# Effectiveness of a Proposed Program in the Medical Geography Using Geographical Information System( GIS) for Promoting Health Culture and Environmental Skills among Students of Geography Department at faculty of education

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**Abstract:**

The recent study aim for investigating the effectiveness of a proposed program in Medical Geography to develop Health Culture and environmental skills among the students at department of geography, faculty of education. The search sample included the students of fourth year at department of geography, faculty of education, Tanta University. To achieve the aim of the study, the proposed program was prepared in medical geography using GIS. In addition, a test of Health Culture, a scale of the environmental skills, papers for the students and a teacher guide were prepared as well. Furthermore, the experimental methodology was adopted in the study. The findings of the search manifested a great effectiveness of the proposed program in Medical Geography using Geographic Information Systems (GIS) for developing the Health Culture and environmental skills of the students at faculty of education, department of geography.

**Keywords:** Medical geography, geographic information system, Health Culture, Environmental skills.

# فاعلية برنامج مقترح في الجغرافيا الطبية باستخدام نظم المعلومات الجغرافية لتنمية الثقافة الصحية والمهارات البيئية لدى طلاب شعبة الجغرافيا بكلية التربية

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**مستخلص**:

هدف البحث الحالي إلى تقصى فاعلية برنامج مقترح في الجغرافيا الطبية باستخدام نظم المعلومات الجغرافية لتنمية الثقافة الصحية والمهارات البيئية لدى طلاب شعبة الجغرافيا بكلية التربية، وتكونت عينة البحث من طلاب الفرقة الرابعة شعبة الجغرافيا بكلية التربية جامعة طنطا ، واقتصر البحث على الجغرافيا الطبية: اقتصرت على ثلاثة أبعاد ؛ وهي : جغرافية الأمراض . جغرافية الرعاية والتنمية الصحية . نظم معلومات الجغرافية الطبية . و نظم المعلومات الجغرافية برنامج .( Arc GIS Desktop "10.3"Manual) والثقافة الصحية : اقتصرت على ثلاثة أبعاد ؛ وهي : الأمراض ، وطرائق الوقاية منها . البيئة ، وصحة الإنسان . الرعاية و التنمية الصحية ؛ وذلك بوصفهم أبعاداً أساسية ، و أكثر ارتباطاً بالجغرافيا الطبية ، بينما المهارات البيئية: اقتصرت على ثلاثة مهارات؛ وهي: إدراك المشكلات البيئية، وتحديدها . تنظيم البيانات، وتحليلها . إقتراح الحلول للمشكلات البيئية ولتحقيق الهدف من البحث تضمنت أدوات ومواد البحث . برنامج مقترح في الجغرافيا الطبية باستخدام نظم المعلومات الجغرافية لتنمية الثقافة الصحية والمهارات البيئية ، وكذلك . أوراق عمل للطلاب المعلمين خاصة بتنفيذ المهام المتعلقة بتدريس البرنامج وايضا شملت دليل المعلم / المحاضر في البرنامج المقترح و كتيب الطالب المعلم في البرنامج المقترح .وتم إعداد قائمة بأبعاد الثقافة الصحية وايضا قائمة بالمهارات البيئية واختبار فى الثقافة الصحية ، ومقياس للمهارات البيئية ، استخدم المنهج التجريبي في التجربة الميدانية وأسفرت نتائج البحث عن فاعلية البرنامج المقترح فى الجغرافيا الطبية باستخدام نظم المعلومات الجغرافية فى تنمية الثقافة الصحية والمهارات البيئية لدى طلاب شعبة الجغرافيا بكلية التربية.

الكلمات المفتاحية : الجغرافيا الطبية , الثقافة الصحية.

**Introduction:**

Recently, the interest in health and health problems has increased; especially in light of the repercussions on the scene with regard to the threats of the emergence of many diseases, and the increasing rate of their spread. Perhaps, the emerging crisis of the Corona virus is one of the most prominent crises today that made the world alert and pay attention to the importance of integrating human efforts together for the sake of human health in the first place. That is the modern era is witnessing a plethora of diseases and their spread. This is due to the lack of a Health Culture that helps individuals to follow healthy behaviors at the stage in which they live which leads to raising the level of health. In other words, Health Culture is one of the most important areas of modern public health, since it is the process by which individuals learn how to protect, maintain, improve, restore, or remedy their health when sick.

Sabri (2016) and Atman (2016) agreed that Health Culture is an urgent societal necessity to help individuals improve their behavior, preserve their health, prevent the spread of diseases and epidemics, and change the unhealthy behaviors and habits; ending up with raising the level of health. Health Culture is viewed as a science that uses modern educational trends, means of communication, and educational technology to develop the health level of both the individual and the community.

Accordingly, the importance of a Health Culture is clear; it helps individuals to follow proper healthy behavior. Most health problems are

due to ignorance of information, knowledge, or behavior of the individual.

