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BALTIC JOURNAL OF LAW & POLITICS

A Journal of Vytautas Magnus University
VOLUME 15, NUMBER 3 (2022)
ISSN 2029-0454

Cite: *Baltic Journal of Law & Politics* 15:3 (2022): 1820-1839
DOI: 10.2478/bjlp-2022-002126

Validity and reliability of the applied instrument in the study of sustainability of the sociology study plan

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Received: August 15, 2022; reviews: 2; accepted: November 04, 2022

Abstract

It is very important that the instruments that are designed and applied to gather information in research are evaluated by experts. The purpose of this study was to identify the sustainability of Study Plan of School of Sociology (SPSS), an educational institution belonging to the Autonomous University of Guerrero, Mexico. To fulfill this purpose, the methodology was framed in two phases. The first consisted of the elaboration of a questionnaire for ten experts with 28 closed questions regarding sustainability with the dimensions (curriculum, teaching-learning strategy, environmental competences of the teachers and environmental competences of the students, some of them related to health issues). In this same phase, the validation and reliability of its content was carried out. The second phase consisted of applying the validated questionnaire to 115 students of the (SPSS). Results: The questionnaire focused on the evaluation of the (SPSS) was designed

and elaborated, the instrument presented adequate levels of content validity from the application in 10 judges (V of Aiken ≥ 0.75). Favorable percentages above 80% were observed. In the validation of experts, it was found that the dimension (1) Curriculum presented a score of 0.928125, for the dimension (2) Teaching-learning strategy 0.953125, the dimension (3) Environmental competences of the teachers 0.921875 and for the dimension (4) Environmental competences of the students 0.93125. With this, it was appreciated that the values are positive above the .80 considered adequate. In conclusion, the instrument has adequate levels of validity and reliability. With regard to the first phase, this was the reason why this instrument was applied to 115 students of the (SPSS). The results of the applied questionnaire showed that sustainability (including health issues) is minimally related to the curriculum, the teaching-learning process and competences. For some decades it has been recommended to educational institutions including universities that their curricula contribute to the sustainability that is required in the world.

Keywords

sustainability, environmental crisis, curriculum, expert judgment, assessment instrument, health issues

Introduction

The curriculum of the institution in this work is offered by the higher school of sociology (higher level) dependent on the Autonomous University of Guerrero (Mexico). He offers the degree in Sociology of Communication and Education. This bachelor's degree is taught over a normal period of 4 years. It was developed under the competition approach and is currently in the process of restructuring and internal changes.

The purpose of this curriculum and the competencies of the graduation profile are aimed at contributing to the resolution of regional, state and national problems related to the areas of communication and education from a sociological perspective. The statistical yearbook of the Autonomous University of Guerrero (AUG) 2019-2020 established that in this period the Higher School of Sociology had a faculty of 11 full-time teachers (10 men and one woman), a teacher (man) of 3/4 time and 6 hourly teachers (5 men and one woman), making a total of 18 teachers. As for the students, there was an enrollment of 232, with a total of 56 first-time students (22 men and 34 women) and 176 re-entry students (70 men and 106 women).

The valuation tools of data collection instruments provide more reliable and more useful information in research. In an extreme case and not valuing the instruments, it could be in the worst case that the information obtained guided the researcher on a wrong path in the study. According to Salas (2019) the survey is the most used technique in research carried out in the social sciences. And that

the interview is the procedure of collecting information based on an interaction between two people or more, through conversation as the main tool, Mata (2020) considers that it is used to collect information from people regarding characteristics. Evaluation through expert judgment, a validation method increasingly used in research, "basically consists of requesting a series of people to demand a judgment towards an object, an instrument, a teaching material, or their opinion regarding a specific aspect" (Cabero and Llorente, 2013 cited in Robles and Rojas, 2015). It is a technique whose adequate realization from a methodological point of view is sometimes the only indicator of content validity of the data or information collection instrument (Escobar Pérez, 2008 cited in Robles and Rojas, 2015). The design of instruments that evaluate the effectiveness of instruments that evaluate the sustainability of educational institutions and curricula is of the utmost importance.

The validity of the data collection instrument used. In the case of the reliability, reliability or internal congruence of the items of the proposed instrument, in order to describe the degree to which their repeated application to the information units produce equal, consistent and coherent results, the method of the internal consistency of Cronbach's alpha (α), developed by J. L. Cronbach, was used, which requires a single administration of the instrument to calculate such a reliability coefficient. Which produces a value ranging from zero (0), which represents zero reliability, to one (1), which characterizes total reliability. However, although there is no rule that indicates from which specific value there is no reliability of the instrument, in a more or less general way, (Hernández et al. 2006 cited in Pérez et al. 2012).

The design of instruments that evaluate the effectiveness of instruments that evaluate the sustainability of educational institutions and curricula is of the utmost importance. The validity of the data collection instrument used.

