8) that the calculated Z value amounted to (2.809), which is greater than the tabular value (1.96), which indicates that there are statistically significant differences between the mean ranks in the dimensions of the questionnaire of awareness of methods of rationalizing water consumption. Ordinary female students in the secondary stage and the total degree, at the level of (0.01) in the pre and post measurements of the experimental group, and that this difference is in favor of the post measurement averages.

The improvement of the experimental group in the post-measurement is due to the fact that the two researchers divided the skills into small steps that require response and are given immediate feedback, which focuses on the

educational goal, and many techniques were used such as: (positivity, interaction, raising the level of motivation, organization, management and guidance, self-assessment, reality representation, working in a team, questioning and imposing hypotheses, role-playing), through which he sought to improve awareness of methods of rationalizing water consumption and using various activities that help ordinary students to acquire skills of rationalizing water consumption through the technique of generalization, reinforcement and modeling. Seehamat et al(2016) agree with this (Mohammed and Subhi, 2015).

### 3- Results of the Third Hypothesis:

The third hypothesis states that "there is no statistically significant difference between the mean scores of the experimental group in the post and follow-up measurements (two months after the end of the program) on the measure of awareness of methods of rationalizing water consumption for

ordinary female students at the secondary level. To test the validity of the hypothesis, the Wilcoxon test and the value of (Z) were used as one of the non-parametric methods to identify the significance of the differences between the mean ranks of the scores of the experimental group in the

questionnaire of the students' awareness of methods of rationalizing water consumption. I have ordinary secondary school students in the post and follow-up measurements. The results were as shown in Table (9).

**Table (9):** The significance of the differences between the mean scores of the post and follow-up measurements for the questionnaire of the awareness of methods of rationalizing water consumption for ordinary female students in the secondary stage at the experimental

Dimensions	negative ranks		Positive ranks		Equality	Z value	Sig
	M	TOTAL	M	TOTAL			
Bathing	3.50	14.00	3.50	7.00	4	0.816	0.414
Use the toilet	4.00	20.00	4.00	8.00	3	1.134	0.257
brushing teeth	3.50	10.50	3.50	10.50	4	0.00	1.000
clothes washing	0.00	0.00	2.00	6.00	7	1.732	0.083
In the kitchen	3.50	14.00	3.50	7.00	4	0.816	0.414
Use the faucet in general	4.50	22.50	4.50	13.50	2	0.707	0.480
House cleaning	3.50	10.50	3.50	10.50	4	0.00	1.000
Watering home garden plants	4.00	8.00	4.00	20.00	3	1.134	0.257
Car wash	0.00	0.00	2.00	6.00	7	1.732	0.083
At school	3.00	9.00	3.00	6.00	5	0.447	0.655
Water recycling	3.00	9.00	3.00	6.00	5	0.447	0.655
<b>Total</b>	3.17	9.50	3.83	11.50	4	0.211	0.833

- The tabular value of (Z) at the level of significance (0.01) is equal to (2.57).
  - The tabular value of (Z) at the level of significance (0.05) is equal to (1.96).
- It is clear from Table (9) that the calculated Z value amounted to (0.211), which is less than the tabular value (1.96), which indicates that there are no statistically significant differences between the mean ranks of the scores of the experimental group in the post and follow-up measurements on the questionnaire of female students' awareness of

rationalizing water consumption for female students. And this result is consistent with (Qandil et al., 2018), (Aqbawi and Haqi, 2012) in the positive impact of the extension program in developing awareness of water consumption.

Results of the fourth hypothesis: The fourth hypothesis states, "There is a statistically significant difference at the level of (0.01) between the mean scores of the experimental group and the control group in the post-measurement on the scale of methods of rationalizing water

consumption for women with hearing disabilities integrated in the secondary stage in favor of the experimental group.

In order to verify the validity of this hypothesis, the Mann-Whitney test (U and the value of Z) were used as one of the non-parametric methods to identify the significance of the differences between the mean ranks of the scores of the two groups, the members of the experimental group and those of the control group in the post-measurement, in order to find out the significance of what might happen to the Methods of rationalizing water for female students with hearing disabilities in the

secondary stage, as reflected by their scores on the scale of methods for rationalizing water consumption among female students with hearing disabilities in the secondary stage, and Table (10) shows this.

