sustainability

MDPI

Article

Perceptions of Environmental Protection of University Students: A Look through Digital Competences in Mexico

Maria P. Amador-Alarcón [1,*], Carlos A. Torres-Gastelú [2], Agustín Lagunes-Domínguez [3], Héctor Medina-Cruz [4] and César A. Argüello-Rosales [4]

[1] Faculty of Pedagogy, Veracruzana University, Veracruz 91097, Mexico
[2] Faculty of Administration, Veracruzana University, Veracruz 91780, Mexico
[3] Faculty of Accounting and Administration, Veracruzana University, Veracruz 91000, Mexico
[4] Complejo Regional Centro, Benemérita Autonomous University of Puebla, Puebla 75010, Mexico
* Correspondence: pilar.amador115@gmail.com; Tel.: +52-222-844-0595

Abstract: This research reflects on the environmental problems that we are currently experiencing as a society and discusses education as an opportunity to solve them. Several frameworks of university digital competencies are identified and environmental care is highlighted as an important part of them, so the objective is to know the perceptions of university students in Mexico on digital competency and environmental protection and verify the following hypothesis: "currently there a is little development of environmental awareness and the relationship between the use of Information Technology (IT) as well as its environmental impact among university students". For this purpose, a quantitative, non-experimental approach was used, specifically, a descriptive cross-sectional design using a Likert-type questionnaire was applied on 22 and 23 November 2021 to 135 students from two public universities belonging to four undergraduate programs in Mexico. The results indicate that most students are aware that the use of electronic devices for educational purposes has an impact on the environment and that, therefore, it is necessary to adopt effective measures and habits for an adequate and optimal use of digital environments.

Keywords: environmental pollution; digital competencies; university education; perceptions; students; environmental behavior; sustainability

Citation: Amador-Alarcón, M.P.; Torres-Gastelú, C.A.; Lagunes-Domínguez, A.; Medina-Cruz, H.; Argüello-Rosales, C.A. Perceptions of Environmental Protection of University Students: A Look through Digital Competences in Mexico. *Sustainability* **2022**, *14*, 11141. https://doi.org/10.3390/su141811141

Academic Editors: Juan C. Infante-Moro and Alfonso Infante-Moro

Received: 31 July 2022
Accepted: 1 September 2022
Published: 6 September 2022

1. Introduction

Currently our planet is experiencing several challenges: climate change, environmental degradation, poverty and inequalities [1]. The sustainability of our environment has become a global priority due to the degree of deterioration we have today: generated, among other things, by the irrational consumption of natural resources and environmental pollution [2]. Various authors and organizations [1–3] agree that education must be the transforming instrument for new generations, that will allow making better individual and collective decisions to transform our society.

Under this perspective in 2015 the United Nations Educational, Scientific and Cultural Organization (UNESCO) created the "2030 Agenda for Sustainable Development" which contains 17 goals that are the action of all countries to eradicate poverty, protect the planet and ensure peace and prosperity. Within the 17 goals the fourth corresponds to quality education, and discusses ensuring inclusive, equitable and quality education and promoting lifelong learning opportunities for all. Specifically, target 4.7 of this goal mentions that:

By 2030, it must be ensured that all learners acquire the knowledge and skills needed to promote sustainable development, including through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and the contribution of culture to sustainable development [1].

Under this perspective, the aforementioned objective and its goals become the guide for teachers to seek in each of their classes a way to generate competencies in students which allows them to be more aware of the problems of their environment, as mentioned by [3] "to develop in the knowledge society, cohabit and advocate for a sustainable environment, as attention to the integral formation of the student, which gives rise to socioformation".

Education for Sustainable Development (ESD) was thus conceived to provide learners with the knowledge, skills, attitudes and values needed to make informed decisions and take responsible actions for environmental integrity, economic viability and a just society [1]. ESD is a lifelong learning process that reinforces the cognitive, social, emotional and behavioral dimensions of learning [1].

The behavior of young people regarding the environment is an issue that occupies and worries the whole world, because they are familiar with environmental measures, but they do not often apply them. Currently, what can motivate young people to carry out ecological practices are social networks, such as Instagram. Influencers or bloggers create public activities to take care of the environment and invite their followers to have responsible environmental awareness. That is why it is important and relevant to conduct studies on the perception of students: to analyze their experience on their environmental behavior and attitude due to the great activity that young people have in them [4].

