Leadership Teaching Through Environmental Education: Grade 9 Students as a Showcase

تدريس القيادة عبر التربية البيئية: طلاب الصف التاسع نموذجًا

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Abstract **Turnitin: 17%**

Environmental Education is a part of the education for sustainable development. In addition, leadership and more particularly educational leadership is a life skill that is shown to influence students' achievements but also to build the needed future leaders who will empower change in the community. On the other hand, Lebanese educational curriculum lacks the environmental education content, and a quick overview reflects ecological problems at many levels in the country. Moreover, observations over many years of social work reveals the absence of both environmental awareness and leadership abilities among Lebanese people. Hence, leadership programs target mainly youth but not school students. Or study focuses on the educational leadership from a student perspective where an environmental activity is designed based on Mezirow's transformative learning theory in order to reveal its effect on grade 9 students transformational leadership abilities. John C. Maxwell assessment tool was used to evaluate students' leadership abilities before and after the activity. Results and statistical analysis showed that the designed environmental activity has a significant effect on students' thoughts toward their plans for personal growth and their impact as leaders. This effect induced a transfer of students' leadership abilities from being possible leaders to be considered as leaders where action is recommended to empower them among peers in order to benefit from their impact on followers.

Keywords: Environmental Education, Transformative learning, Transformational Leadership, Educational Leadership, Student.

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الملخّص

التعليم البيئي هو جزء من التعليم من أجل التنمية المستدامة. بالإضافة إلى ذلك، فإنّ القيادة، وخاصة القيادة التربوية، هي مهارة حياتيّة أثبتت أنها تؤثر على إنجازات الطلاب، ولكنها أيضًا تبني القادة المستقبليين المطلوبين الذين سيمكنون التغيير في المجتمع. من ناحية أخرى، يفتقر المنهج التعليمي اللبناني إلى محتوى التعليم البيئي، وتعكس نظرة عامة سريعة المشاكل البيئية على العديد من المستويات في البلاد. علاوة على ذلك، تكشف الملاحظات مدى سنوات عديدة من العمل الاجتماعي عن غياب الوعي البيئي وقدرات القيادة بين اللبنانيين. وتستهدف برامج القيادة الشباب بشكل أساسي، ولكن ليس طلاب المدارس. تركز الدراسة على القيادة التربوية من منظور الطالب إذ يُصمَّم نشاط بيئي بناءً على نظرية التعلم التحويلي لميزيرو من أجل كشف تأثيره على قدرات القيادة التّحويليّة لطلاب الصف التاسع. استُخدِمت أداة تقييم جون سي ماكسويل لتقييم قدرات القيادة لدى الطلاب قبل وبعد النشاط. أظهرت النتائج والتحليل الإحصائي أن النشاط البيئي المصمم له تأثير كبير على أفكار الطلاب تجاه خططهم للنمو الشخصي وتأثيرهم كقادة. أدى هذا التأثير إلى نقل قدرات القيادة لدى الطلاب من كونهم قادة محتملين إلى أساس أنّهم قادة فيوصى باتخاذ إجراءات لتمكينهم بين أقرانهم من أجل الاستفادة من تأثيرهم على المتابعين.

الكلمات المفتاحية: التعليم البيئي، التعلم التحويلي، القيادة التحويلية، القيادة التربوية، الطالب.

1. Introduction

This section presents the general framework of the study including the main problem, objectives and significance.

1.1. Purpose of the Study

This study encompasses leadership from students' perspective. It aims to assess the enhancement of leadership abilities through environmental education activity based on transformative learning and transformational leadership theories.

1.2. Research Problem

Leadership and more particularly environmental leadership are a priority for sustainable development goals achievements and preservation of the planet through positive human behavior toward the environment. This would not be successfully achieved without the role of education that is a master key playing a vital role in active citizens' preparation [1]

Particularly, in Lebanon, the environmental problems from water

pollution to solid waste crisis, to air pollution, eutrophication and poor food quality lead us to assume that environmental awareness among Lebanese people is still limited to specialists and activists in the field. This represents a challenge toward our development to a sustainable society [2]. Hence, environmental education is nearly absent in the Lebanese science curriculum although the presence of an environmental curriculum that application is still pending. This is accompanied by a noticeable lack in environmental awareness among Lebanese people in general but also students particularly. Observations over years of social work reveal also missing life skills that mark leadership qualities in both educational system and the community.