**Table (10):** Z) values and their significance for the differences between the mean ranks of the scores of the experimental group members and the control group members of the water consumption rationalization scale for female students with hearing disabilities in the secondary stage in the post-measurement

Dimensions	Experimental		Control		U value	Z value	Sig
	M	TOTAL	M	TOTAL			
Bathing	14.25	142.50	6.75	67.50	12.500	3.082-	0.002
Use the toilet	13.75	137.50	7.25	72.50	17.500	2.805-	0.005
brushing teeth	14.50	145.00	6.50	65.00	10.000	3.245-	0.001
clothes washing	14.50	145.00	6.50	65.00	10.000	3.245-	0.001
In the kitchen	14.50	145.00	6.50	65.00	10.000	3.245-	0.001
Use the faucet in general	14.10	141.00	6.90	69.00	14.000	3.033-	0.002
House cleaning	14.75	147.50	6.25	62.50	7.500	3.425-	0.001
Watering home garden plants	14.60	146.00	6.40	64.00	9.000	3.342-	0.001
Car wash	14.00	140.00	7.00	70.00	15.000	2.936-	0.003
At school	14.90	149.00	6.10	61.00	6.000	3.574-	0.000
Water recycling	14.60	146.00	6.40	64.00	9.000	3.342-	0.001
Total	15.50	155.00	5.50	55.00	0.000	3.804-	0.000

- The tabular value of (Z) at the level of significance (0.01) is equal to (2)
- The tabular value of (Z) at the level of significance (0.05) is equal to (1.96).

It is evident from Table (10) the following: It is clear that the calculated Z value amounted to (3.804), which is greater than the tabular value (1.96), which indicates that there are statistically significant differences between the mean ranks of the scores of the two groups, the experimental group and the control group, on the scale

of methods of rationalization of consumption. Water among female students with hearing disabilities in the secondary stage in the post-measurement, and that this difference is significant at (0.01) in favor of the averages of the experimental group.

The two researchers attribute this result to the exposure of the experimental group to the program and the masking of its effect on the control group. Also, during the sessions, the two researchers relied on the

use of various techniques, such as modeling through video, where one of the researchers translated the video into sign language, used pictures, and analyzed tasks into simple steps, as this contributed to developing awareness of methods of rationalizing water consumption for students with hearing disabilities in the secondary stage.

Results of the fifth hypothesis: The fifth hypothesis states that "there is a statistically significant difference at the level (0.01) between the mean scores of the experimental group in the pre and post measurements on the water consumption rationalization methods scale for female students with hearing disabilities integrated in the secondary stage in favor of the post measurement.

To test the validity of this hypothesis, the Wilcoxon test and the value of Z (Z) were used as one of the non-parametric methods to identify the significance of the differences between the mean ranks of the scores of the experimental group in the measure of water consumption rationalization methods for students with hearing disabilities integrated in the secondary stage in the pre and post procedural standards. Table No. (13) ) explains it.

**Table (11):** The significance of the differences between the mean scores in the pre and post measurements of the water consumption rationalization methods scale for the integrated secondary school students of the experimental group

Dimensions	negative ranks		Positive ranks		Equality	Z value	Sig
	M	TOTAL	M	TOTAL			
Bathing	0.00	0.00	4.00	28.00	3	2.428	0.015
Use the toilet	0.00	0.00	3.50	21.00	4	2.271	0.023
brushing teeth	0.00	0.00	5.00	45.00	1	2.81	0.005
clothes washing	0.00	0.00	3.50	21.00	4	2.333	0.020
In the kitchen	0.00	0.00	4.50	36.00	2	2.64	0.008
Use the faucet in general	0.00	0.00	4.00	28.00	3	2.428	0.015
House cleaning	0.00	0.00	4.50	36.00	2	2.828	0.005
Watering home garden plants	0.00	0.00	4.00	28.00	3	2.53	0.11
Car wash	0.00	0.00	4.50	36.00	2	2.64	0.008
At school	0.00	0.00	5.00	45.00	1	2.762	0.006
Water recycling	0.00	0.00	4.50	36.00	2	2.64	0.008
<b>Total</b>	0.00	0.00	5.50	55.00	0	2.807	0.005

- The tabular value of (Z) at the level of significance (0.01) is equal to (2.57)
  - The tabular value of (Z) at the level of significance (0.05) is equal to (1.96)
- It is clear from Table (11) that the calculated Z value amounted to (-2.805), which is greater than the tabular value

(2.807), which indicates that there are statistically significant differences between the mean ranks of the scores in the dimensions of the water consumption rationalization methods scale for female students with hearing disabilities integrated in the secondary stage. The total score is at level (0.01) in the pre and post

measurements of the experimental group, and that these differences are in favor of the post measurement averages.