In the same tenor, adolescents face the negative consequences of climate change, and their environmental behavior is crucial to mitigate these negative consequences. They especially act regarding the environment due to values, identities and moral norms undergoing an intense development during adolescence. The question is whether these factors can motivate adolescents to act in favor of the environment or not; therefore, it is important to promote the pro-environmental behavior of adolescents by strengthening their biospheric values [5].

On the other hand, in Russia the strategic goal of environmental education is the formation and development of an environmental perspective in students of all ages, based mainly on scientific knowledge, environmental culture and ethics for sustainable development [6]. It has a model of sustainable environmental development which is approved at the state level but there is a lack of research on the existing socio-ecological situation in the country, as well as on ecological culture, environmental problems and ecological lifestyles of young people [7]. The methodological principles and philosophical foundations of environmental education are seen as ideological guides for ecological thinking. Students' development and behavior, as well as trends related to the environment, are tracked. Therefore, pedagogy based on information and communication technology and innovation based on the use of interdisciplinary approaches to sustainable development play a very important role [6].

Promoting environmental education strengthens the sustainable relationship between man and nature. If students are educated at an early age they will grow up and adopt techniques, practices and measures to protect their environment in a conscious and safe way in their physical and digital context. However, most students at different ages do not recognize the importance of the impact of their actions; nevertheless, it may be minimal but they show interest in wanting to develop skills that allow them to strengthen their relationship with the environment and contribute from the place where they are formed, both academically and at home [3].

ESD is currently the general objective of all educational institutions in the various countries that make up the United Nations (UN), as it refers to providing quality education to our students so that they are competent in identifying the problems of their environment, of their time and of the world they live in, to understand them in their triple environmental, economic and social dimension and to intervene in favor of their resolution.

Regarding the perception of the 2030 Agenda for sustainable development, a study was conducted among university students who, consequently, showed a favorable attitude towards sustainable development and new technologies to reduce pollution as an alternative to the current ecological crisis. On the other hand, they expressed their difficulty in understanding the environmental protection dimension. Most of them had no knowledge

about environmental protection. These results could be attributed to the lack of tools that students have to understand the environmental impact of the irresponsible use of technology, the variables involved and how it affects the construction of a sustainable society [8].

It is also necessary to know the environmental perceptions of students because the role of the new generations is essential to achieve a real commitment to the Earth and create new policies to protect the environment. Therefore, it was proposed to implement environmental education in schools, where students are integrated, regardless of their gender, so everyone from children to adults can find solutions for environmental situations [9]. The creation of strategies could allow students to develop an active and committed role for the environment, being participants in the proper protection of the environment.

Environmental culture is a very important topic in education which seeks to form responsible citizens with a relationship to the environment and its components, with the purpose of generating an environmental awareness that allows understanding, knowing and acting on the environment, with appropriate behaviors to preserve, enjoy and use it in a sustainable way. In order to achieve the above, it is necessary to formulate and implement pedagogical and training strategies regarding environmental education that generate cognitive, procedural and attitudinal pro-environmental processes and promote environmental awareness behaviors [10].

The development of new technologies today is advancing rapidly because we live in a consumer society, where every hour thousands of electronic devices are manufactured with the aim of facilitating various tasks to users without taking into account the environmental and social consequences. This activity leads to the creation of environmental problems due to technological waste and the improper use of electrical and electronic devices [11]. Strategies adopted for the care of the environment and the use of modern technology will lead to a more conscious society, as well as a legacy for future generations. For the implementation of an effective environmental education program, according to [12], the following components are required:

(a) Systematize humanistic, social and environmental science knowledge.
(b) Identify a variety of problems.
(c) Discerning different environmental problems to apply the right solutions.
(d) Promoting personal qualities and skills to overcome difficulties and develop attitudes.

This proposal serves as a guide on what topics and objectives can be worked on in educational programs to create an environmental education and promote their incorporation at all educational levels to achieve environmental awareness in students.

On the other hand, and in view of the world situation caused by the SARS-CoV-2 pandemic at the beginning of 2019, concepts such as online education and digital competencies have become relevant in the field of education, defined by [13] as: "a group of combined elements (knowledge, skills, abilities and capacities) that are mobilized and integrated by virtue of a series of personal attributes, in concrete contexts of action" and by [14] as: "the set of knowledge, skills and attitudes needed today to be functional in a digital environment".