The purpose of this study was to identify the sustainability of the Curriculum of (SPSS). The methodology was framed in two phases. The first consisted of the elaboration of a questionnaire for 10 experts with closed questions regarding sustainability with the dimensions (curriculum, teaching-learning strategy and environmental competences). In this same phase, the validation and reliability of its content was carried out. The second phase consisted of applying the validated survey to 115 students of the (SPSS). The questions guided this research were: Does identifying the sustainability of the sociology curriculum considering the dimensions, curriculum, teaching-learning strategies, environmental competencies of teachers and environmental competencies of students imply that it contributes to sustainable development?, Is it necessary to carry out the validation of the content of the questionnaire with a group of experts in the field of sustainability?, Is it necessary to design and apply a questionnaire to students of the School of Sociology with the dimensions described in the previous question to

identify sustainability?.

Literature review

The environmental and, therefore, socio-environmental crisis adversely impacts on the sustainable development that is desired. Anthropogenic activities contributed to climate change by: (1) Burning of fossil fuels and greenhouse gas emissions; 2) Deforestation and increased forest fires; (3) Increased concentration of aerosols in the atmosphere; (4) Industrialization, urbanization and changes in vegetation pattern (Gulzar et al., 2021), these authors also consider that the belongings of the climatic variation of foliage have great impacts on human health by increasingly increasing adverse waves of overheating, the enterprise of vector-borne diseases that change the ecology of vectors such as ticks, bedbugs, etc. Each company, through manufacturing processes, produces a certain amount of waste, and at the same time in this way has an impact on the natural environment (Ingaldi, 2015). Economic transformations towards the intensive exploitation of non-renewable natural resources have produced environmental impacts and negative social rights, which violate the collective rights of local communities (Hincapie & López, 2016). The application of human rights thinking to the environmental crisis is an example of humans trying to solve the crisis they have created (Oksanen, 2021). Faced with this situation, it is the duty of universities to take action on the matter and carry out tasks so that they contribute to sustainability, through curricular environmentalization, promoting sustainability from institutions, etc.

The 2013 Educational Model of the Autonomous University of Guerrero (AUG-Mexico) establishes as general principles, social responsibility, training and sustainable development. In this order of ideas, it also establishes that, in the transversal axes, transversal themes must be present, such as human rights, culture of peace, equity, interculturality, plurality, knowledge society, gender perspective, environment, etc. This study focused on the issue of the environment, according to the aforementioned model, it is recommended that the design of curricula and curricula establish clear guidelines for the implementation of learning activities and strategies, in which they permeate the learning environments of these topics. It is also critical that institutions embrace the culture of sustainability. Higher Education Institutions (HEIs) play a central role, as they constitute a strategic sector for the development of societies. Traditionally, HEIs have stood out for their important contribution to sustainable development (Bohne et al., 2019). The Curriculum referred to in this study establishes in its academic model the consideration of cross-cutting issues, such as the environment for example and therefore, contribute to sustainability. De la Rosa et al., (2019) states that we are entering a new era in which not only governments and international organizations must be involved in the transformation towards a more just and equitable society,

but this commitment extends to the whole society and in it the University plays a fundamental role.

Regarding how we understand socio-environmental problems, it should be noted that some authors make distinctions between environmental problems and socio-environmental problems, referring in the first case to issues related to the use and tearing those natural resources are suffering and expanding this issue in the second case to the incorporation of these issues to the communities directly affected by the impacts derived from a specific project. A similar distinction is made between ecological problems and socio-environmental problems. This position, however, has been discussed, since there is no "environmental problem" without a "social dimension" (Orellana, 1998, cited in Moreno & Moreno, 2015). In this sense, that the environmental crisis in the university must be approached from a perspective of sustainable development, that is, that links, society, the economic, the environmental among other aspects. Sustainability is an important issue for all organizations in the twenty-first century. Higher education institutions are exploring ways to integrate sustainability into curricula (Cusick, 2009; Rusinko & Sama, 2009, cited in Rusinko, 2010).

Sustainability education is becoming crucial, primarily for the young generation, so that they have an understanding of concepts such as economic prosperity, resource equity, energy and health uses, and environmental concerns. While educating them about sustainability starts in educational institutions, it is important that sustainability education is well rooted in the curriculum and everyday practice of their lives (Sengupta et al., 2020). (Sammalisto & Lindhqvist, 2008, cited in Mishra & Mishra, 2020) observed the integration of sustainability in higher education based on different dimensions of sustainability such as environmental, economic, social and/or cultural. In this sense, the identification of key competences in sustainability can be the first step towards the inclusion of sustainability in higher education. Multiple studies have found that the main challenges in incorporating sustainability into university education are in the field of teaching, (Lazzarini et al., 2018, cited in Mishra & Mishra, 2020). According to the aforementioned documents approved by the General Assembly of the CRUE, the integration of sustainability in the curriculum is fundamental. Teachers must be professionally trained, and qualified, as qualified teachers are key to a quality education. They must receive the necessary initial training and be equipped with efficient and effective methodological strategies. It is unquestionable that today's professionals must be able to understand how their professional activity interacts with society and the environment, both locally and globally, to identify potential challenges, risks and impacts. It is therefore crucial to transfer sustainability competencies to the teaching profession by developing competencies in sustainability education, linking sustainability teaching with student learning (Ull et al., 2014, cited in Fuertes et al., 2019).