1.3. Research Question

The main question that this study will answer is: ***Does environmental education activity designed based on transformative learning theory enhance leadership competencies of students?***

1.4. Significance of the Study

Based on all the mentioned above, on the fact that high school students are the perfect option for future leaders in the environmental field [3], [4], and on the fact that schools are the perfect environment for leaders preparation, this study represents a new framework that employs transformative learning used usually for adults education to empower leadership competencies.

2. Literature review

2.1. Environmental Education and Education for Sustainable Development

In 1968, the UNESCO Biosphere Conference in Paris issued a declaration about a worldwide awareness of the field of Environmental Education. Later on, a global framework concerning this Environmental Education was declared during Tbilisi declaration (1977) [5], UNEP and UNESCO 1976 summits [6].

More recently in 1992, Agenda 21 on the UN suggested that a balance must be found between addressing the needs of the environment and those of humankind. Agenda 21 signaled the introduction of Sustainable Development discourse as well as the Education for Sustainable Development concept into school curricula throughout the world. This made a shift from the Environmental Education into the Education for Sustainable Development.

Education for Sustainable Development is more advanced

than the Environmental Education, it perceives the environment as a resource for economic development and for sustainable living [7].

In this context, Environmental Education programs were developed at the scholar level to be multidisciplinary programs that take into consideration different aspects of knowledge and skills that meet Sustainable Development Goals. Those programs should provide students with opportunities to develop confidence, knowledge, attitudes, and abilities through extended, active exposure to external situations (Dettman-Easler, D., & Pease, J. 1999). Typical programs would aim to increase environmental literacy, promote citizenship skills, and encourage behaviors that take place on site to be applied once the students return to their home communities [9], [10]. These experiences throughout this curriculum could offer opportunities for development at the personal level by encouraging teamwork, collaboration, and the development of leadership abilities, which are believed to have a positive impact on students at their academic level and professional futures (Stern, M. J., Powell, R. B., & Ardoin, N.M. 2008)

2.2. Leadership Studies

In the past, leadership studies were limited to social sciences, political science, psychology, management, etc.

Most of those studies addressed narrow dimensions and aspects within a specific area at a time like the behavior, the traits and the situation that structured some theories about leadership based on the perspective. Hence, theories developed after modernism and environmental changes that re-structured the leadership role and style.

Styles, roles and leadership definition would extend to schools, environmental actions and any space where influence on other people is exercised.

Few and very limited studies and references link between students' leadership and environmental education [12], or leadership and environmental concern [13]. Kyoungin et al. in 2011 revealed the influence of environmental education on leadership development in an "Asian Program for Incubation of Environmental Leaders" [14]. Moreover, at the scholar level, Okoth in 2018 studied the transformational leadership practices in environmental education and its effect in secondary schools in Kenya, hence leadership was taken into

account from the teacher perspective but not the student [15].

This makes the study concerning student leadership and more particularly environmental leadership teaching through environmental education at schools in an educational context important. Especially that we suffer globally and locally from many environmental crises that affect the life quality of our communities at many levels.

2.3. Educational Leadership

Developing undergraduate student leaders who are authentic in their leadership and who have a positive impact in their surrounding is of high importance, not only for the students, their peers and their schools, but it is strategically important for students' future employers and even the future of our society [16].

At the educational level concerning leadership, most of the classical studies focuses on the importance of teachers, school principals and employees leadership abilities and qualities on the school management, success and the student's outcomes efficiency [17]–[19]. Although, recent studies focus on the importance of student's leadership in higher education (Kiersch & Peters, 2017; Kopnina, 2020; Parkin, 2014; Skalicky et al., 2020)

more attention in education institutions. Consequently, programs that claim to develop leadership capabilities in students are diversified and developed continuously [20].

Transformational leadership is a conscious leadership that does not focus simply on a goal accomplishment but focuses on making followers trust their performing behaviors that contribute to achievement.

Excitement of the leader during communication, leader's charisma, high levels of self-confidence and esteem are essential to support the vision and the communicated knowledge. In the EE context, the students and teachers are likely to view environment issues differently. Hence, both feel some degree of responsibility to solve problems [3].