In relation to the lifestyle and environment of students, research was conducted at the Mendel University in Brno by means of a questionnaire, and it was discovered that 90.6% of 417 of the participants intended to change their lifestyle to stop generating negative environmental impacts. On the other hand, they mentioned the obstacles they face all the time, in particular lack of time, lack of financial resources, lack of specific information and insufficient conditions. They state that this is mainly due to the COVID-19 pandemic. Therefore, close cooperation in education between governmental and non-governmental organizations, both in the public and private sectors, is required [15].

Although it seems a recent topic, the digital competence of teachers and students has been addressed in the literature for decades with various concepts related to the use of digital technology and computer-assisted learning. Derived from the COVID-19 pandemic, there was a need to seek methods and strategies to develop the skills mentioned above

to improve academic performance and skills safely and adequately for students' future lives and as professionals. In this sense, the development of digital competencies will allow them to be aware of the proper use of their electrical and electronic devices in order to stop them generating a negative impact on the environment [16].

Today there are different digital competence frameworks that contemplate, for the most part, a safe and sustainable use of technology, and advise students to adopt safe, legal and ethical practices when using digital tools. They aim to develop skills, knowledge and attitudes through the description of each of the main areas: security, citizenship, technological competences and digital literacy. Regarding the area of digital security, its objective is to create environmental awareness through digital competence protection of the environment, detecting the need to strengthen learning about environmental protection measures through innovative strategies that seek to encourage students about their proper appropriation [17].

Considering that the incorrect or excessive use of technologies impacts the environment negatively, to meet the proposed goals of the 17 UNESCO objectives for quality education, young people must develop competencies for the protection of the environment [18]. Currently there is little development of these, and ignorance that using digital devices for so long can generate environmental damage [19].

Environmental attitudes are predispositions of thought to act actively for or against the environment based on the experiences, knowledge and values assumed by the human being about the environment [20]. For this reason, perception studies are relevant, because from them, actions related to environmental education can be planned, allowing university students to make better decisions for the benefit of the planet's environment and make them aware that part of the problem can be reduced with changes in habits [21].

In view of the situation described above, the objective of this research was to know the perceptions of university students about the environmental problems related to the use of digital technologies and devices, based on the hypothesis that currently there is little development of environmental awareness and knowledge of the relationship between the use of Information Technology (IT) and its environmental impact.

2. Materials and Methods

The research was conducted in two public universities in Mexico during their Spring 2022 term. The context of the selected students was urban. The research methodology used was a quantitative, non-experimental approach; specifically a descriptive cross-sectional design was used, which according to [22], collects data at a single time with the purpose of describing variables and the interrelation incidence of a phenomenon under analysis; in this case, the diagnosis of perceptions of university students about environmental protection through their digital competencies.

A Student's *t*-test was used to test/prove the hypothesis proposed in this research study.

2.1. Instrument

For the design of the instrument, a review of different state-of-the-art frameworks of digital competencies of university students was carried out, where five frameworks were identified: Digital Skills Framework, Global Framework for Educator Competence in the Digital Age, Framework of the "International Society for Technology in Education" (ISTE) for students, Digital Competence Framework for Undergraduate Students and the Common Framework of Teaching Digital Competences. Among these, the "Common Framework of Teaching Digital Competences", of the National Institute of Educational Technologies and Teacher Training (INTEF for its acronym in Spanish), (published in 2017 and composed of 5 areas, see Table 1) stands out:

Table 1. INTEF digital competencies areas.

Field	Competencies
Information and informational literacy	• Browsing, searching, and filtering of information, data and digital content. • Evaluation of information, data and digital content. • Storage and retrieval of information, data and digital content.
Communication and collaboration	• Interaction through digital technologies. • Sharing information and digital content. • Online citizen participation. • Collaboration through digital channels. • Netiquette. • Digital identity management.
Creation of digital content	• Digital content development. • Digital content integration and reprocessing. • Copyright and license. • Programming.
Security	• Device protection. • Personal data and digital identity protection. • Health protection. • Environment protection.
Problem-solving	• Technical problem-solving. • Identification of technological needs and answers. • Creative innovation and use of digital technology. • Identification of lacking digital competencies.

Source: Own elaboration based on INTEF [23].

Within the five areas, safety is defined as: "taking into account the impact of technologies on the environment" [23] and within this area the competence of environmental protection stands out, which is directly related to the responsible and sustainable use of electrical and electronic devices.