Higher Education Institutions (HEIs) played a role in "transforming societies and serving the general public good, so there is a social need for universities to assume responsibility for contributing to sustainable development" (Waas et al., 2010, cited in Bautista et al., 2021) and HEIs "must be leaders in the search for solutions and alternatives to current environmental problems and agents of change" (Hesselbarth & Schaltegger, 2014, cited in Bautista et al., 2021). Cross-cutting themes are essential in the curriculum, because they raise problematic situations that affect our society in general. Transversal social issues, those that refer to values, urbanity, consumption, human rights, respect, non-violence and harmonious coexistence. Cross-Cutting Environmental Issues, those that refer to respect for nature, animals, plants and the universe in general, and transversal health issues, those that refer to the care of the human body, good nutrition and nutrition, prevention against drug addiction and sex education, among other aspects, or therefore, the incorporation of environmental education as a transversal theme is assumed, a methodological resource that helps the integration, in the pedagogical process, of necessary environmental elements, as well as the readjustment of the study programs, under the adopted curricular conception (greening). In this way, it is possible to integrate environmental content as a cross-cutting theme rather than developing segregated courses related to the topic (Simões et al., 2019).

According to Mercado (1993) cited in (Ramírez and González, 2014), including the environmental dimension implies that social subjects are included in careers with a technical profile, as well as addressing work projects on environmental problems, thus linking the various curricular areas; consider these problems as transversal contents in the study programs and that different positions on the environment and development are addressed in curricular spaces of a mandatory or optional nature.

Environment, health and education

The relationship between environment and health is a fact accepted by the entire scientific community and a cause for concern for much of society. The knowledge of the relationships between environmental factors with health and their application to the professional activity of pharmacy is a challenge and a necessity for adaptation to new social requirements (Domenech, 2003). Health education is an opportunity to achieve learning, improve the health literacy of the population, including improving the knowledge of the population in relation to health and the development of personal skills for individual and collective self-care of health (De la Guardia y Ruvalcaba, 2020). Transversality in the current educational curriculum is represented by educational themes that respond to certain social problems and that are present in all curricular areas. Cross-Cutting Themes have been incorporated into education as aspects of our world that must be approached from a moral perspective. Under this concept of Transversality, eight themes have been grouped: Moral and Civic Education, Education for Peace, Education for Equal Opportunities between both Sexes, Health Education,

Sex Education, Environmental Education, Consumer Education and Road Safety Education (Muñoz, 1997).

Materials and method

Type of study

An instrumental study of validity and reliability was carried out with respect to the instrument that was designed to identify sustainability in the study plan. This study as described in its purposes, consisted of analyzing the sustainability of the (PEESS)." It was a mixed study. Mixed methods (MM) combine the quantitative (quanti) and qualitative (quali) perspective in a study with the aim of giving depth to the analysis when the research questions are complex (Hamuy, 2013). In this order of ideas, the results are explained and described under the two approaches. Non-probabilistic sampling strategies are any sampling method that does not use some form of random selection. By far the most common non-probability sampling strategy used within developmental science is convenience sampling (for review, see Bornstein et al., 2013 cited in Jager et al., 2017), which is a sampling strategy in which participants are selected on an ad hoc basis based on their accessibility and/or proximity to research. One of the most common examples of convenience sampling within developmental science is the use of student volunteers as study participants (Jager et al., 2017). The sample in this study was carried out under the convenience approach, thus, experts and other participants were considered. In this study, an instrumental study of validity and reliability was carried out with respect to the instrument that was applied to a group of experts in the field of sustainability. Evaluation through the judgment of experts, is the validation method increasingly used in research, "consists, basically, in requesting a series of people the demand for a judgment towards an object, an instrument, a teaching material, or their opinion regarding a specific aspect" (Cabero and Llorente, 2013 cited in Robles and Rojas, 2015). It is a technique whose proper realization from a methodological point of view is sometimes the only indicator of content validity of the data or information collection instrument (Escobar Pérez, 2008 cited in Robles and Rojas, 2015). Used as a decision criterion to establish the validity of the instrument, the following (García 2007 cited in Pérez et al. 2012) states that if a 100% agreement is obtained among the judges, it is considered that the item complies with the basic aspects under which the specialists are analyzing it, but if it is less than 100% the item has some deficiency in any of the aspects evaluated and its possible modification must be studied considering the observations of specialists. (Hernández et al. 2006 cited in Pérez et al. 2012) establish that, if the coefficient approaches 0, there will be greater error in the measure; while, if a value of 0.25 is obtained in the coefficient it will indicate low reliability; and if the result is 0.50, the reliability is average or regular; on the other hand, if it exceeds 0.75 it is acceptable, and being greater than 0.90 is considered high to take into account.

