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### RESEARCH ARTICLE

#### EFFECT OF KWL-PLUS STRATEGY ON ENVIRONMENTAL AWARENESS AND ATTITUDE TOWARDS ENVIRONMENT AMONG EDUCATION COLLEGE STUDENTS.

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#### Abstract

The purpose of this study is to determine the effect of KWL-Plus strategy on Environmental awareness and attitude towards Environment among Education College students. The quasi experimental method was used. The participants were chosen using intentional technique and consisted of (69) third-year students from Physics and Mathematics Departments in the College of Education at Ibb University, Yemen. Mathematics students were assigned as an experimental group and the Physics students were also assigned as a control group. To accomplish the objectives of the research, two instruments were prepared; an Environmental awareness test and an attitude scale towards Environment. Independent Sample t-test was employed to find out the significant difference in Environmental awareness and attitude towards Environment. The 't' value for the post-means of experimental group and control group on Environmental awareness was significant ( $p < 0.05$ ) in favor of experimental group. In addition, the 't' value for the post-means of experimental group and control group on attitude towards Environment was not significant ( $p > 0.05$ ).

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#### Introduction:-

The Environmental degradation has become a serious issue as it threatens not only the tranquility of people's existence, but their health and lives as well. As such, the Environmental protection and preservation has been an urgent need of ours.

It is observed that degradation of Environment mostly occurs due to destruction of natural environs. Now there is a cry all over for protection and preservation of such natural resources. This can only be possible if we have a right type of attitude towards Environment such issues and if we have proper awareness in the related matters. It is widely accepted that the development of such awareness and attitude can be possible through Environmental Education.

The observer to the Environmental problems/issues can easily realize that they are resulted of the unconsciousness behaviors of the people. Although, there are several laws that were set up by different countries to limit the wrong behaviors towards the Environment. So, Educational institutions are the main responsible to fight the problems of the Environment and to improve the learners' awareness of the Environment via reaching the Educational objectives and improving learners' knowledge, values and attitudes towards Environment. That is what was confirmed by the world's first International Conference on Environmental Education which adopted by the Tbilisi Declaration

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(UNESCO, 1978). This declaration built on the Belgrade Charter and established three broad objectives for Environmental Education. These objectives, which follow, provide the foundation for much of what has been done in the field since 1978:

1. To foster clear awareness of and concern about economic, social, political, and ecological interdependence in urban and rural areas;
2. To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the Environment; and
3. To create new patterns of behavior of individuals, groups, and society as a whole toward the Environment.

For the Environmental Education programs to be achieved, teachers should have positive knowledge, values and attitudes towards the Environment.

Teachers' awareness of the Environmental issues allows them to convey their knowledge to the learners in a simple and an exciting method. Due to the important role played by the teacher, Educational institution, therefore, is the main responsible to improve the Environmental awareness of the student teachers.

According to the recommendations of the Conferences and studies such as, several countries including Yemen inserted the course of the "Environmental Education" in the program of preparing and qualifying teachers in Education Colleges to improve the Environmental awareness of the student teachers to cope them with teaching these Environmental issues to their learners at schools after graduating.

Teaching Environmental Education is considered one of the recent Educational fields that give the learners the chance to identify the Environment problems and to cope with dealing and caring of the Environment around them.

In addition, there are limit number of studies related to teaching methods of the Environment Education such as (Al-Dwahidi, 2006; Qasem, 2017) which recommended to necessity of utilize variety teaching methods/strategies to teach Environment Education and improve learners' Environmental awareness. Consequently, Goncharova's study (2012) concluded that the Environmental Education games can be multifunctional, combining the benefit of raised Environmental awareness in learners with support of existing methods of Education.

After the emergence of the concept of Environmental Education as a new dimension in the Educational system, Yemen also recognized the significance of Environmental Education in the direction of Environment protection and emphasized the need for Environmental Education as an integral part of the curricula at all stages of Education which includes prekindergarten to twelfth grade learners, college, and adult and general public learners.

Environmental Education is defined as a process involving life-long learning as we come to understand the complexity of our natural world and Environmental issues, using various approaches for individual and societal decision-making based on knowledge integrated from various disciplines, and resulting in our own attitudes and action strategies to "make a difference" in the world (Environmental Education Council of Ohio, 2000, 4). While North American Association for Environmental Education assert that the Environmental Education is a process that aims to develop an Environmentally literate citizenry that can compete in our global economy; has the skills, knowledge, and inclinations to make well-informed choices; and exercises the rights and responsibilities of members of a community (North American Association for Environmental Education, 2000, 70).