The interest in Health Culture is consistent with the view of education as a comprehensive and balanced development tool for the human being in general and for the student in particular, in terms of the physical, mental and emotional aspects, with the aim of building attitudes and values, and practicing healthy habits and healthy behavior patterns (Al-Gharibi, 2018). Asafovaa & Sazanovab (2016) state that the formation of healthy habits among individuals is of great importance and interest in contemporary education. Therefore, a number of previous studies concerned the development of Health Culture among learners; including the searchof Al-Zahrani (2014), Rosen (2015), and Morsi (2019).

Basically, environmental skills are among the life skills that can be acquired by student teachers, through which their interests and experiences expand. The interest in developing environmental skills is consistent with the objectives of the sustainable development strategy "Egypt Vision 2030" in the fields of education and the environment. Therefore, a number of studies concerned the development of environmental skills among learners; As the searchof: Al-Qaisi (2015), Awad (2012), and Alewa (2012).

Since the phenomenon of illness is a geographical phenomenon, the place plays a major role in the variance of its existence and patterns. Therefore, the interest in the phenomenon of illness contributed in the emergence of the field of medical geography, which

imposed itself on the arena of applied geography, allowing the possibility of revealing the diseases of the geographical environment and how they spread, the natural and human factors that contributed to that spread, and the health problems that the population suffers from. , and equitable geographical distribution of health care services (Al-Hassan, 2016). In the same vein, Photis (2016) expounded that medical geography can provide a spatial understanding about the health of a population, the distribution of diseases in an area, the extent to which the environment affects health and disease, and it also demonstrates the accessibility of health care, and the spatial distribution of diseases and health care providers.

As a consequence, the importance of medical geography increases, that it helps in understanding the nature of diseases and epidemics, knowing their sources, rates and places of spread, and awareness of the social, cultural, political and economic conditions and contexts for the spread of diseases (Dummer, 2018).

In this regard, Western civilization realized the importance of medical geography in the modern era and included it within the academic curricula. In the Arab world, we had to pay attention to medical geography, as some universities added a course called Medical Geography within their academic curricula, which has not yet been circulated in all universities (Jaber, 2014).

Due to importance of medical geography, many previous studies recommended the importance of teaching medical geography to

learners; including the searchof: Ismail (2017), Muhammedin (2018), Morsi (2019), and Salam (2020).

In this regard, it is necessary to clarify the relationship between medical geography from one hand, and Health Culture and environmental skills on the other hand. Morsi's search(2019) indicated that there is a relationship between health culture and geography in general; that the Health Culture varies according to the geographical borders between countries. Every society has its own health culture that stems from its geographical characteristics. In addition, health practices and behaviors differ in different geographical environments. Salloum (2017) and Al-Gharibi (2018) agreed that the goal of Health Culture is to achieve happiness and well-being for members of society. Abdul Jalil (2010) stated the possibility of medical geography's contribution to investigating a problem specific to the dangers of a particular disease, ways to prevent it, and the application of studies in medical geography on topics of optimal medical care at varying levels, and contribution to the well-being and happiness of humankind. Hence, sustainable health is achieved.

Accordingly, there is a particularly strong relationship between health culture and medical geography; since Health Culture aims to provide individuals with health awareness through providing them with health facts related to diseases and methods of prevention, environmental health, and health care services.

Therefore, medical geography has used Geographic Information Systems (GIS) as a powerful tool for understanding how disease

relates to a place in different ways. Such as: identifying the distribution of diseases, geographical resources associated with medical services, reducing disparities in medical services, improving access to these services, and preventing the spread of disease, meaning that health can be obtained everywhere and at any time (Bill, 2012).

In the same context, Wadhwa and Grady (2015) indicated that there has been a development in the topics that medical geography means; Especially after the great progress in geographic information systems; Therefore, a number of previous studies were concerned with the use of GIS in the searchof medical geography; Including the searchof: Al-Zayni (2010), Farid (2016), Photis (2016), Ali (2019), and Bawazir (2020).

Geographic Information Systems (GIS) are at the forefront of technological innovations in search of new technologies for teaching and learning geography; It is an essential part that is difficult to dispense with in geography in general, and teaching and learning of geography in particular In addition to supporting and developing the teaching and learning of geographical subjects; It enables the students to make a map, link metadata with spatial information, develop accurate, detailed observations.. Therefore, it is one of the basic requirements that the teacher needs in teaching geography (Al-Banna, 2017).

Some educational studies have confirmed the effectiveness of education accompanied by geographic information systems (GIS) technology. Including the searchof: Tawfiq (2013), Swailem (2014),

Webster (2015), Ghazi (2016), Al-Banna (2017), Shallakami (2018), and Al Duqil (2019).