As a product of the review of the aforementioned frameworks, a Likert-type questionnaire was constructed, originally composed of ten questions with five levels in each one. The questions of the instrument asked participants to reflect on the optimal use of digital devices, the efficiency measures taken to save energy, digital consumption habits and awareness of the relationship of serious environmental problems that we currently live with and the use of technology.

Finally, the levels of the instrument were: "1" strongly disagree; "2" disagree; "3" neither disagree nor agree; "4" agree and "5" strongly agree, see Table 2:

Table 2. Likert-type questionnaire to measure the perception of the university students about environmental protection through their digital competencies.

Item Content	SD 1	D 2	NDA 3	A 4	SA 5
Protection of the Environment					
1. I consider that recycling is to collaborate with the maintenance and protection of our environment.					
2. I make optimal use of my digital devices so that they have the least impact on the environment.					
3. I adopt effective measures to save energy and extend the life of the batteries of my digital devices.					
4. My participation is necessary to solve environmental problems.					
5. I will need to change my digital consumption habits.					
6. I consider that there is no point in trying to do anything because serious environmental problems have no solution.					
7. I am aware of the environmental problems related to the use of digital technologies.					
8. I adopt behaviors that can improve my digital environment.					
9. I understand the digital environment and follow rules that allow its improvement.					
10. I am aware of the benefits and risks associated with information technologies.					

Diagnosis of perception on the protection of the environment.

[1] STRONGLY DISAGREE; [2] DISAGREE; [3] NEITHER DISAGREE NOR AGREE; [4] AGREE; [5] STRONGLY AGREE.

The validity of the instrument was carried out by expert judgment through the Kappa index (K) which represents the proportion of observed agreements; for this purpose a group of researchers with experience in the area of sustainability and digital competencies were sent to evaluate each of the questions of the instrument in four dimensions: sufficiency, clarity, coherence and relevance, having a concordance percentage of 90%. The following index results were reached: sufficiency 0.62, clarity 0.78, coherence 0.62 and relevance 0.73; for Hernandez-Nieto (2002), a Kappa index between 0.76 and 1 is an excellent concordance, between 0.41 and 0.75 is satisfactory and between −1 and 0.4 is not sufficient; in this sense all the evaluated items of the instrument were satisfactory and excellent.

For its part, the internal consistency (a measure of reliability that refers to the degree to which a measurement instrument produces results that are homogeneous and coherent when applied repeatedly [8] was performed by means of the "Cronbach's Alpha" coefficient which takes values between 0 and 1, taking into account that the closer a number is to 1 the more reliable it is. In the case of the instrument the value reported was 0.75 (see Figure 1); to obtain the coefficient the statistical analysis program Minitab version 19 created by the Pennsylvania State University (State College, PA, USA) was used.

Once the instrument was validated and reliable, participants were chosen as described below.

Test

Null Hypothesis $H_0: \mu \geq 2$
Alternate Hypothesis $H_1: \mu < 2$

T-value	*p*-value
26.93	1.00

Figure 1. The probability with which the null hypothesis is fulfilled is *p*-value = 1, so the null hypothesis is rejected, i.e., there was no statistical evidence to say that the students' perceptions indicate that they had little development of environmental awareness; on the contrary, most students were aware of the relationship between the use of IT and the impact generated on the environment.

2.2. Sample

Taking into account that the population of the research work was university students, the sample was made by non-probabilistic sampling which, according to [24], is one where "the selection does not depend on chance, the elements are chosen according to characteristics defined by the researcher or the research".

The decision to work with a non-probabilistic sample lead to the academic interaction with both students from Benemérita Universidad Autónoma de Puebla (BUAP for its acronym in Spanish) in San José Chiapa, which belongs to the Central Regional Complex (CRC for its acronym in Spanish) and students from the Accounting Faculty of the Veracruz region of the Universidad Veracruzana (UV for its acronym in Spanish).

The sample consisted of 135 students, 38 from Automation and Autotronics Engineering (IAA for its acronym in Spanish), 35 from Process Engineering and Industrial Management (IPGI for its acronym in Spanish) and 28 from Industrial Information Technology Engineering (ISTII for its acronym in Spanish) faculties of the BUAP, in addition to 34 students from the Bachelor's Degree in Administrative Computer Systems (ISCA for its acronym in Spanish) of the UV, see Table 3.