The improvement of the experimental group in the post-measurement is due to the fact that the two researchers divided the skills into small steps that require response and are given immediate feedback, which focuses on the educational goal, and many techniques were used such as: (positivity, interaction, raising the level of motivation, organization, management and guidance Self-assessment, reality representation, working in a team, questioning and imposing hypotheses, role-playing) with explanation in sign language, through which he sought to improve awareness of methods of rationalizing water consumption and using various activities that help students with hearing disabilities to acquire skills to rationalize water consumption through Through the art of generalization, reinforcement and modeling.

The results of the sixth hypothesis:

The sixth hypothesis states that "there is no statistically significant difference between

the mean scores of the experimental group in the post and sequential measurements (two months after the end of the program) on the measure of methods of rationalizing water consumption among students with hearing disabilities integrated in the secondary stage.

To test the validity of the hypothesis, the Wilcoxon test and the value of (Z) were used as one of the non-parametric methods to identify the significance of the differences between the mean ranks of the scores of the experimental group in the water consumption rationalization methods scale for female students with hearing disabilities integrated in the secondary stage in the post and sequential measurements. The results were as shown in Table (12).

**Table (12):** Significance of the differences between the mean ranks of the scores of the post and follow-up measurements of the measure of water consumption rationalization methods for students with hearing disabilities integrated in the secondary stage at the experimental level.

Dimensions	negative ranks		Positive ranks		Equality	Z value	Sig
	M	TOTAL	M	TOTAL			
Bathing	2.00	4.00	2.00	2.00	7	0.577	0.564
Use the toilet	2.00	4.00	2.00	2.00	7	0.577	0.564
brushing teeth	2.00	2.00	2.00	4.00	7	0.577	0.564
clothes washing	3.00	3.00	3.00	12.00	5	1.342	0.180
In the kitchen	2.50	2.50	2.50	7.50	6	1.000	0.317
Use the faucet in general	4.50	13.50	4.50	22.50	2	0.707	0.480
House cleaning	3.00	6.00	3.00	9.00	5	0.447	0.655
Watering home garden plants	4.00	16.00	4.00	12.00	3	0.378	0.705
Car wash	4.50	18.00	4.50	18.00	2	0.000	1.000
At school	3.50	3.50	3.50	17.50	4	1.633	0.102

Water recycling	3.50	14.00	3.50	7.00	4	0.816	0.414
<b>Total</b>	4.67	14.00	5.17	31.00	1	1.021	0.307

- The tabular value of (Z) at the level of significance (0.01), equal to (2.57)
- The tabular value of (Z) is at the level of significance (0.05), equal to (1.96)

It is clear from Table (12) that the calculated Z value amounted to (1.021), which is less than the tabular value (1.96), which indicates that there are no statistically significant differences between the mean ranks of the scores of the experimental group in the post and follow-up measurements on the scale of methods of rationalizing water consumption among female students. Women with hearing disabilities are integrated in the secondary stage, and this means the continuity of the program. This result is due to the conviction of the students to conserve domestic water and to practice rationalization methods.

### RECOMMENDATIONS

- 1- Highlighting the seriousness of water scarcity in the Kingdom of Saudi Arabia and worldwide in the curricula of all grades.
- 2- Introducing concepts and methods of rationalizing domestic water consumption in school curricula and extra-curricular activities.
- 3- Include the goals and importance of sustainable development in school curricula and extra-curricular activities to spread awareness of rationalizing consumption.
- 4- Spreading awareness of the importance and how to recycle domestic water.
- 5- Training female students on how to use water-conserving tools so that they can train their families.