Accordingly, the current searchemployed the style of teaching accompanied by geographic information systems (GIS), and the autonomous learning method on the GIS unit, which gives him the full opportunity to train, and perform the associated educational activities, commensurate with his own speed; in order to meet individual differences.

In sum, in the context of the increasing number of health problems, diseases, and their prevalence rate; We find the importance of developing a healthy culture and environmental skills among learners; In order to prevent them from diseases, preserve their health, form a comprehensive future vision for any health problem, and deal well with it; This is provided by medical geography using geographic information systems (GIS).

In fact, geographic information systems (GIS) are one of the most important digital technologies that provide a set of analyzes and important visualizations to explore the multiple dimensions of diseases, and mapping to determine disease intensity, endemic areas, and disease-threatened areas.

**The problem of the study:**

The problem of the search is derived from the following indicators:

- - The global health emergencies during the current environmental challenges imposes providing a sufficient amount of Health Culture and a better life for learners.

- – The recommendations of some international conferences and forums such as the following:
- The scientific conference for the Health Culture and psychological and social factors impacting health and disease, Iraq, April 17, 2017.
- The international conference around the public health and medical geography, Amsterdam, Holland, 2020.
- The scientific forum for the health GIS, Tunisia, 2021.

For deepening the sense of the problem of the current study; the two studyers conducted an exploratory search on a sample of (20) male and female student-teachers (Geography Department) in the Fourth Year (10 students in the Faculty of Education / Tanta University – 10 students in the Faculty of Education / Mansoura University) that included the following:

1- Applying a test on environmental skills, prepared by the studyers, on the pilot search sample. The results highlighted a low performance of student-teachers (the exploratory search sample) in responding to the test items. The following table illustrates the results well.

Table (1): Results of the pilot experiment on environmental skills.

| Number of student-teachers | Total grade | Highest grade | Lowest grade | The Mean |
|---|---|---|---|---|
| 20 | 30 | 14 | 6 | 9,35 |

In light of the previous table, it is clear that the average grades of student teachers reached (9.35) degrees which is equivalent to (31.2%) only of the total score for the test.

2- Applying a test on Health Culture, prepared by the studyers, on the pilot search sample. The results highlighted a low performance of student-teachers (the exploratory search sample) in responding to the test items. The following table illustrates the results well.

Table (2): Results of the pilot experiment on environmental skills.

| Number of student-teachers | Total grade | Highest grade | Lowest grade | The Mean |
|---|---|---|---|---|
| 20 | 20 | 8 | 2 | 4,7 |

In light of the previous table, it is clear that the average grades of student teachers reached (4.7) degrees that is equivalent to only (23.5%) of the total score for the test.

In order to emphasize the problem of the study, the study focuses on some previous studies which referred to the following:

- - The low level of the Health Culture for learners.
- - The weak level of learners' environmental skills.
- - The rare use of the GIS in teaching geography.
- - The importance of studying the topics of medical geography by learners.

**Methodology**

The problem of the search is derived from the weakness of the Health Culture level besides the few environmental skills of the learners at department of geography. Hence, the present search attempts to check the effectiveness of the proposed program in Medical Geography using a geographic information system GIS to develop the Health Culture and

the environmental skills for students at faculty of education, department of geography.

To address this problem, the current research attempts to answer the following main question:

What is the effectiveness of a proposed program in medical geography using geographic Information systems to developing health culture and environmental for students at faculty of education, department of geography?

Furthermore, there are many sub-questions related to the major question of the searches follows:

1. What is the Required Health Culture to be developed for students at faculty of education, fourth year, department of geography?
2. What are the necessary environmental skills to be developed for those students?
3. What are the fundamentals to be found in the proposed program?
4. What is the design and image of the proposed program in Medical Geography using a geographic information system to develop the skills of Health Culture and the environmental skills for students at faculty of education, department of geography?
5. What is the impact of the proposed program in Medical Geography using a geographic information system to develop the skills of Health Culture students at faculty of education, department of geography?
6. What is the impact of the proposed program in Medical Geography using a geographic information system to develop the environmental skills for students at faculty of education, department of geography?

**Hypotheses of the Study:**

The current search aim to check the validity of the following hypotheses:

1. There are no statistically significant differences at $(\alpha \geq 5,0)$ between the means of the experimental group students' degrees in the pre and post application of the Health Culture test as a whole.
2. There are no statistically significant differences at level of $(\alpha \leq 5,0)$ between the means of the experimental group students' degrees in the pre and post application of the different dimensions of the Health Culture test.
3. There is no statistically significant difference at the level of $(\alpha \leq 5,0)$ between the means of the experimental group students' degrees in the pre and post application of the environmental skills scale as a whole.
4. There are no statistically significant differences at level of $(\alpha \leq 5,0)$ between the means of the experimental group students' degrees in the pre and post application of the different dimensions of the environmental skills scale.