Further, the Environmental Education aims to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the Environment. So, teaching methods/strategies plays a significant role in Education in general and a vital role in promoting Environmental Education which aimed at developing Environmental awareness, knowledge, attitude, skills, and values among students.

According to Tal, "in order to educate environmentally literate and active students, various settings and teaching methods should be employed" (Tal, 2005, 575).

According to EECO's guidelines (EECO, 1996) recommend that Environmental Education program development and implementation should recognize that learners build upon prior knowledge and experience to construct their

own knowledge through investigations, discussions, applications, and other modes of active learning (Environmental Education Council of Ohio, 2000, 19).

The driving force behind constructing meaning is using what we already know about a topic to interpret what we are learning. Without prior knowledge to interpret new knowledge, nothing can make much sense (Marzano, 1992, 37). Both teachers and students need models and opportunities to construct meaning. As teachers we need to employ classroom instructional strategies that facilitate students' construction of their own meanings. Research has made quite clear the importance of the active, constructive nature of reading and learning; good learners link their prior knowledge to new information, reorganize it and create their own meanings (Taboada & Guthrie, 2006). KWL provides a framework for learning that can be used across content areas to help students become active constructors of meaning. It is a literacy strategy that teachers can easily modify to meet students' learning needs at any level and in any content area.

Some studies on Environmental awareness and attitude towards Environment were carried out by (Jinarajan, 1999; Larijani, 2007) and asserted importance of Environment Education in pre-service teacher preparation program.

So, the present research investigated the effect of KWL-Plus strategy on Environmental awareness and attitude towards Environment among Education College students.

### **Background:-**

KWL strategy was developed by Ogle (1986). KWL strategy consists of the three steps: "What I know? What I want to know? And What I have learned?" The KWL strategy allows the learner to start by brainstorming (generating) any prior knowledge they may have on the topic which then helps them develop a curiosity on the subject and gets them interested in learning more about it. This can be done individually or in a group. After generating what is known, learners generate what they want to learn about the subject which gives them the self-motivation to read and make up their own questions and it is an excellent way to establish a purpose for learning. After learning, students generate what they have learned an excellent way to compare prior knowledge which might have been erroneous, with new, accurate knowledge (Ogle, 1986, 565).

Carr & Ogle (1987) revised the strategy into the KWL-Plus scheme, short for Know, Want, and Learn plus Mapping and Summarizing. The researchers supplemented the traditional K-W-L strategy with mapping and summarization strategies for use in content area texts. And they define KWL-Plus is an extension of the strategy that helps students organize and summarize important information from the text. These additions to the K-W-L strategy were helpful for remedial and non-remedial high school students, guiding them in advanced reading (Strangman & Hall, 2009). KWL-Plus is a reading and thinking strategy which focuses on the student as a learner. It is a highly effective strategy that supports nonfiction inquiry and clarifies thinking. Ogle claims KWL helps learners become better readers of expository texts and helps instructors to be more interactive in their teaching. After doing several KWL-Plus activities, learners are encouraged to use it as an independent learning strategy to activate their prior knowledge and also extend their KWL scheme to confirm the accuracy of their prior knowledge and of what they learn. This helps them set a definite purpose for reading and record what they have learned (Conner, 2006). The KWL-Plus helps students to:

1. Recall what is known (K);
2. Determine what students want to learn (W);
3. Identify what have learned (L); and
4. Map text and summarize information (Plus).

When mapping, learners categorize what they learned. Placing the title at the center of the map, they form categories as major branches, and add explanatory concepts. When summarizing, learners number the concepts on the map and choose to make them a written summary. The summary becomes a useful summative evaluation learners can use to evaluate their comprehension (Fengjuan, 2010, 79).

### **Procedures of Teaching Using KWL-Plus Strategy:-**

The strategy is designed to be used by a teacher and group of students working together. The following are the procedures of teaching using KWL-Plus (ogle, 1992):