Ross and Gray in 2006 stated that transformational leadership behavior is positively correlated with high academic performance in schools. Transformational leadership has a benefit of the teachers as well. Transformational leadership behavior influences teachers' commitment to school's vision, professional community, school norms of collegiality, collaboration, and team work to think "Globally" and focus beyond own interest [26].

Transformative learning theory is

one of the learning strategies used to induce transformational leadership.

2.5. The Transformative Learning Theory

Transformative learning is generally associated with adults learning where Mezirow focused on sociology and adult education. The theory founded in the early 1970's evolved into detailed explanations about understanding, validating and reforming the meaning of what a learner experiences during the process.

And then in 2006 Mezirow founded the steps of thinking and the model of perspective transformation process in ten phases that will be discussed in the following Chapter3 [27].

Generally, the transformative learning theory is based on a learning method where fundamental change in the reference frames of fixed assumptions and expectations in the minds of adults are made. This leads to the transformation process in the ideas, knowledge, practices and future actions. Hence, inducing this transformation would not occur without a critical reflection and thinking to construct the new frames of meaning [28]–[33]. The critical thinking that plays the essential role in this transformation process is to be directed to change the frames of reference so that there can be a change in ideas and attitudes [33] and this is what we employed in the design of our intervention.

3. Methodology

The current study is an action research conducted on elementary school students where a general leadership test was employed to evaluate their qualities before and after an environmental interactive activity designed based on Mezirow's transformative learning theory.

The aims of this action research are (i) to investigate some leadership abilities of the grade 9 students and (ii) to reveal the impact of environmental education activities on the leadership abilities for the students' subject of this study.

The main question that this study will answer is:

Does environmental education respecting transformative learning theory enhance leadership qualities of students?

3.1. Research Design

The study is pre-experimental that groups one-shot case study where this group is subjected to a pre and a post-test. Knowing that the educational leadership of elementary school students in this context was not explored, this research design

is employed in order to reveal if the intervention of the study has an effect on the leadership qualities of students.

3.2. Research Sample

Experimental sample is a group of grade 9 students at an official school in south Lebanon. The sample is static. Intervention is held in person in interaction with the participants. Students are of English and French sections. The number of participants is 35 participants: 34 students and the teacher. Students' average age is 15.4 years with a standard deviation of 1.12 years. The students are divided between 50% males and 50% females respectively.

3.3. The Intervention

An interactive activity is designed based on transformative learning theory. The activity is followed by an open discussion about the topic and the perspectives of the topic. The activity is environmental that touches every Lebanese citizen's life. Intervention focuses on solid waste status in Lebanon. Knowing that Lebanon suffered from critical crisis in this field in 2015 in Beirut and lately in 2019 in Tripoli. Solid waste management topic is one of many topics that are mandatory to be involved in environmental education but also in education for sustainable development. The school system is known to be one of the best outlets to promote such type of education especially if activities are accompanied with implemented infrastructure in the school that reinforces the activities outcomes. The activity was held to the 34 students and their teacher in 20 minutes. The activity language is Arabic to make the interaction more fruitful and to familiarize the topic. The intervention was prepared based on a modified 5E instructional model (Engagement, exploration, explanation and evaluation). For this purpose, 18 power point slides were employed. Engagement was established by direct questions about pictures related to the 2015's and the 2019's solid waste crisis followed by explanations about the real situation on field. The explanations expanded to reveal the role of individuals on the solid waste management after showing the classification of waste. The activity ends by a direct question about the next step that students would make to change this situation.

3.4. John C. Maxwell Test

The test is adapted from John C. Maxwell, *Developing the leaders around you 2008* [34]. It is a general assessment of current leadership qualities for potential leaders. But

it also provides a positioning of the leaders based on the test score. The performed test is composed of two main parts:

1- **The first part** of qualitative aspect, composed of 5 Yes or No questions that represent self-reflection questions as the following:

Self-reflection question	Yes	No
Do I have a game plan for personal growth?		
Am I the leader of that plan?		
Am I willing to change to keep growing, even if it means giving up my current position, if I am not experiencing growth?		
Is my life an example for others to follow?		
Am I willing to pay the price to become a great leader?		

Table 1. The Yes or No questions from the pre and posttests.

2- **The second part** of quantitative aspect, composed of 25 Likert-scale response question (scale of 5) based on a level of agreement toward asked questions. The level of agreement items ranged from "*never*" (0) to "*always*" (4) as shown in the following table 2.