**Aims of the Study:**

The current search aims for investigating the effectiveness of the proposed program in Medical Geography using a geographic information system (GIS) to develop Health Culture and the environmental skills for students at faculty of education, department of geography.

**Significance of the Study:**

For the student teacher:

• Shedding light on the importance of studying medical geography topics; Because of its impact on the development of learners' Health Culture, providing them with health information, and acquiring trends, habits, and sound health practices.

• Helping student teachers to develop a healthy culture of environmental skills through their awareness of the environmental problems around them and the ability to identify them, and search for solutions to them.

For those in charge of university education programs:

Directing the developers of geography teacher preparation programs to the importance of including medical geography using geographic information systems, Health Culture and environmental skills within those programs.

For educational study:

• Providing evaluation tools and a set of recommendations and proposals that may be useful in conducting more future studies related to the current study field.

**Variables of the Study:**

There are two variables: the independent variable including a proposed program in Medical Geography using GIS besides the dependent variable which includes Health Culture and environmental skills.

**The Borders of the Study:**

• Medical geography: limited to three dimensions; geography of diseases – geography of health care and development – medical geographic information systems.

• Geographic Information Systems: Arc GIS Desktop " 10.3").

• Health Culture: limited to three dimensions: diseases and ways to prevent them – the environment, human health – health care and development as basic dimensions, and more related to medical geography.

• Environmental skills: limited to three skills: realizing and identifying environmental problems, organizing and analyzing data, proposing solutions to environmental problems.

• A sample of fourth year students, Geography Department, Faculty of Education / Tanta University, in the academic year 2020/2021.

**The Experimental Design of the Study:**

The recent study was performed by the experimental design with the mono group. It aimed to verify this proposed program to check its effectiveness in developing Health Culture and environmental skills for a sample of students at faculty of education, department of geography. It must be added that the program did not compare the search groups. This design is considered the suitable one to apply the tools of the study.

**Tools and Materials of the Study:**

The materials of the search were prepared by the two studyers as follows:

1. A proposed program in Medical Geography using a geographic information system (GIS) to develop Health Culture and environmental skills.
2. Pieces of paper to help students perform the tasks of the program.
3. A teacher's or a lecturer's guide.
4. A student's book.
5. A list of Health Culture dimensions.
6. A list of environmental skills.

The tools of the search included a test of Health Culture and scale of environmental skills.

**Procedures of the Study:**

1. The list of Health Culture dimensions was prepared according to the following steps:

- Identifying the aim of the list.
- Identifying the sources of the list.
- Forming the primary list of Health Culture dimensions.
- Adjusting the list by being judged by a group of specialists and experts.
- Forming the final edition of the list of Health Culture dimensions after referring to the judges' opinions.

2. The list of environmental skills of students at faculty of education, department of geography was prepared according to the following steps:

- Identifying the aim of the list.
- Identifying the dimensions of the list.
- Forming the primary edition of the list.

- Adjusting the final edition of the list.
- Designing the final shape of the list.

3. Making the test of Health Culture according to the following steps:

- Identifying the aim of the test.
- Identifying the test axes.
- Forming the test instructions.
- Making a table for the test specializations after defining the importance and proportional weight of each topic plus identifying the kind of phrases and forming the test.

- Adjusting the test by referring to the experts (external validity) and doing a diagnostic experiment on a random group (non basic sample) in order to clarify the test instructions, put a fixed time for the test and measuring the validity and reliability of the test.

**The pilot experiment is done to achieve the following:**

1. Clarifying the instructions of the test.
2. Specifying the time of the test.
3. Measuring the validity and reliability of the test.

**Table (3):** a correlation coefficient between every dimension degree of the test and the whole degree of the test

| | Dimension | **Alpha Cronbach** |
|---|---|---|
| 1 | Diseases and protection | 0.63 |
| 2 | Environment and human's health | 0.64 |
| 3 | Care and health development | 0.66 |
| 4 | The whole test | 0.64 |

4. Preparing scale of environmental skills according to the following steps:

- Defining the aim of the scale.
- Defining the scale dimensions.

**Table (4)**: number of phrases at environmental skills scale.

| Environmental skills | Number of phrases | Numbers |
|---|---|---|
| Defining the environmental problems | 10 | 1 – 10 |
| Organizing and analyzing environmental data | 10 | 11 – 20 |
| Suggesting solutions for environmental problems | 10 | 21 – 30 |
| Total | 30 | |

- Designing the primary edition of the scale.
- Making the scale instructions.
- Defining the method of scale.
- Adjusting the primary edition of the scale by referring to judges' validity, self–validity and checking the pilot experiment which included 35 students at fourth year of the faculty of education, Tanta University, geography department on Saturday corresponding to October 10,2020 to calculate the emotional intensity of the scale its credibility and the time of performing the scale.
- Designing the final image of the scale which has become available to be applied.