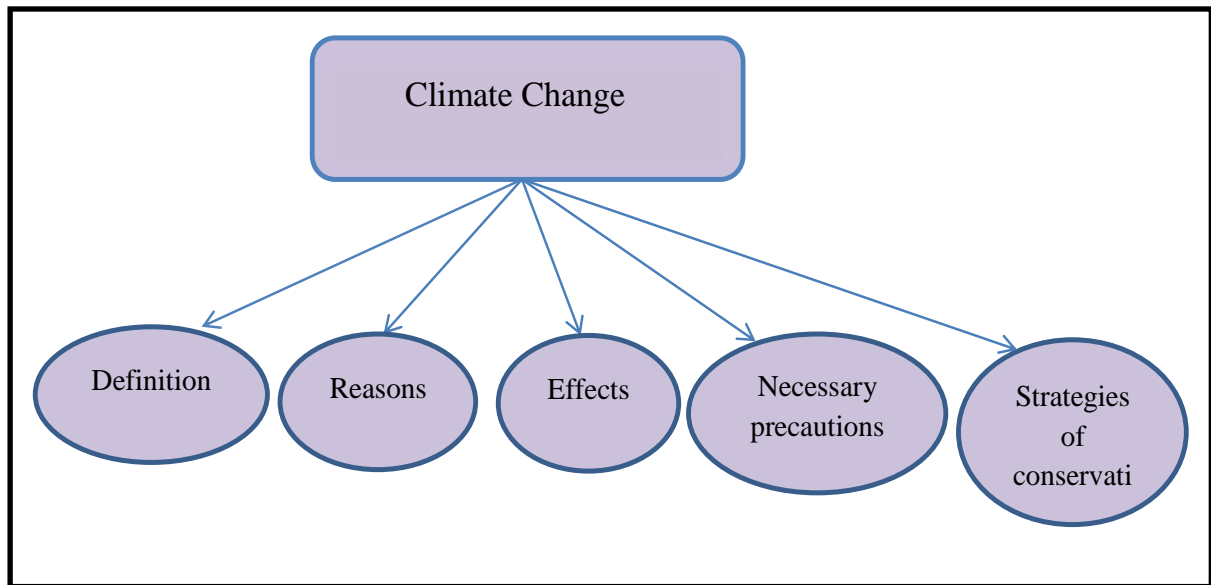
1. Introduce and explain the strategy to each of the student groups, or even to the group as a whole.

2. Distribute copies of activity sheet to students, or create a class KWL organizer using chart paper and indicating the three parts by putting a K in the first column, a W in the second column, and an L in the third column. Choose a topic and guide the students in a brainstorming activity to generate ideas regarding what they already know about this topic. And the students will place it in the **K** column. The students are to describe orally to the teacher any background information that they may have and the teacher would then write it on the board in the **K** column.
3. Questioning is an important part of being able to do in depth research on a given topic. Guide students in generating questions they would like answered about the given topic. Use probing questions to encourage students to think. This becomes the information for the **W** column and students will write these questions in the **W** column. Students should be given text about the topic. They can read the text independently or in small groups. Text should be in manageable segments until the student becomes familiar with the technique. Reading text in segments allows students to become aware of what they are learning as well as what they have not comprehended.
4. As students read the text and encounter new information, they can add questions to the **W** column. Thus, as students proceed through the material, they constantly think about what they read, monitor their learning, and perhaps generate additional questions to guide their reading. As they research with an eye toward answering the questions they have posed, the student should note new information in the **L** column, which identifies what he/she has learned. Students will record the answers to their questions as well as other information they have learned. In many cases, they also find out that what they thought they knew was inaccurate.
5. Guide students through the process of categorizing information in the **K** column. This allows them to anticipate areas of information they may find in their research. Have students ask themselves what each statement describes. Model the categorization process by thinking aloud while identifying categories and combining and classifying information. The KWL-Plus strategy is set up in the form of the following chart:

<b>KWL-PLUS STRATEGY SHEET</b>		
<b>Name:</b>		
<b>Topic: Climate Changes</b>		
<b>K - What We Know</b>	<b>W - What we Want to Learn</b>	<b>L - What We Learned</b>
<ul style="list-style-type: none"> <li>▪ Climate change is a change in air temperature, winds and rains.</li> <li>▪ There is relationship between climate change and greenhouse.</li> <li>▪ C.C causes high temperature, high a level of sea surface and flooding.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Climate change definition.</li> <li>▪ Reasons that stand behind occurrence of climate change.</li> <li>▪ Role of industrial technology for increasing gases of greenhouse.</li> <li>▪ Effects of climate change on Environment and natural resources.</li> <li>▪ Effects of climate change on population communities.</li> <li>▪ Necessary precautions for facing climate change problems.</li> <li>▪ Strategies of conservation of natural resources from climate change.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Climate change definition is .....</li> <li>▪ There are many reasons lead to occurrence the climate change, they are: .....</li> <li>▪ The role of industrial technology for increasing gases of greenhouse is .....</li> <li>▪ The effects of climate change on Environment are .....</li> <li>▪ The effects of climate change on natural resources are .....</li> <li>▪ The effects of Climate change on natural resources are .....</li> <li>▪ The necessary precautions for facing climate change problems are .....</li> <li>▪ The strategies of conservation of natural resources from climate change .....</li> </ul>
<b>Categories of Information We Expect to Use</b>		
1. Definition of C.C	2. Reasons of C.C occurrence	3. Effects of C.C on Environment and natural resources.
4. Necessary precautions for facing climate change problems.	5. Strategies of conservation of natural resources from climate change.	