Instruments

The validity and reliability study of the instrument was carried out through two phases:

First phase: The first phase consisted of the elaboration of a questionnaire for 10 experts with closed questions regarding sustainability with the dimensions (curriculum, teaching-learning strategy and environmental competences). In this same phase, the validation and reliability of its content was carried out. The instrument was designed using a questionnaire with a Likert scale. Ten experts participated for the review, assessment and evaluation of the instrument. The instrument is composed of the following dimensions called curriculum, teaching-learning strategies, teaching competencies and student competencies and has 28 items. It is completed by the procedure of analysis by experts.

Second phase: it consisted of applying the validated questionnaire to 115 students of the (SPSS). A survey was applied to 115 students (68 women and 47 men) from the Higher School of Sociology, 23 students from group 201 in the morning, 13 from 202 in the afternoons, 14 from 401 in the morning, 13 from 402 in the afternoon, 18 from group 601 in the morning, 10 from 602 in the afternoons, 10 of group 801 in the morning and 14 of group 802 in the afternoon.

Procedure

In the first phase the form of qualification or evaluation is by means of the scale of the content coefficient of the V Aiken. In this same phase, the content validation was carried out (from the survey designed after the assessment of the issues related to sustainability), the instrument presented adequate levels of content validity from the application in 10 judges (V of Aiken ≥ 0.75). In the second phase, the survey was analyzed quantitatively by IMB SPSS Statistics Program 22, and the results were presented in percentages.

Ethical Aspects

In the research, the following ethical criteria of the research were met: 1) All participants were made aware of the objective of the instrument applied, in the case of the group of experts, the questionnaire was applied in Forms Program. They were informed of what the questionnaire was about and marked the legend of agreeing to participate. In the event that they did not accept, they did not have to answer said in slope. In the case of the survey that was applied to the population under study, that is, the 115 students of the (SPSS) who participated, they were informed of the purpose of the instrument; 2) participants could withdraw at any time; and 3) there was protection of the personal data of all participants in accordance with the Mexican Law on The Protection of Personal Data.

Results and Discussion

A survey focused on the evaluation of the (SPSS) was designed and elaborated. Based on the theoretical framework of this study. The questionnaire was designed with a Likert scale with 28 items. Table 1 presents this instrument with the indicator (curriculum, teaching-learning strategy, environmental competences of teachers and students). Considering that these indicators would indicate the level of sustainability of the (SPSS).

Validation and reliability of its content

The instrument that was designed and presented in Table 1, was presented to ten experts for review and evaluation. Table 2 summarizes the sociodemographic data of the 10 experts. Table 3 summarizes the dimensions and questions of the instrument in Table 1. The content analysis conducted by experts included 10 participants, 8 doctoral-level researchers and 2 master's-level researchers directly related to education. It shows other information from the ten experts who participated in this study (Table 4). It is completed by the procedure of analysis by experts. The form of qualification or evaluation is by means of the scale of the content coefficient of the V Aiken.

Table 1. Presentation of the questionnaire prepared with the aim of evaluating the sustainability of the (SPSS).

1. Curriculum indicator

	Indicator (curriculum)	Perception				
1.	The sociology curriculum integrates Environmental Education and addresses disciplines, or subjects related to environmental issues.	1	2	3	4	5
2.	The curriculum integrates Environmental Education as a cross-cutting theme.	1	2	3	4	5
3.	The sociology curriculum integrates in its elements the protection and care of biodiversity	1	2	3	4	5
4.	The curriculum establishes the teaching and learning strategies that students must develop	1	2	3	4	5
5.	The curriculum establishes the teaching and learning strategies for an Environmental Education	1	2	3	4	5
6.	The curriculum integrates among its transversal elements to health or environmental health	1	2	3	4	5
7.	The study plan establishes among its elements the prevention of obesity and overweight	1	2	3	4	5
8.	The study plan establishes among its transversal axes human rights	1	2	3	4	5

2.-Indicator (teaching-learning strategies)

	Indicator (teaching-learning strategies)	Perception				
9.	Projects or tasks are developed that are linked to the environment	1	2	3	4	5
10.	The development of the subjects includes activities that are linked to Environmental Education activities	1	2	3	4	5
11.	The development of the subjects includes activities that are linked to health and environmental health activities	1	2	3	4	5
12.	The development of the subjects includes activities that are linked to human rights activities	1	2	3	4	5
13.	Development of activities that touch on the issues of water, soil, energy and air and their link with social activities.	1	2	3	4	5
14.	Development of activities that touch on health or environmental health issues and their link with social activities.	1	2	3	4	5
15.	Development of activities that touch on human rights issues and their link with social activities.	1	2	3	4	5
16.	Development of activities that address the teaching-learning strategies that students must form.	1	2	3	4	5

3.-Indicator (teaching environmental competences)