5. Preparing the theoretical framework by reviewing the literatures which relate to the variables of the current study.

6. Preparing the proposed program according to the fundamentals and philosophy of the proposed program.
7. Preparing the proposed program according to the previous steps.
8. The proposed program was established according to the ADDIE model. Then, it was reviewed by a group of reviewers specialized in curricula and teaching methods of geography, psychology, and medical geography to determine its validity for application. The modifications were performed in the light of the reviewers' opinions.
9. Preparing an adjusted teacher's guide.
10. Preparing an adjusted student's book.
11. Defining the effectiveness of the proposed program in developing Health Culture and environmental skills.
12. Using proper statistic methods for processing the data of the pre and post application.
13. Displaying and discussing results.
14. Introducing suggestions and recommendations of the present search to open the way for more related study.

**The Search Results:**

**First:** results of fourth – year students at faculty of education, Tanta University, geography department participating in search sample concerning the test of Health Culture as a whole.

- **To what extent is using the proposed program effective in Medical Geography using GIS for developing Health Culture as a whole among the students of geography department?**

In order to compare the performance of the experimental group students on the health culture test before and after using the proposed program, the two studyers calculated the value of “t” and its statistical significance for the difference between the mean scores of the experimental group students in the two applications before and after the health culture test as a whole, and table (5) shows a summary of the findings.

**Table (5):** “T” value and statistically significant differences between the means of experimental group students’ degrees in the pre and post application of the Health Culture
Test as a whole.

| Group | Sample size | means | Standard deviation | Freedom degree | Level of significance | Value of “T” | Significance at level of 0.05 |
|---|---|---|---|---|---|---|---|
| **Pre application** | 25 | 12.50 | 6.12 | 14 | 0.001 | 15.23 | Statistically significant |
| **Post application** | 25 | 45.00 | 3.11 | | | | |

- The results of Table (5) indicate that the difference between the mean scores of the students of the experimental group and the search sample on the Health Culture test as a whole, pre and post, is statistically significant at the level (0.05) in favor of the post application, where the calculated “T” value was statistically significant at the level of significance (0.05).

• Accordingly, the first null hypothesis of the study hypotheses was rejected, which states that "there is no statistically significant

difference at the level $(\alpha \geq 0.05)$ between the mean scores of the experimental group students in the pre and post applications of the Health Culture test as a whole." , the Figure$(1)$ shows this.

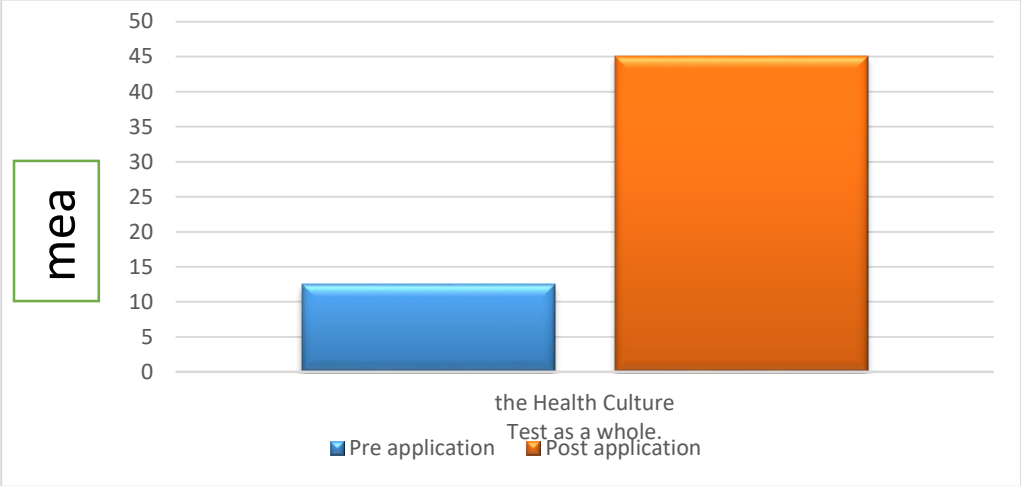


Figure $(1)$ the scores of the students of the experimental study group on the pre and post applications of the health culture test as a whole

Hence, it is obvious that the independent variable (the proposed program) has a significant effect on the dependent variable (Health Culture as a whole), but it does not indicate the size of the effect or the degree of the relationship between the two variables, and to find the strength of the relationship between the two variables. The value of (d) was calculated it was $(8.14)$. This value $(<0.8)$ indicates the strength of the influence of the independent variable (the proposed program) on the dependent variable (the health culture as a whole), which shows the practical effectiveness of using the proposed program.