Question	0	1	2	3	4
I influence others.					
I have self-discipline.					
I have a good track record.					
I have strong people skills.					
I have the ability to solve problems.					
I do not accept the status quo.					
I see the big picture.					
I have the ability to handle stress.					
I display a positive spirit.					
I understand people.					
I am free of personal problems.					
I am willing to take responsibility.					
I am free from anger.					
I am willing to make changes.					
I have integrity.					
I have strong values.					
I am able to see what has to be done next.					
I am accepted as a leader by others.					
I have the ability and the desire to keep learning.					
I have a manner that draws people.					

I have a good self-image.					
I have a willingness to serve others.					
I have the ability to bounce back when problems arise.					
I have the ability to develop other leaders.					
I take initiative.					
Total points:	……../100				
*SCALE: 0=Never 1=Seldom 2=Sometimes 3= Usually 4=Always					

Table 2. The Likert-Scale questions from the pre and posttests.

The two aspects of the questionnaire make the analysis qualitative (the self-reflection questions) and quantitative (the Likert-scale questions).

This assessment serves to evaluate the leadership potential and pay attention to the qualities of the person taking the test before the intervention. The development of the potential is evaluated by the comparison between the pre and posttests.

Based on the Likert-scale questions part, score of questions are added to have a total score of points that is used for leadership evaluation as shown in the following table 3.

Score	Evaluation	Interpretation
100-90	Great leader	should be mentoring other good and great leaders
89-80	Good leader	must keep growing and keep mentoring others
79-70	Emerging leader	focus on growth and begin mentoring others
69-60	Bursting with potential	excellent person to be developed
Below 60	Needs growth	may not be ready to be mentored as a leader

Table 3. Leadership positioning based on Likert-scale questions total score.

The tests are adapted in Arabic and shown in the annex. Pre and posttests are performed by the students in 15-20 minutes on paper. The papers are collected at the end of the session.

3.5. Data collection

Data is collected for the two parts test as Yes or No for the first part and as a score for the second part. The Likert-scale of the second part is coded to be used for the statistical analysis. In addition, the total score of the Likert-scale questions is calculated and employed to classify the leadership potential of the students as previously mentioned in table 5. The answers are collected on paper where participants will perform the tests.

3.6. Data analysis

Data collected is statistically analyzed using SPSS statistics. Data are analyzed using a dependent t-test

to answer the research question and understand if there is a significant difference between the pre and posttests results. The dependent variables are the answers of the questionnaire, the related groups are the "Yes or No" answer, the Likert-scale answers and the total score.

3.7. Ethical consideration

Consent is sought from school administration and students before conducting the research in order for them to be aware of.

4. Results and Discussions

Based on the data collected from the used tool, leadership abilities of the students were evaluated and classified according to the final score of the Likert-scale questions before and after the intervention.

4.1. Initial Leadership Abilities

Based on the John C. Maxwell assessment tool, two types of questions are used, the first part is of self-reflection type with Yes or No answers (table 4).

Question	Yes	No
Do I have a game plan for personal growth?	18%	82%
Am I the leader of that plan?	6%	94%
Am I willing to change to keep growing, even if it means giving up my current position, if I am not experiencing growth?	12%	88%
Is my life an example for others to follow?	0%	100%
Am I willing to pay the price to become a great leader?	15%	85%

Table 4. Answers distribution of the self-reflection questions of the pre-test.

The results reveal that at the reflection level concerning thoughts about personal growth and leadership, students do not seem to be interested or aware about these features concerning their personalities. This could be related to the student age (15.4 years average) where students are considered as adolescents, or that the test they passed is new and they do not have any previous participation in such assessments which did not open previously perspectives in this area.

Hence concerning the Likert-scale questions, the initial answers score was calculated, and results were distributed as shown in the following Table 5.

Total Score range	Students' percentage	Interpretation
100-90	0	should be mentoring other good and great leaders
89-80	6%	must keep growing and keep mentoring others

79-70	18%	focus on growth and begin mentoring others
69-60	44%	excellent person to be developed
below 60	32%	may not be ready to be mentored as a leader
Total	100%	

Table 5. Total score of the Likert-scale questions.