Table 3. Composition of the project sample.

University	Academic Program	Students Sample
BUAP	Process Engineering and Industrial Management (IPGI)	35
BUAP	Industrial Information Technology Engineering (ISTII)	28
BUAP	Automation and Autotronics Engineering (IAA)	38
UV	Administrative Computer Systems (ISCA)	34
	Total	135

Source: Own elaboration.

The results of the perception of protecting the environment through digital competencies of the students in public universities in Mexico are discussed below.

3. Results

The application of the questionnaire led us to identify the perceptions of the protection of the environment in university students. For the description of the results, the four levels of the Likert-type questionnaire were grouped as follows: the group in disagreement contemplated the levels "strongly disagree" and "disagree" and the group in agreement contemplated the levels "agree" and "strongly agree".

Regarding the perception that recycling is collaborating with the maintenance and protection of our environment, 94.8% of the university students agreed and 5.2% disagreed. For the perception that an optimal use of devices decreases the impact on the environment, 86.6% agreed and 13.4% disagreed. In addition, 89.6% agreed that they adopt measures to save energy and extend the battery life of their digital devices.

Item 4 asked students if their participation is necessary to solve environmental problems. A total of 92.6% agreed and 88.9% agreed to change and adopt new digital consumption habits.

When questioned about the consideration that there is no point in trying to do something because serious environmental problems have no solution, 80% disagreed.

As for the students' awareness that there is a relationship between the use of digital technologies and environmental problems, 88.2% agreed; consequently, 87.4% agreed to adopt behaviors that could improve their digital environment.

Finally, 82.2% of the students agreed to follow rules that would allow improvement of the digital environment.

The overall results of the instrument, presented in Table 4, indicate that university students are convinced that actions such as recycling are necessary for the protection of our environment. Additionally, most students believe that they make optimal use of digital devices so that they have the least impact on the environment, since they are aware that their participation is necessary to solve the environmental problems that we are currently experiencing as a society.

Table 4. Results of perceptions of environmental protection.

Category	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agreed	Strongly Agree
1. I consider that recycling is to collaborate with the maintenance and protection of our environment.	3.7%	1.5%	0%	34.8%	60.0%
2. I make optimal use of my digital devices so that they have the least impact on the environment.	1.5%	11.9%	0%	66.6%	20.0%
3. I adopt effective measures to save energy and extend the life of the batteries of my digital devices.	1.5%	8.9%	0%	70.3%	19.3%
4. My participation is necessary to solve environmental problems.	0.7%	6.7%	0%	50.4%	42.2%
5. I will need to change my digital consumption habits.	3.0%	8.1%	0%	62.2%	26.7%
6. I consider that there is no point in trying to do anything because serious environmental problems have no solution.	40.7%	39.3%	0%	16.3%	3.7%
7. I am aware of the environmental problems related to the use of digital technologies.	2.2%	9.6%	0%	62.3%	25.9%
8. I adopt behaviors that can improve my digital environment.	1.5%	11.1%	0%	73.3%	14.1%
9. I understand the digital environment and follow rules that allow its improvement.	3.7%	14.1%	0%	65.2%	17.0%
10. I am aware of the benefits and risks associated with information technologies.	1.5%	6.7%	0%	65.9%	25.9%

Source: Own elaboration.

In addition to the analysis of the percentage distribution of the perceptions of university students in the Likert-type questionnaire, the overall average and standard deviation were analyzed for each of the items and contrasted by gender and university of origin. In the case of the average and standard deviation by university of origin, the following results were obtained, see Table 5.

Table 5. Average perception of students by university of origin.

Average Perception of Students by University of Origin										
University of Origin	**Item 1**	**Item 2**	**Item 3**	**Item 4**	**Item 5**	**Item 6**	**Item 7**	**Item 8**	**Item 9**	**Item 10**
BUAP	4.45	3.79	3.85	4.27	4.00	2.01	3.95	3.85	3.75	4.06
UV	4.50	4.29	4.32	4.26	4.06	2.09	4.15	3.94	3.85	4.15
Grand total	4.46	3.92	3.97	4.27	4.01	2.03	4.00	3.87	3.78	4.08
Standard deviation of student perception by university of origin										
BUAP	0.95	0.94	0.89	0.86	0.88	1.17	0.98	0.85	1.00	0.88
UV	0.66	0.63	0.47	0.75	1.07	1.24	0.70	0.81	1.05	0.56
Grand total	0.89	0.90	0.83	0.83	0.93	1.18	0.92	0.84	1.01	0.88

Source: Own elaboration.