**Second**: displaying the results of the fourth – year students at faculty of education, Tanta University, geography department participating in the search sample concerning the test of different dimensions of Health Culture as separate items.

- **To what extent is using the proposed program effective in Medical Geography using GIS for developing Health Culture focusing on each separate dimension among students at faculty of education, Tanta University, geography department?**

**Table (6)**: "T" value and statistically significant differences between the means of experimental group students' degrees in the pre and post application of different dimensions of Health Culture Test.

| Dimension | Group | Sample size | Means | Standard deviation | Freedom degree | Level of significance | Value of "T" | Significance at level of 0.05 |
|---|---|---|---|---|---|---|---|---|
| **Disease and protection** | **Pre** | 25 | 4.5 | 2.390 | 19 | 0.001 | 15.30 | Statistically significant |
| | **Post** | 25 | 15.5 | 3.43 | | | | |
| **Environment and health** | **Pre** | 25 | 4.1 | 2.90 | 19 | 0.001 | 17.80 | Statistically significant |
| | **Post** | 25 | 15.7 | 1.46 | | | | |
| **Care and health development** | **Pre** | 25 | 3.9 | 1.90 | 19 | 0.001 | 12.82 | Statistically significant |
| | Post | 25 | 13.8 | 2.54 | | | | |

– The results of Table (6) indicate that the differences between the mean scores of the students of the experimental group in the pre and post applications of the Health Culture test, each dimension separately, are statistically significant differences at the level (0.05) in favor of the

post application, where the calculated "t" value was statistically significant at the level $(0.05)$ for each dimension separately.

- Accordingly, the second null hypothesis of the study was rejected, which states that "there are no statistically significant differences at the level $(\alpha \geq 0.05)$ between the mean scores of the experimental group students in the two applications, pre and post, for the health culture test, each dimension separately. , the Figure$(2)$ shows this

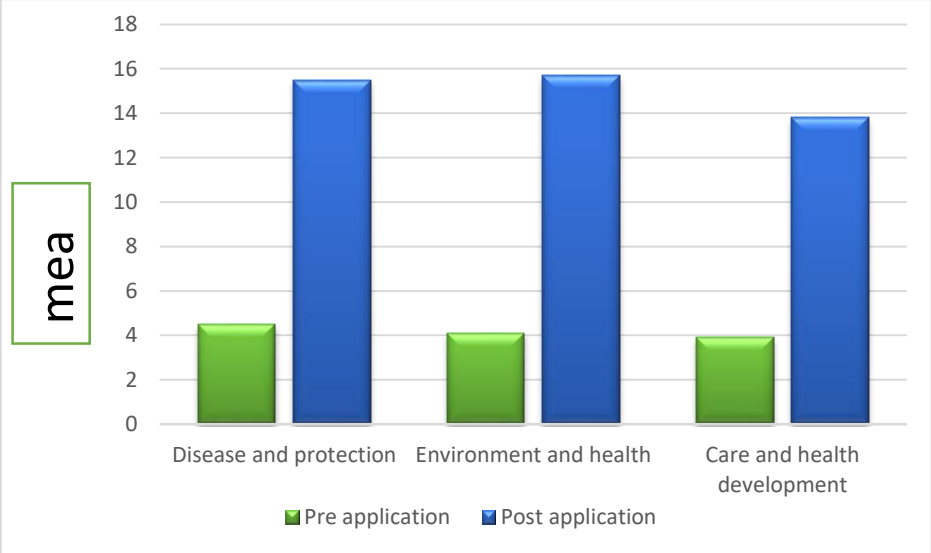


Figure $(2)$ the mean scores of the experimental group students in the pre and post applications of the health culture test each dimension separately.

- **Third:** displaying the results of the fourth – year students at faculty of education Tanta University, geography department participating in search sample concerning the environmental skills scale as a whole unit.

- **To what extent is using Medical Geography using GIS effective in developing environmental skills as a whole among students at faculty of education, Tanta University, geography department?**

**Table (7):** "T" value and statistically significant differences between the means of experimental group students' degrees in the pre and post application of the environmental skill scale as a whole.

| Group | Sample size | means | Standard deviation | Freedom degree | Level of significance | Value of "T" | Significance at level of 0.05 |
|---|---|---|---|---|---|---|---|
| **Pre application** | 25 | 10.60 | 2.23 | 24 | 0.001 | 19.23 | Statistically significant |
| **Post application** | 25 | 26.40 | 2.11 | | | | |

- The results of Table (7) indicate that the difference between the mean scores of the students of the experimental group and the study sample on the scale of environmental skills as a whole, pre and post, is a statistically significant difference at the level (0.05) in favor of the post application, where the calculated "t" value was statistically significant at the level of significance (0.05).