6. The next step could be for students to create a map/web with the information. Through listing and categorizing, the most difficult tasks of constructing a map are already completed. Instruct students to use the article title as

the center (big idea) of their map. Categories developed with the KWL-Plus organizer become the map's major concepts, with explanatory details subsumed under each. Lines show the relationship of the main topic to the categories. The following figure illustrates the KWL-Plus map:



**Figure (1):-** KWL-Plus map

7. Guide students in writing a summary of their data. The most difficult part of summarizing has already been completed. Instruct students to use the map as an outline for their summary. The map's center becomes the title of the summary. Students number the categories on the map in the sequence they prefer. Each category forms the topic for a new paragraph. Finally, supporting details in each category are used to expand the paragraph or explain the main idea.

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

Because the participants are not randomly selected from the population, this research adopted a “quasi-experimental pre-test, post-test two groups” design.

#### **Sample of the Research:-**

The participants were chosen using intentional technique and consisted of (112) third year students from Physics and Mathematics Departments in the College of Education at Ibb University, Yemen. Each one of the two departments, were randomly assigned, Mathematics students was assigned as an experimental group for KWL-Plus strategy and Physics students was assigned as a control group for conventional teaching approach.

The experimental group consisted of (57) students, while (55) others were in the control group.

#### **Instruments of the Research:-**

To accomplish the objectives of the research, the researcher construct two instruments; an Environmental awareness test, and an attitude scale towards Environment.

#### **Environmental Awareness Test (EAT):-**

In this research, the researcher prepared the Environmental awareness test to measure the students' mastery of the topics of Environment and consisted of forty four multiple choice items.

For estimating the validity, the content validity was established. All the items were reviewed by the experts for validation. And the experts confirmed that the items included in the Environmental awareness test are valid and relevant for measuring Environmental awareness of college students.

The Environmental awareness test was tried out on other sample of fifty students. The procedure suggested by Al-Bana'a (2017, 150) was employed for item analysis. The items with a difficulty index in the range of (21-80 %) and discriminating power greater than (0.20) were selected.

Besides the above, reliability of the test was established using internal consistency coefficient (Kuder Richardson-21 Equation) and found to be (0.86) which indicates high reliability of the test.

The final test consisted of forty items and the time duration fixed for the test was seventy minutes and the maximum score of the test was forty. The maximum score that could be obtained on test is (40).

#### **Attitude Scale towards Environment (ASTE):-**

For the present research, the researcher constructed the attitude scale towards Environment consisting of thirty two statements. The scale was constructed based on Likert method.

The scale was submitted for experts' evaluation to establish the content validity. And the experts confirmed that the statements included in the attitude scale towards Environment are valid and relevant for measuring attitude towards Environment of college students.

Also, construct validity technique was used. And correlation analysis was done using Pearson's Product Moment Correlation. The correlation coefficient between score of each item and total score of the scale was significant which indicates high validity of the scale.

Stability coefficient (test-retest) was established to ascertain the reliability of the scale. The correlation coefficient of the two sets of scores calculated using Pearson's Product Moment Correlation obtained (0.81), indicating high reliability of the scale.

The final scale consisted of thirty two statements and fifty percent statements were of positive polarity and remaining fifty percent were of negative polarity. Each statement therefore contained five alternative responses such as Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD). For the positive statements, the scores assigned are as follow: SA=5, A=4, U=3, D=2, SD=1. Negative statements were assigned scores in the reverse order. The scale statements are arranged in such a way that the positive statements appeared randomly among negative statements. The maximum score that could be obtained on scale is (160).

#### **Implementation of the Research Experiment:-**

In the Implementation stage, mainly three activities were carried out:

##### **Administration of pre-test:-**

The developed instruments were administered as pre-test to the students of both the experimental and control groups for measuring Environmental awareness and attitude towards Environment. Besides, the groups were homogenized on their level of second year achievement.