Regardless of the university of origin, the averages and standard deviations in each of the items are similar, identifying in Item 2 "I make optimal use of my digital devices so that they have the least impact on the environment" the highest range of difference, equal to 5.

In the case of the averages and standard deviations by gender, the following results were obtained, see Table 6.

Table 6. Standard deviation of student perception by gender.

Standard Deviation of Student Perception by Gender										
Gender	**Item 1**	**Item2**	**Item 3**	**Item 4**	**Item 5**	**Item 6**	**Item 7**	**Item 8**	**Item 9**	**Item 10**
Man	4.41	3.93	3.93	4.25	3.93	2.18	3.93	3.85	3.84	4.09
Woman	4.54	3.90	4.04	4.29	4.17	1.75	4.13	3.92	3.67	4.06
Grand total	4.46	3.92	3.97	4.27	4.01	2.03	4.00	3.87	3.78	4.08
Standard deviation of student perception by university of origin										
Man	0.90	0.91	0.87	0.82	0.99	1.29	0.99	0.93	1.03	0.88
Woman	0.87	0.88	0.74	0.85	0.81	0.91	0.79	0.65	0.97	0.67
Grand total	0.89	0.90	0.83	0.83	0.93	1.18	0.92	0.84	1.01	0.88

Source: Own elaboration.

In the case of the means by university of origin, there are no significant differences in each of the items, as in the case of the standard deviations by gender.

With analysis of the averages and standard deviations, it can be generalized that the percentage distributions of the Likert scale are homogeneous, regardless of the university of origin or gender.

In order to verify the hypothesis proposed in this research work: "currently there is little development of environmental awareness and the relationship between the use of Information Technology (IT) and its environmental impact among university students", the following was carried out:

- 1st. It was determined that according to the Likert scale from level 2 or less, the students had little development of environmental awareness.
- 2nd. The items of the instrument were analyzed and to test/prove the hypothesis, Item 6 was eliminated, which states: "I consider that it makes no sense to try to do anything because serious environmental problems have no solution", since unlike all the others, if this item is rated with a 2 or less it means that they have a high development of environmental awareness, which contravenes criterion 1.
- 3rd. Once Item 6 was eliminated, the averages and standard deviations of all the others were generated, giving an average = 4.04 and standard deviation = 0.88. See Table 7.
- 4th. The proposed hypothesis was tested by means of a Student's *t*-test with a confidence level of 95% which compared the average of a sample against a predetermined

value; in this case it is sought to be less than 2, having the following results, see Figure 1.

Table 7. Overall averages per ITEM.

Overall Averages per ITEM									
Item 1	**Item2**	**Item 3**	**Item 4**	**Item 5**	**Item 7**	**Item 8**	**Item 9**	**Item 10**	**Overall**
4.5	3.9	4.0	4.3	4.0	4.0	3.9	3.8	4.1	4.04
0.9	0.9	0.8	0.8	0.9	0.9	0.8	1.0	4.06	0.88

Source: Own elaboration.

4. Discussion

In order to have a starting point to determine various actions in the development of digital competencies, that add to others which have currently been adopted in society to try to reverse the deterioration of our environment, the perceptions of university students on the protection of the environment through a responsible use of different devices and electronic media have been highlighted.

In contrast to the hypothesis from which this research work started (which mentioned that university students have little development of environmental awareness and knowledge of the relationship between the use of IT and its environmental impact), the results show the opposite. There is a high perception that predominates in students about the impact on the environment by the use of various digital devices and consequently the need to adopt effective measures and habits for an adequate and optimal use of digital environments.

These results are consistent with other research that has shown empirical evidence of the awareness of university students about environmental problems. For example, a research paper called "Young university students and the environment in Chile: Perceptions and behaviors" [25] concluded that 76% of young university students have a negative perception of environmental care and are aware of air pollution in addition to showing concern about the current situation.