- 6- Activating the role of the various media in spreading awareness of water consumption in multiple periods of time and continuously.
- 7- Using water-saving tools in schools and government departments to disseminate concepts and methods of rationalizing water consumption.
- 8- Imposing high prices for domestic water, especially in large cities, to urge individuals to rationalize water.
- 9- Implementing this simplified program in schools and universities to spread awareness of methods of rationalizing water consumption among the largest number of students so that it becomes a way of life.

### ACKNOWLEDGMENTS

The author are thankful to the deanship of scientific research at Najran University for funding this work under Najran Region research program funding program grand code ((NU/NRP/SEHRC/11/1).

### REFERENCES

- Abdel-Rahman, S M . (2010). Estimating women's awareness of rationalizing water consumption, an analytical vision from the perspective of general practices of social work, the twenty-third international scientific conference for social work (implications of the global water crisis on social welfare policies, Faculty of Social Work, Helwan University, pp. 552-595.
- Abdullah, A L . (2022). Water and the importance of preserving its quality and ways to rationalize its use from an Islamic perspective. *Jerash for Research and Studies, Jerash University* (1) 23, pp. 1829-1848, retrieved.

- Abdullah, K A. (2010). The professional intervention of social work to develop awareness to rationalize water use, in the rural community, a study applied to the village of Qasr Rashwan, master's thesis, Department of Development and Planning, Faculty of Social Work, Fayoum University, Egypt.
- Abu Zaid, L S . (2018). The effectiveness of a proposed program in nutritional education for kindergarten students at Taif University on developing their nutritional awareness, Arab Research Journal in the Fields of Specific Education, Egypt, (9) 9, pp. 115-133.
- Elbyaly, M. Y. H., & Elfeky, A. I. M. (2022). The role of metacognition in promoting deep learning in MOOCs during COVID-19 pandemic. *PeerJ Computer Science*, 8, e945.
- Al Anzi, M H I A A . (2021). The jurisprudence of rationalizing water consumption in the Prophet's Sunnah: Journal of the Faculty of Dar Al-Ulum, Cairo University, Egypt, No. 133, pp. 421-460. Retrieved from <http://search.mandumah.com/Record/1207376>.
- Al-Ghamdi, S A A . (2007). The role of the school counselor with students with special needs in integration schools, Journal of the Faculty of Education in Zagazig, Zagazig University, Egypt, (57), 85-115.
- Elbyaly, M. Y. H., & Elfeky, A. I. M. (2022). Investigating the effect of vodcast to enhance the skills of the Canadian smocking and complex problem solving. *Current Psychology*, 41(11), 8010-8020.
- AL-Hassan, A M . (2011). Sustainable development and the requirements to achieve it, a research presented at the Forum of Government Strategy to Eliminate Unemployment and Achieve Sustainable Development, University of Messila 15, Sudan - 16-11-2011.
- Ali, M. , Munala, G. , Muhoro, T. , Shikuku, J. , Nyakundi, V. and Gremley, A. (2020) Water Usage Patterns and Water Saving Devices in Households: A Case of Eastleigh, Nairobi. *Journal of Water Resource and Protection*, 12, 303-315. doi: 10.4236/jwarp.2020.124018.
- Elbyaly, M. Y. H., & Elfeky, A. I. M. (2023). THE EFFECTIVENESS OF A PROGRAM BASED ON AUGMENTED REALITY ON ENHANCING THE SKILLS OF SOLVING COMPLEX PROBLEMS AMONG STUDENTS OF THE OPTIMAL INVESTMENT DIPLOMA. *Ann. For. Res*, 66(1), 1569-1583.
- Al-Maalouli, R F. (2013). Methods of rationalizing the use of domestic water and its relationship to some variables, an analytical field study in the southwestern governorates of Syria, Tishreen University Journal for Research and Scientific Studies, Series of Arts and Humanities, Volume 35, Number 2, pp. 43-65.
- Al-Nubi, M. (2018). Characteristics of people with hearing disabilities: cultural legacies or novel features? *International Journal of Literature, Humanities and Social Sciences*, Arab Academy for Humanities and Applied Sciences, No. 2, pp. 242-2225. Retrieved from: <http://search.mandumah.com/Record/888807>.
- Al-Obeidi, Q H J. (2011). Water Education and Awareness, Journal of