##### **Experimental Treatment:-**

The experimental group was taught using KWL-Plus strategy while the control group was taught the same content by conventional teaching approach. Both groups were taught by the researcher.

The lectures were taught to the two groups in seven weeks which was of two hours duration each.

##### **Administration of post-test:-**

Immediately after the experimental treatment was completed, the subjects were administered the post-test for all the dependent variables: Environmental awareness and attitude towards Environment.

#### **Results and Discussion:-**

To study the effect of KWL-Plus strategy on Environmental awareness and attitude towards Environment for college students, analysis of t-test was employed to find out the significant difference between mean scores of the groups. Table (1) shows the independent samples t-test result for significant difference between the experimental and the control groups on Environmental awareness.

**Table 1:-** t-test for significant difference between the experimental and the control groups on Environmental awareness

Group	N	Mean	S.D	df	t' value	p value	Effect Size
Experimental	57	31.52	2.50	67	9.19	0.000	0.42
Control	55	25.45	4.28				

As it shown in the table (1), the obtained 't' value for the post-means of EG and CG on Environmental awareness is significant ( $p < 0.01$ ), where mean scores of the experimental group (31.52) is found to be significantly higher than the control group (25.45). It means there is significant difference is seen in in favor of the experimental group regarding Environmental awareness test.

This finding confirmed the findings of the study of Dhawan et al (2005), demonstrating that the student teachers at Garhwal University had more Environmental knowledge.

The reason for the experiment group where the KWL-Plus strategy is applied is more successful than the control group is the result of the positive involvement of the students in the learning process itself has built in them the desire to know, and encouraged them to participate and produce. The KWL-Plus strategy helps students in asking themselves questions, thinking logically, researching and answering them. Also, it creates a discussion ambient within the group members. And this has a stimulant effect on the students. Besides, the KWL-Plus provides a structure for activating and building prior knowledge, establishing a purpose for reading and for mapping, organizing and summarizing what have learned. On the other hand, the strategy motivates the students more and evaluates their learning experience.

The comparative result of the independent samples t-test for significant difference between the experimental and the control groups on attitude towards Environment is given in the table (2).

**Table (2):-** t-test for significant difference between the experimental and the control groups on attitude towards Environment

Group	N	Mean	S.D	df	t' value	P value
Experimental	57	124.07	9.42	110	1.58	0.116
Control	55	127.14	11.07			

As it shown in the table (2), the obtained 't' value for the post-means of EG and CG on attitude towards Environment is not significant ( $p > 0.01$ ). It means there is no significant difference is found regarding attitude scale towards Environment.

As the study showed the reason for this result due to the neglecting affective aspects through teaching both EG and CG. Besides, the students were not exposed towards active participation in non-formal educational activities such as seminars, workshops, demonstrations, exhibitions, nature treks, tree plantation etc. whereby all these activities provide students chance for integrating with Environmental components that leads to construct intimate emotion between students and Environment.

To study the significant difference between mean scores of male students and female students in Environmental awareness and attitude towards Environment, independent samples t-test is used and the details are presented in table (3).

**Table (3):-** t-test for significant difference between male and female on Environmental awareness and attitude towards Environment

Variable	Gender	N	Mean	SD	t-value	P value
Environmental Awareness	Male	25	30.88	2.57	1.75	0.085
	Female	32	32.03	2.37		
Attitude towards Environment	Male	25	122.56	8.38	1.07	0.289
	Female	32	125.25	10.13		

As it seen in the table (3), the obtained 't' values for Environmental awareness and Attitude towards Environment are found to be not significant ( $P > 0.05$ ). It means there is no significant differences are found between male and female regarding Environmental awareness test and attitude scale towards Environment.

As the study revealed, the reason for this result due to both male students and female students were exposed to same educational situations and taught with same formal education setting.

#### **Implications:-**

The KWL-Plus is an effective approach, which Environment Education faculties need to incorporate in their teaching. The KWL-Plus strategy motivates active learning and instructing on the parts of both learners and instructors. This strategy breaks up into three different parts to focus on a different aspect of the student's individual learning style. This can also help with categorization.

#### **Recommendations:-**

1. Environment Education course should be taught using KWL-Plus strategy.
2. The Environment Education faculties should blend a variety of teaching methods and strategies appropriate of teaching for increasing the level of students' Environment awareness and attitude towards Environment.
3. Environment Education course should be enriched with non-formal educational activities and implemented effectively.

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