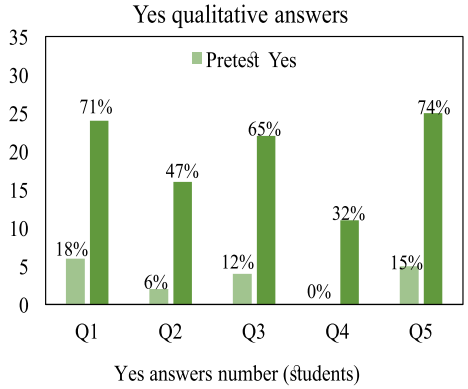
The initial results show that the majority of the students could be considered as excellent persons to be developed (44% of the total students' number), 32% of them are not ready to be mentored as a leader, 18% focus on growth and begin mentoring others, 6% must keep growing and mentoring others and no one is considered as great leader who should be mentoring other good.

4.2. Environmental Activity effect on Leadership Abilities

➢ **Self-reflection answers**

At the level of self-reflection questions, results show an important variation of the answers that Yes percentage increased noticeably to reflect more commitment at the personal level due to the nature of the questions as shown in Figure 6.

Figure 1. Distribution of Yes and No answers for the self-reflection questions by the sample (Post-test)



Moreover t- dependant test is performed to test if the intervention effect is significant. The 2-tailed test was performed using SPSS-Statistics and results are shown in the following Table 6:

Paired Samples Test									
Mean		Paired Differences					T	Zf	Sig. (2-tailed)
		SD	SE	95% CI					
				Lower	Upper				
Pair 1	Q1 Q1›	0.529	0.507	0.087	0.353	0.706	6.093	33	0.000
Pair 2	Q2 Q2›	0.412	0.500	0.086	0.237	0.586	4.806	33	0.000
Pair 3	Q3 Q3›	0.529	0.507	0.087	0.353	0.706	6.093	33	0.000

Pair 4	Q4 Q4›	0.324	0.475	0.081	0.158	0.489	3.973	33	0.000
Pair 5	Q5 Q5›	0.500	0.508	0.087	0.323	0.677	5.745	33	0.000

Table 6. Paired sample test results for the self-reflection pretest-posttest

The P-value for each pair of questions is equal to 0.000 that is inferior to 0.05, this reveals that there is a difference between the pre and posttests.

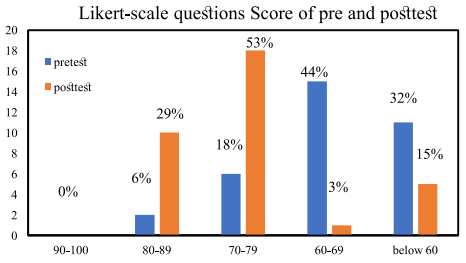
The environmental activity is then shown to have an effect of the self-reflection of the students toward their personal growth which is related to leadership as designed by John C. Maxwell. This result is promising and reveals an output of the transformative learning theory where the learners start to re-build the attitude toward their personal growth and effect to influence the others especially that the solid waste management issue is highly interactive, it tackles directly a topic related to real and practical life in addition to the group of values and ethics that are related to personal reflections and beliefs.

➢ Likert-scale answers

The second part of the leadership test is composed of 25 Likert-scale questions where scale is between 0 and 4.

The total score of the 25 answers is calculated and the following Figure 2 shows its value before and after the environmental activity with the percentages of the students in each class.

Figure 2. Distribution of the students' leadership between the 5 classes of the John C. Maxwell leadership assessment.



Results show that the percentage of students in the classes 8089- and 7079- increased noticeably from 6 to 29% and from 18 to 53% respectively. This increase is accompanied by an important decrease of the students' number in the class 6090- and a reduction of the number of students in the class below 60 the half of the students' number before the intervention.

This environmental activity then transferred the attitude of the students from a level of non-readiness or readiness to be leaders to a level where they already have leadership abilities

and then could act as leaders and mentor their surroundings. The importance of this transfer between classes is related to the effect of the activity on the initiation of social responsibility and individual action toward a situation where individuals are responsible of the result of their actions. This is marked by the answers concerning the questions related to the problem solving and the change making.

In order to prove statically the effect of the environmental activity on the leadership abilities of students, a paired sample test was elaborated, results are shown in Table 7.