- Accordingly, the third null hypothesis of the study hypotheses was rejected, which states that "there is no statistically significant difference at the level (α 0.05) between the mean scores of the

experimental group students in the two applications, pre and post the environmental skills scale as a whole."

- Thus, it is clear that the independent variable (the proposed program) has a significant effect on the dependent variable (environmental skills), but it does not indicate the size of the effect or the degree of the relationship between the two variables, and to find the strength of the relationship between the two variables (the independent and the dependent) the value of (d) was calculated. It was (7.85), and this value (<0.8, which indicates the strength of the influence of the independent variable (the proposed program) on the dependent variable (environmental skills as a whole), and this shows the effectiveness of using the proposed program in practice, the Figure (3) shows this

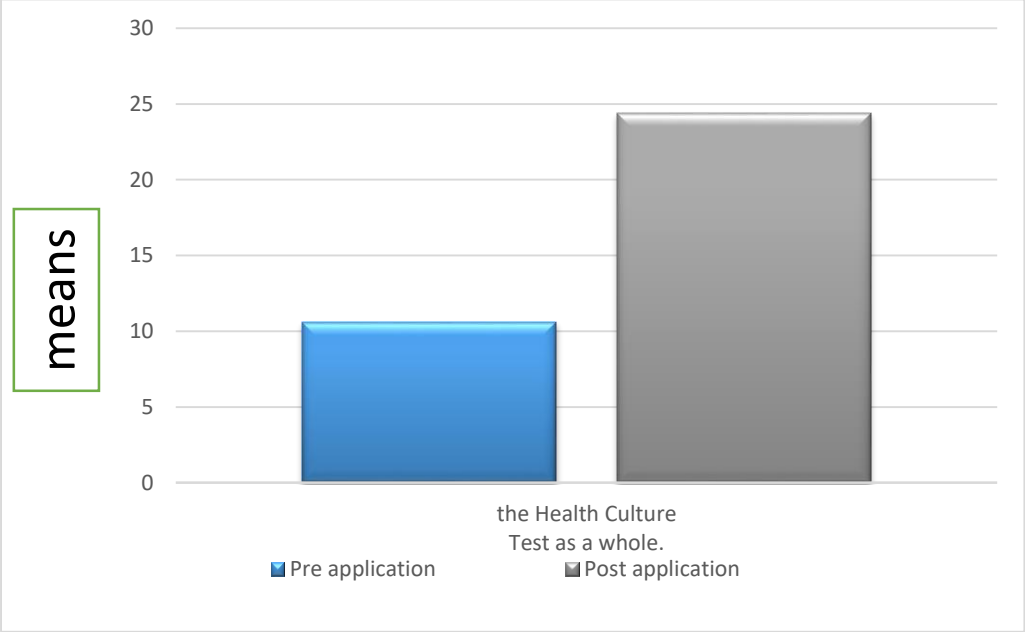

Figure (3) the scores of the students of the experimental study group on the pre and post applications of the environmental skills scale as a whole.

**Fourth:** displaying the results of the fourth – year students at faculty of education, Tanta University, geography department participating in search sample concerning the environmental skills scale focusing on each separate skill.

- **To what extent is using the proposed program in Medical Geography using GIS is effective in developing environmental skills as separate items for students at faculty of education, Tanta University, geography department?**

**Table (8):** "T" value and statistically significant differences between the experimental group students' degrees in the pre and post application of the environmental skills (each skill is separated from the other).

| Dimension | group | Sample size | means | Standard deviation | Freedom degree | Level of significance | Value of "T" | Significance at level of 0.05 |
|---|---|---|---|---|---|---|---|---|
| **Disease and protection** | **Pre** | 25 | 3.5 | 1.30 | 24 | 0.001 | 12.42 | Statistically significant |
| | **Post** | 25 | 8.5 | 2.32 | | | | |
| **Environment and health** | **Pre** | 25 | 3.1 | 1.90 | 24 | 0.001 | 14.30 | Statistically significant |
| | **Post** | 25 | 9.7 | 1.56 | | | | |
| **Care and health development** | **Pre** | 25 | 4.0 | 1.17 | 24 | 0.001 | 13.50 | Statistically significant |
| | Post | 25 | 9.2 | 3.11 | | | | |

- The results of Table (8) indicate that the differences between the mean scores of the students of the experimental group in the pre and post applications of the environmental skills scale, each skill separately, are statistically significant differences at the level (0.05) in

favor of the post application, where the calculated "t" value was statistically significant. At the significance level $(0.05)$ for each dimension separately.