	Indicator (teaching environmental competences)	Perception				
17.	The teacher has environmental knowledge or skills.	1	2	3	4	5
18.	The teacher has the ability to relate the topics of the subject he teaches with the environment or Environmental Education.	1	2	3	4	5
19.	The teacher has the ability to relate the topics of the subject he teaches with health or environmental health.	1	2	3	4	5
20.	The teacher has the ability to relate the topics of the subject he teaches with Human Rights.	1	2	3	4	5
21.	The teacher possesses the ability to form the habit of studies and learning strategies in students.	1	2	3	4	5
22.	The professor mentions in the group that you must classify the garbage, turn off the air, take care of plants and animals.	1	2	3	4	5
23.	The professor mentions in the group that it is important to take care of health with preventive programs, such as to avoid overweight and obesity.	1	2	3	4	5
24.	The professor mentions that it is important to understand and put into practice human rights.	1	2	3	4	5

4.-Indicator (student environmental competencies)

	Indicator (student environmental competencies)	Perception				
25.	Students have the competencies (knowledge, skills and values) to preserve and care for the environment	1	2	3	4	5
26.	Students have the competence to form study habits and learning strategies.	1	2	3	4	5
27.	Students have the competence to take care of their health and mainly the problem of overweight and obesity	1	2	3	4	5
28.	Students have the competence of human rights and put them into practice.	1	2	3	4	5

[Questionnaire for evaluating the sustainability of the (SPSS)].

Table 2. Sociodemographic Data of the Experts (SDE)

		Frequency	Percentage
Gender	<i>Men (6)</i>	6	60%
	<i>Women (4)</i>	4	40%
Education	<i>Complete PhD (8)</i>	8	80%
	<i>Incomplete Doctorate</i>		
	<i>Master's Degree (2)</i>	2	20%
	<i>Specialization</i>		
Age		1.30	.949
Invitational conferences		6.00	6.464
Degree of experience as a reviewer (1-4)		1.30	.823
Years of experience	<i>Teaching</i>	1.30	.823
	<i>Research</i>	1.30	.823
Publications	<i>Articles</i>	5.60	6.186
	<i>Books</i>	.90	1.101
	<i>Chapters</i>	1.20	2.098
	<i>Papers</i>	6.0	6.464
Continuing education	<i>Courses</i>	4.50	1.650

[Sociodemographic data of the experts].

Table 3. Dimensions and questions of the instrument.

Dimensions	Questions
Dimension 1. Curriculum	01-08
Dimension 2. Teaching-learning strategy	09-16
Dimension 3. Teaching skills	17-24
Dimension 4. Student competences	25-28

[Dimensions and questions of the instrument].

In relation to the study of the validity of content, once the instrument was presented to experts, the content validity study was carried out, this was done through the V of Aiken through an Excel template. This technique was accepted values higher than 0.75 with a $p < 0.05$. Items with lower values were removed from the test. After the initial exercise, an expert validation was carried out. Where the limit value of 0.80, can be obtained for both groups of 5 and groups of more than 10 judges (Escurra, 1988). In this sense, the Aiken V coefficient made it possible to combine the calculation and evaluation of the results to ensure the objectivity of the procedure. According to the author, this coefficient can obtain values between 0 and 1. As the registered value becomes higher, the item will have greater content validity (Figure 1).

Table 4. Data from the 10 experts who participated in the expert analysis.

ID	Start time	End time	Email	Name	I confirm that I know the purpose of the evaluation of the instrument and agree to participate.	Indicate the academic degree and/or specialty you currently hold.	Name of the public institution to which expert belongs.
1	8/24/21 18:16:43	8/24/21 18:20:40	Anonymous	Anonymous	I agree to participate.	Doctorate	Autonomous University of Guerrero
2	8/24/21 19:37:45	8/24/21 19:41:56	Anonymous	Anonymous	I agree to participate.	Doctorate	Regional Development Science Center
3	8/24/21 20:20:03	8/24/21 20:33:55	Anonymous	Anonymous	I agree to participate.	Mastery	Autonomous University of the Occidente
4	8/24/21 20:31:37	8/24/21 20:40:19	Anonymous	Anonymous	I agree to participate.	Doctorate	Autonomous University of Guerrero
5	8/24/21 19:26:14	8/24/21 21:02:20	Anonymous	Anonymous	I agree to participate.	Mastery	Regional Development Science Center
6	8/25/21 10:28:59	8/25/21 10:31:27	Anonymous	Anonymous	I agree to participate.	Doctorate	Tecnológico Nacional de México/Instituto Tecnológico de Acapulco
7	8/25/21 20:53:24	8/25/21 21:17:06	Anonymous	Anonymous	I agree to participate.	Doctorate	Faculty of Foreign Languages
8	8/26/21 2:03:50	8/26/21 2:08:48	Anonymous	Anonymous	I agree to participate.	Doctorate	Autonomous University of Guerrero
9	8/26/21 14:51:37	8/26/21 14:58:36	Anonymous	Anonymous	I agree to participate.	Doctorate	Autonomous University of Guerrero
10	8/26/21 14:50:10	8/26/21 15:29:30	Anonymous	Anonymous	I agree to participate.	Doctorate	Autonomous University of Guerrero

[Data from the 10 experts who participated in the expert analysis].