Paired Samples Test									
Mean		Paired Differences					T	df	Sig. (2-tailed)
		SD	SE	95% CI					
				Lower	Upper				
Pair 1	Q1 - Q1›	-0.765	0.654	0.112	-0.993	-0.536	-6.817	33	0.000
Pair 2	Q2 - Q2›	-0.265	0.511	0.088	-0.443	-0.086	-3.020	33	0.005
Pair 3	Q3 - Q3›	-0.176	0.387	0.066	-0.311	-0.041	-2.659	33	0.012
Pair 4	Q4 - Q4›	-0.706	0.579	0.099	-0.908	-0.504	-7.110	33	0.000
Pair 5	Q5 - Q5›	-1.088	0.753	0.129	-1.351	-0.825	-8.421	33	0.000
Pair 6	Q6 - Q6›	-0.088	0.288	0.049	-0.189	0.012	-1.787	33	0.083
Pair 7	Q7 - Q7›	-0.706	0.676	0.116	-0.942	-0.470	-6.093	33	0.000
Pair 8	Q8 - Q8›	-0.147	0.359	0.062	-0.272	-0.022	-2.385	33	0.023
Pair 9	Q9 - Q9›	-0.588	0.609	0.104	-0.801	-0.376	-5.633	33	0.000
Pair 10	Q10 - Q10›	-0.206	0.479	0.082	-0.373	-0.039	-2.508	33	0.017
Pair 11	Q11 - Q11›	-0.235	0.496	0.085	-0.408	-0.062	-2.766	33	0.009
Pair 12	Q12 - Q12›	-1.000	0.778	0.134	-1.272	-0.728	-7.490	33	0.000
Pair 13	Q13 - Q13›	0.088	0.288	0.049	-0.189	0.012	-1.787	33	0.083
Pair 14	Q14 - Q14›	1.059	0.694	0.119	-1.301	-0.817	-8.899	33	0.000
Pair 15	Q15 - Q15›	0.147	0.359	0.062	-0.272	-0.022	-2.385	33	0.023
Pair 16	Q16 - Q16›	0.324	0.535	0.092	-0.510	-0.137	-3.527	33	0.001
Pair 17	Q17 - Q17›	0.529	0.615	0.105	-0.744	-0.315	-5.022	33	0.000
Pair 18	Q18 - Q18›	0.441	0.504	0.086	-0.617	-0.265	-5.104	33	0.000
Pair 19	Q19 - Q19›	0.441	0.561	0.096	-0.637	-0.245	-4.586	33	0.000
Pair 20	Q20 - Q20›	0.147	0.359	0.062	-0.272	-0.022	-2.385	33	0.023
Pair 21	Q21 - Q21›	0.265	0.448	0.077	-0.421	-0.108	-3.447	33	0.002
Pair 22	Q22 - Q22›	1.088	0.753	0.129	-1.351	-0.825	-8.421	33	0.000
Pair 23	Q23 - Q23›	0.471	0.662	0.114	-0.702	-0.240	-4.144	33	0.000
Pair 24	Q24 - Q24›	0.206	0.410	0.070	-0.349	-0.063	-2.925	33	0.006

Pair 25	Q25 - Q25›	0.882	0.591	0.101	-1.089	-0.676	-8.704	33	0.000

Table 7. Paired sample test results for the Likert-Scale questions of the pretest-posttest

The results show that if we consider the confidence interval at 95 % then alpha will be 0.005, so the environmental activity is not significant at the level of pairs 3, 6, 8, 10, 13, 15 and 20 but significant at the level of other 19 pairs of questions.

Hence, if we consider the confidence interval at 90%, then alpha will be 0.1, so all values are significant since the p-value is less than alpha which is 0.1. Which means that the results of the posttest are significantly different from the results of the pre-test and then we can elaborate a paired samples statistics to evaluate the nature of the effect of the environmental activity on the score of the pre and posttest answered by the students. Results of the paired samples statistics are shown in the following Table 10.