- Accordingly, the fourth null hypothesis of the study hypotheses was rejected, which states that "there are no statistically significant differences at the level $(0.05 \geq \alpha)$ between the mean scores of the experimental group students in the two applications, before and after the environmental skills scale, for each skill separately, the figure $(4)$ shows this

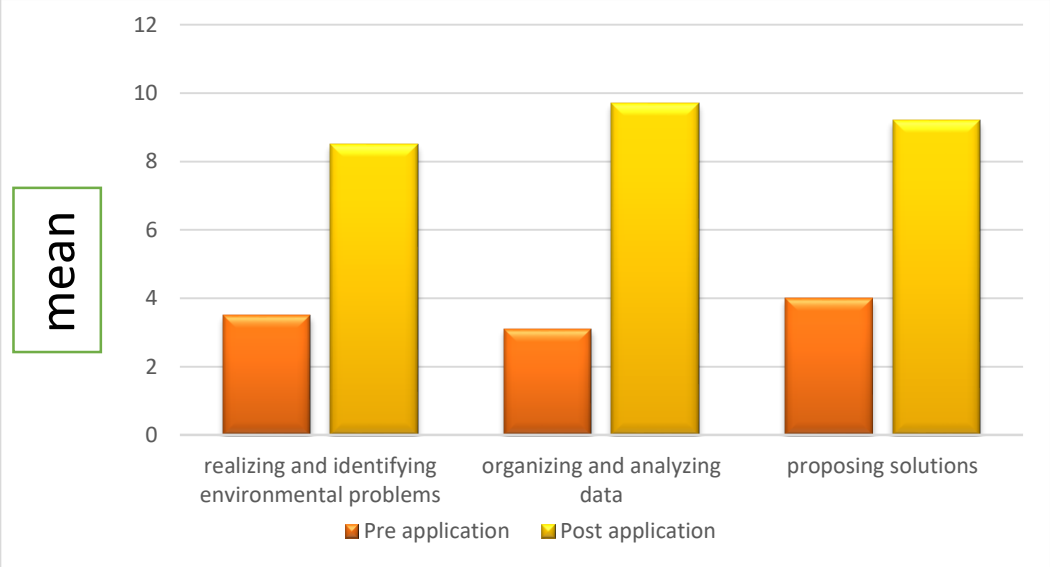


Figure $(4)$ the mean scores of the experimental group students in the pre and post applications of the environmental skills scale, each skill separately.

**Discussion of the results**

It is clear that the proposed program has proved to be effective in developing the Health Culture and environmental skills of the students at faculty of education, department of geography This is due clarity of

objectives, organization of educational content, and familiarity of the student with the steps, as well as ease and flexibility in dealing with the program, Using the program is in line with the developments of the age and the world around us, which has motivated students to learn about its contents and how it works, to benefit from it in geographical issues on the one hand, and in the labor market on the other hand, The proposed program is a new method for teaching and learning for students. Firstly, it was difficult for them to understand it because they search medical geography and geographic information systems only in theory, but by the time the students liked it and interacted with it and the evidence for that is the results of the study, The nature of the program contains geographical maps, which led to attracting their attention and the emergence of the principle of competition among them. The student is responsible for his work, as well as their self-confidence, increasing their ability to learn, and making efforts to achieve the goal of the study, Adding activity and vitality to the learning process by making its topics realistic geographic, which led to the active participation and integration of students in learning the program ,The topics of the program related to medical geography are vital and of a special nature, as they deal with the distribution of diseases and identify their locations and spread. Thus, it is possible to identify the nature of the problem (disease) and the possibility of finding solutions to it through the participation of students in learning the program and the emergence of their abilities and capabilities to identify the problem and discovering its causes and participating in finding solutions to it.

This is one of the goals of teaching geography by developing the ability to think of its various types and showing the abilities and potentials of learners.

**Recommendations:**

In the light of the results of the study, the study recommends the following:

- ❖ Work to establish colleges and institutes that graduate medical geography specialist.
- ❖ It is important to teach medical geography in all different stages of education.
- ❖ Making University students aware of the importance of Health Culture via making workshops and training courses.
- ❖ Designing programs for developing Health Culture in all stages.
- ❖ Providing the laboratories of the faculty of education with the latest technologies and GIS to be available for being studied.
- ❖ Holding forums and courses in GIS for students and teaching staff.
- ❖ Making a strategic plan for spreading Health Culture including its concept, principles, and importance.
- ❖ Environmental skills must be included in the geographical curricula for different search stages.

F**uture study**

In the light of the results of the study, some study can be suggested:

- Teaching medical geography for students of secondary one to understand skills of maps.

- A proposed program in Medical Geography to develop the protective awareness of students at faculty of education, department of geography.
- A proposed curriculum in geographical Health Culture for developing health awareness of prep students.
- Using an effective educational program of medical geography using GIS for developing skills of solving problems creatively and managing crises for secondary school students.
- A strategy based on dimensions of Health Culture to develop health awareness for primary students.
- Developing geography curricula at secondary stage in the light of Health Culture.
- Effectiveness of using a proposed educational unit in medical geography to develop future thinking and making decisions for secondary school students.

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