- Basic Education Research, Volume 11, Number 1, pp. 340-356.
- Ahmed, E. S. A. H., Alharbi, S. M., & Elfeky, A. I. (2022). Effectiveness Of A Proposed Training Program In Developing Twenty-First Century Skills And Creative Teaching Skills Among Female Student Teachers, Specializing In Early Childhood. *Journal of Positive School Psychology*, 4316-4330.
  - Al-Quraiti, A M A . (2010). Inclusion of people with special needs in general education: reasons, benefits, forms and requirements, Psychological Counseling Center - Ain Shams University, *Psychological Counseling Journal*, ( 27).
  - Al-Shatnawi, Y A K . (2020). The degree of school students' practice of the skills of rationalizing water consumption and its role in achieving sustainable development in the light of the purple economy in Jordan, *Journal of Strategy and Development*, Volume 10, Special Issue, 508-526 Retrieved from <http://search.mandumah.Com/Record/1105165>.
  - Al-Zahrani, S S M., Baslim, A M. and Bawazir, W S . (2022). The role of virtual laboratories in increasing the motivation to learn science for female students with hearing disabilities in government institutes in Jeddah, *Journal of Special Education and Rehabilitation*, (49) 14, 115-154. retriever from <http://search.mandumah.Com/Record/1331254>.
  - Aqabawi, N A M. , Haqqi, Z M and Abu Ruzaizah, O S . (2012). The effectiveness of a pilot program for developing awareness of water consumption among Saudi women. *Journal of Arab Studies in Education and Self-Illness*, No. 27, Part Two, 92-112.
  - Arabiyat, B and Mazahra, A . (2010). *Environmental Education: Curriculum House for Publishing and Distribution*, Amman, The Hashemite Kingdom of Jordan.
  - Atris, M E. (2020). A proposed strategy for the expected roles of the secondary school administration in spreading the culture of rationalizing water use as an entry point to achieving sustainable development, *Fayoum University Journal of Educational and Psychological Sciences*, Volume 14, Number 6, pp. 79-217.
  - Burke, K& Sutherland , C .(2004). Attitudes Toward inclusion knowledge vs . Experience. *Education* ,(2) 125.163-173.
  - Elfeky, A. I. M., & Elbyaly, M. Y. H. (2019). Multimedia: Different Processes. *Interactive Multimedia-Multimedia Production and Digital Storytelling*. doi: 10.5772/intechopen.81987
  - Clark, W.A and Finley, J.C.(2007). Determinants of water conservation intention in Blagoevgrad, Bulgaria. *Soc. Nat. Resour*,20(7), 613–627. <https://doi.org/10.1080/08941920701216552>.
  - Damanhour M S. (2012). Impact of Training Program to Rationalize Consumption of Domestic Water Usages, *American Journal of Applied Sciences* 9 (8): 1188-1193. DOI: <https://doi.org/10.1038/s41598-022-17560> doi:10.3390/ijerph16162896
  - Environmentalism in the Middle East : Attitudes toward preservation, conservation, and grass roots ecosystem