Figure 1. Aiken coefficient V.

$$V = \frac{S}{(n(c-1))}$$

The values are S = the sum of s_i , s_i = Value assigned by the judge i , n = Number of judges, c = Number of values of the rating scale.

Once the theoretical bases that underpinned the proposal of the instrument were analyzed, a database was made that considered as the main features to evaluate the clarity, congruence, context and domain of the construct. The formula described in the previous figure was developed in the Office Excel program, as described in table 5 and 6.

Table 5. Validation by experts

Validation by experts														
Traits to be evaluated														Total
				Clarity	Congruence	Context	Construct	Domain						Total
s	n	c	ITEM	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	V AIKEN
10	10	2	28	1	1	1	1	1	1	1	1	1	1	1

[Validation by experts].

Table 6. Validity of coefficient content V Aiken

Dimensions	Clarity	Congruence	Context	Domain of construct	Total
Dimension 1 Curriculum	0,9375	0,9375	0,9375	0,9	0,928125
Dimension 2 Estrategy teaching learning	0,9625	0,95	0,9625	0,9375	0,953125
Dimension 3 Teaching skills	0,95	0,9125	0,9125	0,9125	0,921875
Dimension 4 Students skills	0,95	0,9	0,95	0,925	0,93125
Total	0,95	0,925	0,940625	0,91875	

[Validation by experts. Note. Own elaboration based on the statistical formula of V Aiken].

All dimensions were rated favorably, however, it should be noted that dimension 2 showed better ratings in the ranges of clarity, congruence, and context. As well as the dimension 4 environmental competences of the student in the ranges of clarity and context. Once the information is concentrated. The average of each item was made, it is important to note that to favor the analysis of the instrument an analysis was made divided into dimensions, which are corresponding to the four dimensions assigned. These are divided as follows from item 01-08 according to the curriculum dimension, from 09-16 the teaching-learning strategy, from 17-24 environmental competences of the teacher and from 25-28 environmental competences of the student. Table 6 of content validity shows the values corresponding to the instrument. For dimension 1 Curriculum a score of 0.928125 was obtained, for dimension 2 Teaching-learning strategy 0.953125, dimension 3 Teaching environmental competences 0.921875 and for dimension 4 Environmental competences of the student 0.93125. As can be seen, the values are positively above the .80 considered adequate.

The results in the first phase fulfilled the purpose of the study because the instrument or questionnaire developed was validated and applied to identify the

sustainability of the study plan, likewise, it answered the first two questions of this study because it also allowed to know that the dimensions of the instrument such as curriculum, teaching-learning strategies, teacher's environmental competencies and student's environmental competencies are essential in an instrument that aims to identify the sustainability of the school curriculum. In relation to validation, it was possible to understand that the instruments that are designed and applied in study or research carried out must be validated by experts in the field because this way what is to be measured and collected is measured and known. The results of the first phase of this research agree with a study carried out by Escofet, Folgueiras, Luna and Palou (2016) that in its second part presented the development of an information collection instrument; specifically, a questionnaire to assess service-learning projects from the perspective of university students, and that was the general objective of this work, they concluded that having detailed the validation process of the instrument that involves an investigation helps to ensure that "we measure what we want to measure" and that we approach scientific research in a more "reliable" way. They also indicated that the definitive and validated instrument was applied in a sample of university students who participated in Service-Learning (APS) projects in public and private universities in the Spanish state. In the same way as in the aforementioned study, in the research presented after the evaluation or validation of the instrument or questionnaire, this was applied to the study sample, that is, to the actors of the educational process that are the students mentioned in the second phase. Another study that agrees with the present is the one carried out by Martínez and Juárez (2019) whose purpose was to design and validate an instrument that delimits the degree of attention to university students with respect to the issue of sustainability and that for its validation was submitted to a *prima facie* review by five experts; subsequently a trial process was applied with 16 expert judges who qualitatively and quantitatively evaluated the relevance and quantity, it concluded that the instrument is valid in content, reliable and affordable to monitor and evaluate the perception of environmental and sustainability in university students. The results of the second phase are confirmed in the results of the application of the survey to identify the sustainability of the Study Plan of the Higher School of Sociology to 115 students who attended the different degrees of education in the institution. Table 7 and Table 8 present the sociodemographic data of the 115 students *of the* (SPSS) and the dimensions of the instrument that was validated in the first phase.

Table 7. Sociodemographic data of the Participants.

Number	115 students (47 men, 68 women)
Sex	71.4% male 28.6% women
Average age	22
Marital status	bachelor
Average years of study	1.1
Economic conditions	Low-Medium Level
Area of residence	Most Acapulco and other parts of Guerrero, in the lowest percentage of other states.
Employment status Marital status	Work (50.4%), do not work (49.6%) Single (87.8%), married (8.7%), free union (3.5%)

[Sociodemographic data of the Participants].