For their part, [2], in their research paper entitled: "Perception of environmental education in higher education students", report that 64% of the students' perception predominates not only to acquire more knowledge of environmental problems but also to carry out various actions that provide solutions to reduce environmental deterioration. Similarly, [26] report that university students have a high responsibility in changing attitudes towards a sustainable society, in their research paper entitled "Perceptions on environmental pollution and attitudes in university students". Another case is presented in "Climate change and strategic ecosystems: perceptions of university students" by [27], where they register tendencies towards a greater recognition of climate change as a phenomenon that needs to be addressed in a participatory manner. The sample used to identify perceptions was of students from urban contexts, which may limit the study; it would be recommended to apply the questionnaire to a larger sample that covers semi-urban and rural contexts to counterbalance the students' perceptions.

5. Conclusions

After the analysis of the questionnaire items, it can be concluded that the students' perceptions about environmental protection are that:

1. They are aware that the use of different electronic devices for educational use has implications on the environment and therefore on the sustainability of our planet.
2. They are convinced that taking actions such as recycling and adopting effective measures to save energy and extend the battery life of their digital devices will contribute to reducing the impact of IT on the environment.
3. They believe that their involvement in the responsible use of IT is necessary to contribute to reducing environmental problems.

4. They need to adopt behaviors and actions that can improve their digital environment for the benefit of the environment.
5. The averages and standard deviations of the survey were analyzed by university of origin and gender, and no significant differences were found.

As mentioned, several digital competency frameworks mention environmental care, so it can be concluded that this competency has been developed in university students, as revealed by 10 perceptions about climate change in university students being conditioned by educational processes. Climate change is a problem of human origin and can be modified for the benefit of all through education, so let us continue to promote actions in favor of our environment.

Author Contributions: Data curation, H.M.-C.; Formal analysis, C.A.A.-R.; Investigation, M.P.A.-A.; Methodology, H.M.-C.; Project administration, M.P.A.-A.; Supervision, C.A.T.-G.; Visualization, A.L.-D.; Writing—original draft, M.P.A.-A. and C.A.A.-R.; Writing—review & editing, A.L.-D. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data are available upon request.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. UNESCO. Available online: https://es.unesco.org/creativity/sites/creativity/files/247785sp_1_1_1.compressed.pdf (accessed on 28 July 2022).
2. Vargas-Ramos, C.; Salazar, M.C.F. Percepción de la Educación Ambiental en Alumnos del Nivel Medio Superior. Atlante Cuadernos de Educación y Desarrollo. 2018. Available online: https://www.eumed.net/rev/atlante/2018/08/educacion-ambiental-superior.html (accessed on 30 July 2022).
3. Tobón, S.; Guzmán, C.E.; Hernández, J.S.; Cardona, S. Sociedad del Conocimiento: Estudio documental desde una perspectiva humanista y compleja. *Rev. Paradig.* **2015**, *36*, 7–36.
4. Balundė, A.; Perlaviciute, G.; Truskauskaitė-Kunevičienė, I. Sustainability in youth: Environmental considerations in adolescence and their relationship to pro-environmental behavior. *Front. Psychol.* **2020**, *11*, 582920. [CrossRef]
5. Shutaleva, A.; Martyushev, N.; Nikonova, Z.; Savchenko, I.; Abramova, S.; Lubimova, V.; Novgorodtseva, A. Environmental behavior of youth and sustainable development. *Sustainability* **2021**, *14*, 250. [CrossRef]
6. Shutaleva, A.; Nikonova, Z.; Savchenko, I.; Martyushev, N. Environmental education for sustainable development in Russia. *Sustainability* **2020**, *12*, 7742. [CrossRef]
7. Rybakova, M.V.; Vinichenko, M.V.; Ushakova, Y.S.; Chulanova, O.L.; Barkov, S.A.; Malyshev, M.A.; Makushkin, S.A. Ecological Problems of Russian Cities on the Views of Young People. Available online: http://ekolojidergisi.com/download/ecological-problems-of-russian-cities-on-the-views-of-young-people-7115.pdf (accessed on 27 August 2022).
8. Villarroel, A.B.; Bastías, L.S.B. Aproximación a las percepciones de los estudiantes de pedagogía hacia la Agenda 2030 para el desarrollo sustentable. *Rev. Estud. Exp. Educ.* **2021**, *20*, 113–128. [CrossRef]
9. Robles, J.G.; Palma, P.I.; Bustingorry, S.O. Evaluación de las percepciones medioambientales en estudiantes de enseñanza media de la ciudad de Temuco, Región de La Araucanía. *Estud. Pedagóg.* **2017**, *43*, 107–121. [CrossRef]
10. Del Socorro Pérez-Vásquez, N.; Tirado, J.A.A. Cultura ambiental desde la proyección social comunitaria para la comprensión colectiva de la sustentabilidad. *Tecné Epistem. Didaxis TED* **2022**, *52*, 283–302.
11. Santamaría-Cárdaba, N.; Vicente-Mariño, M. Educomunicación sobre cambio climático: Experiencia en una escuela rural. *Edutec Rev. Electrón. Tecnol. Educ.* **2021**, *78*, 284–298. [CrossRef]
12. Merino, F.A.M.; Parrales, D.V.M.; Rodríguez, X.E.S.; Plúa, C.R.C. Contribución de las TI en la problemática medio ambiental y su incidencia en instituciones de educación superior. *Empresa Investig. Pensam. Crít.* **2016**, *5*, 41–57. [CrossRef]
13. Pavié, A. Formación docente: Hacia una definición del concepto de competencia profesional docente. *Rev. Electrónica Interuniv. Form. Profr.* **2011**, *1*, 67–80.
14. Ferrari, A.; Punie, Y.; Brečko, B.N. *DIGCOMP: A Framework for Developing and Understanding Digital Competence in Europe*; Publications Office: Luxembourg, 2013.
15. Dimitrova, A.; Vaishar, A.; Šťastná, M. Preparedness of young people for a sustainable lifestyle: Awareness and willingness. *Sustainability* **2021**, *13*, 7204. [CrossRef]