- management in Bahrain, Jordan, and Saudi Arabia
- Ghoneimi, Z A ; Cleo, A A. (2009). Water Security in the State of Kuwait and the Arab Gulf States; Orientalist vision, Journal of Social Sciences, Academic Publishing Council, Kuwait University, (1) 37, pp. 151-161. Retrieved from <http://search.mandumah.com/Record/187980>
  - gue M . , Jiang Z . , Bu Y and Cheng J. (2019): Supporting Sustainable Development of Water Resources: A Social Welfare Maximization Game Model, International Journal of Environmental Research and Public Health.(16) 16 2896 <http://search.mandumah.com/Record/1280181>. <http://search.mandumah.com/Record/888807>.
  - Humaidan, A A ; Khalaf M A.(2006). Arab water security and the issue of water in the Arab world (a demographic and political economic study of the reality of the development of the water issue and its prospects in the Arab world and its repercussions on Arab water security), Damascus University Journal of Economic and Legal Sciences, Vol. 22, No. 2, p. 7- 39.
  - Ismail, M A A. (2015). The Effectiveness of a Cognitive Behavioral Counseling Program for Reducing Depression among AIDS Patients in Integrated Care Centers in South Darfur State, Ph.D. Thesis, College of Graduate Studies, Sudan University of Science and Technology, Sudan.
  - Krinner, W., Lallana, C. and Estrela, T., CEDEX Nixon S. and Zabel, T.( 1999). Sustainable Water Use in Europe ‘ Enviromental Assessment Report No.1 Institute of Hydrology. European Communities.
  - Lam, S.-P. (2006). Predicting intention to save water: Theory of planned behavior, response efficacy, vulnerability, and perceived efficiency of alternative solutions. J. Appl. Soc. Psychol. 36(11), 2803–2824 <https://doi.org/10.1111/j.0021-9029.2006.00129.>,
  - Ministry of Environment, Water and Agriculture. (2018). National Water Strategy 2030, Kingdom of Saudi Arabia.
  - Mohamed S A A . (2020). Water and sustainable development and the role of human values in rationalizing their uses, Graduate Studies Journal, 15, Special Issue, pp. 86-94. Retrieved from <http://search.mandumah.com/Record/1252650>.
  - Muhammad, S T N and Subhi , M M D . (2015). The effectiveness of a proposed program to develop behaviors to rationalize water consumption among kindergarten children. Kindergarten College Journal. Port Said University, Egypt, Issue 7, pp. 11-57 [.http://search.mandumah.com/Record/978496](http://search.mandumah.com/Record/978496).
  - Mustafa, O F . (2015). Communication Disorders, 2nd Edition, Dar Al Masirah for Publishing and Distribution, Amman, Jordan.
  - Nauges, C. and Thomas, A. (2000). Privately operated water utilities, municipal price negotiation, and estimation of residential water demand: The case of France. Land Econ. 2000, 76(1), 68–85 <https://doi.org/10.2307/3147258>
  - Otaki, Y.; Ueda, K.; Sakura, O.(2017). Effects of feedback about community water consumption on residential water

- conservation. *J. Clean. Prod.* 143, 719–730.  
<https://doi.org/10.1016/j.jclepro.2016.12.05>
- Qandil , S A ., Khamis, I ., Haseeb, H and al-Najjar, D I M . (2018). An educational extension program to rationalize the use of some resources among rural women in Buhaira Governorate. *Alexandria Journal of Scientific Exchange*, 39 (4), 464-484.
  - Ruqban , n m . (2005). Planning, implementing and evaluating an indicative program for the development of etiquette for a pre-school child, *Alexandria Journal of Agricultural Research* (2) 43.
  - Saleh, A M A. (2018). International experiences in rationalizing the use of water resources, *Arab Academy for Humanities and Applied Sciences, International Journal of Specialized Qualitative Research*, No. 7, pp. 150-197.
  - Savari M , Mombeni A S , and Izadi H .(2022).Socio-psychological determinants of Iranian rural households' adoption of water consumption curtailment behaviors: *Scientific Reports* 12:13077
  - Seehamat ,L . , Sanrattana ,U and Tungkasamit A .(2016). The Developing on Awareness of Water Resources Management of Grade 6 Students in Namphong Sub-Basin. *International Education Studies*; 9 (5),156-165. URL: [http:// dx.doi.org/10.5539/ ies.v9n5p156](http://dx.doi.org/10.5539/ies.v9n5p156)
  - The Ministry of Water and Electricity .(2004). A follow-up study on water consumption and its equivalent in the Kingdom of Saudi Arabia. *Studies and Research Center in cooperation with Synovate.*
  - The World Bank. (2017). *Beyond Water Scarcity: Water Security in the Middle East and North Africa*, Public Review Handbook, Washington.
  - Wang D , Liu Z , Yuan J , Li L , and Liu X .(2022). Indoor Household Water Consumption Data Generation Model by Use of Probability: Distributions *Research Square*. 1-22 DOI: <https://doi.org/10.21203/rs.3.rs-1931715/v1>
  - World Health Organization .(2000). *Primary Health Care, Report of the International Conference on Primary Health Care, Health for All.*
  - Willis ,R .M ., Stewart ,R .,Panuwatwanich ,K .,Williams ,P .R.and Hollingsworth ,A.L.Q. (2011) . quantifying theinfluenceof environmental and wate rconservation attitudes on household end use water consumption. *J. Environ. Manag.* 92(8) , 1996–2009 <https://doi.org/10.1016/j.jenvman.2011.03.023>