Table 8. Dimensions of the instrument.

Dimensions	Questions
Dimension 1. Curriculum	01-08
Dimension 2. Teaching-learning strategy	09-16
Dimension 3. Teaching skills	17-24
Dimension 4. Student competences	25-28

[Dimensions and questions of the instrument].

The result of the questionnaire that was applied to the students to identify the dimension of sustainability in the curriculum as already mentioned, established four indicators (curriculum, teaching-learning strategies, environmental competencies of teachers and environmental competencies of the students some of them related to health issues) all of them linked to sustainability to achieve the objective. The results showed that the percentages were located at the levels (never, rarely and occasionally), this led to the understanding that the dimension of sustainability in the curriculum and in the learning, process is insufficient, as described in Table 9.

The questionnaire applied to the 115 students of the (SPSS) to identify the link between the curriculum, the teaching-learning process in relation to the principle of sustainability, the results shown indicated that sustainability is minimally integrated into the curriculum and the learning-teaching process. The percentages were mostly inclined, to never, rarely and occasionally, that is, there is not much relationship with the aspect of sustainability. By not including the presence of the sustainable dimension or by not applying it, the work done by the teacher and the skills developed by the student, the teaching-learning process will be dismantled from the principle of sustainable development. The results of this research coincide with a study carried out by (Mancilla et al., 2019) that aimed to analyze the sustainability aimed at academic programs at the professional level for business schools in Mexico, the result of the study concluded in the lack of sustainability in the formal education of the universities that will be resolved with initiatives and projects that have arisen under principles of equity, respect for the environment and ethical reflection. Another study was carried out by Rodríguez (2017) whose objective was to analyze the incorporation of generic competence for sustainability in the curriculum of the Matehuala Preparatory School of the UASLP, where he found that the competence for sustainability is present in a dispersed and isolated way because the RIEMS itself establishes all competencies in a fragmented way. In this second phase, the third question of the study was answered, which raised the need to apply a questionnaire to students to identify sustainability, in relation to what was described, it is established that with the application of the instrument the level of sustainability of the plan was corroborated, because it led to knowing the relationship that exists between curriculum and the sustainable dimension, the teaching strategies by the teacher and their link with this sustainable dimension, as well as the work of the teacher and the promotion of the

student's environmental competences.

Table 9. Results of the questionnaire applied to the 115 students of the (SPSS).

Indicator: Sustainability in the curriculum						
N: Never A: Rarely O: Occasionally F: Often V: Very often NO: Not answered	N	R	O	F	V	NO
The sociology curriculum integrates Environmental Education (socio-environmental dimension) and addresses disciplines or subjects related to socio-environmental issues.	29.6%	23.5%	24.3%	13.0%	7.0%	2.6%
The curriculum integrates Environmental Education as a cross-cutting theme.	26.1%	27.0%	25.2%	12.2%	7.0%	2.6%
The sociology curriculum integrates transversally in its elements the protection and care of biodiversity, the environment and emerging economic and social problems.	24.3%	29.6%	27.0%	13.0%	2.6%	3.5%
The curriculum sets out the sustainable teaching and learning strategies that students should form.	7.0%	18.3%	30.4%	30.4%	11.3%	2.6%
The curriculum sets out the strategies to achieve sustainable learning.	29.6%	22.6%	23.5%	18.3%	3.5%	2.6%
The curriculum integrates health issues among its cross-cutting themes.	25.2%	34.8%	24.3%	10.4%	2.6%	2.6%
The study plan establishes among its elements the prevention of obesity and overweight.	49.6%	25.2%	13.9%	6.1%	2.6%	2.6%
The curriculum establishes human rights among its transversal axes	22.6%	33.0%	25.2%	11.3%	3.5%	4.3%
Indicator (teaching-learning strategies with a focus on sustainability)						
Projects or tasks are developed that are linked to the socio environmental.	31.3%	31.3%	21.7%	11.3%	9%	3.5%
The development of learning units considers activities that are linked to aspects of sustainability.	33.9%	31.3%	23.5%	4.3%	1.7%	5.2%
The development of the subjects includes activities that are linked to health or environmental health.	34.8%	34.8%	18.3%	8.7%	.9%	2.6%
The development of learning units includes activities linked to Human Rights or some other emerging social issue.	27.8%	35.7%	18.3%	11.3%	3.5%	3.5%
Activities are carried out that are related to issues such as saving electricity and water consumption, control, disposal and management of solid waste, air pollution and its impact on human activities.	19.1%	28.7%	28.7%	12.2%	7.8%	3.5%
Development of activities related to health and these linked to socio-environmental aspects.	22.6%	34.8%	20.9%	11.3%	7.0%	3.5%
Development of activities related to human rights and their socio-environmental linkage.	17.4%	31.3%	29.6%	11.3%	7.8%	2.6%
Development of activities through strategies that promote sustainable learning.	4.3%	24.3%	27.8%	20.9%	20.0%	2.6%
Indicator (teaching skills and sustainability)						
I perceive that the teacher has environmental knowledge or skills.	7.0%	20.9%	35.7%	21.7%	12.2%	2.6%
The teacher has the ability to relate the subjects of the subject he teaches with socio-environmental aspects.	9.6%	28.7%	33.9%	21.7%	3.5%	2.6%
The teacher has the ability to relate the topics of the subject he teaches with health or environmental health from a sustainability approach.	18.3%	24.3%	31.3%	18.3%	4.3%	3.5%