16. Díaz-Arce, D.; Loyola-Illescas, E. Competencias digitales en el contexto COVID 19: Una mirada desde la educación. *Rev. Innova Educ.* **2021**, *3*, 120–150. [CrossRef]
17. Amador-Alarcón, M.P.; Torres-Gastelú, C.A.; Lagunes-Domínguez, A.; Angulo-Armenta, J.; Argüello-Rosales, C.A.; Medina-Cruz, H. Marcos de competencias digitales relacionados con seguridad para docentes. *Pädi Boletín Científico Cienc. Básicas E Ing. ICBI* **2021**, *9*, 48–52. [CrossRef]
18. Gómez-Gil, C. Objetivos de Desarrollo Sostenible (ODS): Una revisión crítica. *Pap. Relac. Ecosociales Cambio Glob.* **2018**, *140*, 107–118.
19. López-Gil, K.S.; García, M.L.S. Desarrollo de competencias digitales de estudiantes universitarios en contextos informales de aprendizaje: Development of digital skills of university students in informal learning contexts. *Educ. Siglo XXI* **2020**, *38*, 53–78. [CrossRef]
20. Gonzáles, A.; Machín, F.; Galán, V. Actitudes ambientales hacia la sostenibilidad agrícola desde la enseñanza de la Física. *Rev. Electr. Opuntia Brava* **2018**, *8*, 17–31.
21. Flores, C.; Herrera, L. Estudios sobre las percepciones y la educación ambiental. *Tiempo Educ.* **2010**, *11*, 2227–2249.
22. Hernández-Sampieri, R.; Fernández-Collado, C.; Baptista-Lucio, M. *Metodología de la Investigación*; McGraw-Hill: Mexico City, Mexico, 2014.
23. INTEF. *Marco Común de Competencia Digital Docente*; Supervisión 21 Revista De Educación E Inspección; INTEF: Madrid, Spain, 2017; p. 9.
24. Álvarez, C.A.M. Metodología de la Investigación Cuantitativa y Cualitativa Guía Didáctica. Ph.D. Thesis, Universidad Surcolombiana, Neiva, Colombia, 2011.
25. Pavez-Soto, I.; León-Valdebenito, C.; Triadú-Figueras, V. Jóvenes universitarios y medio ambiente en Chile: Percepciones y comportamientos. *Rev. Latinoam. Cienc. Soc. Niñez Juv.* **2016**, *14*, 1435–1449. [CrossRef]
26. Casa, M.; Cusi, L.; Vilca, L. Percepciones sobre contaminación ambiental y actitudes en estudiantes universitarios. *Rev. Innova Educ.* **2019**, *1*, 391–399. [CrossRef]
27. Rodríguez-Pacheco, F.L.; Mejía-Rodríguez, D.L.; Sánchez-Buitrago, J.O. Cambio climático y ecosistemas estratégicos: Percepciones de estudiantes universitarios. *Form. Univ.* **2021**, *14*, 165–174. [CrossRef]