Paired Samples Statistics					
	Mean		N	Std. Deviation	Std. Error Mean
Pair 1	Q1	2.76	34	0.741	0.127
	Q1›	3.53	34	0.615	0.105
Pair 2	Q2	2.41	34	0.500	0.086
	Q2›	2.68	34	0.638	0.109
Pair 3	Q 3	2.74	34	0.567	0.097
	Q3›	2.91	34	0.621	0.107
Pair 4	Q 4	2.53	34	0.615	0.105
	Q4›	3.24	34	0.606	0.104
Pair 5	Q 5	2.38	34	0.817	0.140
	Q5›	3.47	34	0.615	0.105
Pair 6	Q6	2.47	34	0.563	0.097
	Q6›	2.56	34	0.613	0.105
Pair 7	Q7	2.24	34	0.699	0.120
	Q7›	2.94	34	0.694	0.119
Pair 8	Q8	2.29	34	0.579	0.099
	Q8›	2.44	34	0.561	0.096
Pair 9	Q9	2.85	34	0.784	0.134
	Q9›	3.44	34	0.660	0.113
Pair 10	Q10	2.59	34	0.701	0.120
	Q10›	2.79	34	0.592	0.101

Pair 11	Q11	1.88	34	0.686	0.118
	Q11›	2.12	34	0.686	0.118
Pair 12	Q12	2.68	34	0.727	0.125
	Q12›	3.68	34	0.589	0.101
Pair 13	Q13	1.91	34	0.712	0.122
	Q13›	2.00	34	0.696	.119
Pair 14	Q14	2.68	34	0.589	0.101
	Q14›	3.74	34	0.511	0.088
Pair 15	Q15	2.56	34	0.613	0.105
	Q15›	2.71	34	0.629	0.108
Pair 16	Q16	2.74	34	0.618	0.106
	Q16›	3.06	34	0.600	0.103
Pair 17	Q17	2.18	34	0.576	0.099
	Q17›	2.71	34	0.629	0.108
Pair 18	Q18	2.32	34	0.684	0.117
	Q18›	2.76	34	0.606	0.104
Pair 19	Q19	0.53	34	0.507	0.087
	Q19›	0.97	34	0.834	0.143
Pair 20	Q20	0.32	34	0.535	0.092
	Q20›	0.47	34	0.507	0.087
Pair 21	Q21	0.88	34	0.640	0.110
	Q 21›	0.15	34	0.657	0.113
Pair 22	Q22	0.62	34	0.604	0.104
	Q22›	0.71	34	0.462	0.079
Pair 23	Q23	2.71	34	0.462	0.079
	Q23›	3.18	34	0.626	0.107
Pair 24	Q24	2.47	34	0.615	0.105
	Q24›	2.68	34	0.684	0.117
Pair 25	Q25	2.94	34	0.489	0.084
	Q25›	3.82	34	0.387	0.066

Table 7. Results of the paired samples statistics test of the scores

According to the table 10, all the Q' means are higher than the Q means this reveals that the score of the posttests is all higher than the scores of the pre-tests and then that the environmental activity was not simply significant at the level of students' attitude toward their leadership abilities, but it was shown to improve the attitude of students toward their skills.

The increase in the mean for each question score accompanied with the

increase of total score of the Likert-Scale questions reveals that the effect is made over the thought and the attitudes of the students over the 25 points marked by the questions, which is important to show that the effect is not localized over a skill but not the other one. Hence, after the intervention was done and the posttest was elaborated, students were going out of the class, some were still talking about the topic.

5. Conclusions and Perspectives

This study is considered as a preliminary step to evaluate the effect of environmental education and related activities on the leadership abilities of school students. Results showed that the environmental activity has a significant effect on the thoughts and attitudes of students toward the points of the tests concerning leadership abilities. This significance was an improvement in their attitude toward their personal growth that was reflected by the increase of "Yes" answers on the self-reflection questions in the post-test which marks a better performance. In addition, the results of total score of the Likert-Scale questions showed that the majority of students assed from the classes of not being ready to lead or being excellent possible leaders to a class where the majority of students are thought to be leaders that need to be acting and mentoring others. This transfer between the classes was not done punctually. It was shown to be affecting the overall of the 25 questions which reveals that the effect of the intervention is general and affects the whole interval of abilities summarized by the John C. Maxwell test. This leads us to conclude that the environmental activity performed during the current study, designed based on the transformative learning theory and tackling an active issue as the solid waste management topic is significantly effective to change students' leadership abilities and to improve their attitude toward the studied leadership elements summarized by the used assessment tool.

In addition, it is important to evaluate the effect of environmental activities concerning other topics as climate change, water, energy and other topics in order to evaluate the effect per topic. An assessment of the teaching strategy and the leadership abilities of the biology teacher performing the activity if he is not the researcher himself would lead to more comprehensiveness of the initial leadership abilities of the students.

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