The teacher has the ability to relate the subjects of the subject he teaches with Human Rights with a focus on sustainability.	15.7%	29.6%	25.2%	19.1%	7.8%	2.6%
The teacher has the ability to form study habits and learning strategies in students in a sustainable way.	5.2%	19.1%	27.8%	29.6%	15.7%	2.6%
The professor mentions in the group that garbage must be classified, the air should be turned off, plants and animals should be taken care of, water consumption should be reduced, electricity consumption should be reduced, and actions should be taken to obtain economic benefits from municipal solid waste.	29.6%	29.6%	22.6%	9.6%	6.1%	2.6%
The professor mentions in the group that it is important to take care of health with preventive programs, such as avoiding overweight and obesity with a sustainable approach.	32.2%	32.2%	19.1%	9.6%	4.3%	2.6%
The professor mentions that it is important to understand and put into practice respect for human rights from the perspective of sustainability.	13.9%	26.1%	31.3%	16.5%	9.6%	2.6%
Indicator (student competences and sustainability)						
Students have competencies (knowledge, skills and values) to preserve and care for the environment with a sustainable development approach.	12.2%	22.6%	27.8%	20.9%	10.4%	6.1%
Students have the competence to form study habits and use learning strategies with a sustainable approach.	4.3%	23.5%	34.8%	20.0%	12.2%	5.2%
Students have the competence to take care of their health and mainly the problem of overweight and obesity.	20.9%	25.2%	20.9%	16.5%	11.3%	5.2%
Students have the competence of human rights from the perspective of sustainability and put that knowledge into practice.	13.9%	26.1%	31.3%	16.5%	9.6%	5.2%

[Student survey result to identify the dimension of sustainability in the curriculum and learning process].

Conclusion

This study concludes by affirming that the curriculum of educational institutions around the world and at all educational levels including universities must integrate the sustainable dimension into their curricula. In this study, to identify sustainability, it was considered to analyze the curriculum, that is, the relationship between sustainability and the subjects of the curriculum, the transversality of the environmental dimension, the incorporation of transversal themes, etc. Teaching-learning strategies were also addressed, that is, the implication of the environmental or sustainable dimension of the teaching work., Likewise, with the teaching competences, that is, the mentor, has the concern to promote environmental knowledge so that in this way it permeates the environmental dimension in the work it does. With regard to the environmental competences of students, it is necessary to understand whether students with the training they receive at the university promote environmental knowledge that leads to the acquisition of sustainable skills. Currently it is essential that the university contributes to sustainability, and, therefore, the inclusion of the principle of

sustainability in the curriculum is urgent to address. Since sustainability from a development approach is an emerging issue in the world, it is necessary for university researchers to carry out research to know sustainability in the curriculum they work on. This study suggests that in research in any field of science and mainly in studies such as the one presented and that refers to the identification of sustainability in curricula, the dimensions and contents of the instrument to be applied with the target population are validated, because in this way what you want to know is achieved with certainty. The study presented allowed in its first phase to elaborate and validate the instrument, there were favorable results, with the judgment of experts it was successful, the instrument was the one indicated, however, in the second phase, when applying it to the target population, to identify the sustainability of the plan, the results yielded minimum levels between the curriculum and the sustainable dimension. The questionnaire designed and applied can be very useful for research with objectives similar to the work presented.

Sustainable development is a development alternative that seeks to meet the needs of present generations without compromising the ability to meet the needs of future generations. To speak of development is to speak of sustainability since development is in itself the well-being of people, including their quality of life. Therefore, access to employment, health services, education and housing, water and drainage, etc., are part of development, but also the quality of the natural environment is part of the quality of life in development (Aguilar, 2002: cited in Osorio, Vazquez and Tanka, 2007). Therefore, it is possible to talk about sustainable health as long as a reality of sustainable development is effectively constructed, that is, where there is a different conception of life and an environmental economic logic. For healthy-sustainable living conditions to exist in present and future generations, it is necessary to rely on the paradigm of sustainable development (Osorio, Vazquez and Tanka, 2007). It is important to understand that sustainability includes environmental, social, economic dimensions, etc. The integration of this principle in university curricula means addressing emerging issues of social concern, such as the environmental crisis or aspects that have to do with health in such a way that students graduate with competences attached to sustainable development.

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