sustainability

MDPI

Article

Defining Sustainability Core Competencies in Business and Management Studies Based on Multinational Stakeholders' Perceptions

Almudena Eizaguirre [1], María García-Feijoo [1,*] and Jon Paul Laka [2]

[1] Marketing Department, University of Deusto, Hermanos Aguirre, 2, 48014 Bilbao, Spain; almudena.eizaguirre@deusto.es

[2] Quantitative Methods Department, University of Deusto, Hermanos Aguirre, 2, 48014 Bilbao, Spain; jplaka@deusto.es

* Correspondence: maria.garciafeijoo@deusto.es; Tel.: +34-944-139-168

Received: 22 March 2019; Accepted: 12 April 2019; Published: 17 April 2019

Abstract: One of the concerns in our time is the need to integrate economic, social and environmental aspects, which is known as sustainable development. The role of higher education is essential for providing future professionals with the necessary profiles to respond to the sustainability challenges in increasingly complex and global contexts. That is why numerous authors have sought to define key competencies, skills and learning outcomes for sustainability. However, there is still no agreement on what these key competencies for sustainability in higher education really are. For that reason, the objective of this paper is to determine which are the sustainability core competencies, considering three different geographical regions (Europe, Latin America, and Central Asia), and the perspective of four different stakeholders (graduates, employers, students and academics). The framework of the research is the development of the so-called Tuning projects, which aim to design comparable and compatible higher education degrees in different regions of the world, based on student-centered and competency-based learning. Using an exploratory factor analysis (EFA), the results of this study reveal the existence of a factor intimately related to sustainability, which includes competencies such as commitment to the preservation of the environment, social responsibility or respect for diversity and multiculturality, among others.

Keywords: education for sustainable development; education for sustainability; sustainability competencies; higher education; business and management education

1. Introduction

There seems to be a consensus nowadays that economic, social and environmental concerns can no longer be treated as separate and independent [1–3]. Sustainability thus becomes a concept that appears not only in the agenda of public institutions but also in those of organizations and companies, as well as in the citizens' minds.

It also seems clear that educational institutions and, specifically higher education ones, are called to play a fundamental role in the effort to achieve sustainability [4,5]. International and national organizations have recognized the role of education in building societies based on values of equity, social justice and sustainability, and have elaborated strategies and action plans to achieve it [5,6]. In other words, universities are considered to play an essential role in providing future professionals with the necessary attributes to respond to the sustainability challenges of the 21st century in increasingly complex and global contexts [4,7,8]. Universities can become catalysts for change [9] and must play an increasingly important role in helping students become responsible and active citizens, with a clear vision of the importance and future challenges of sustainability [10,11].

In this context of globalization and growing complexity, higher education for sustainable development (ESD) or education for sustainability (ES) (concepts that we will consider as synonymous in this document) aims to enable people not only to acquire and generate knowledge, but also to reflect on the effects and complexity of behaviors and decisions from a responsible, global and future-oriented perspective [12].

There is no universal formula for achieving this, but it seems essential to generate a paradigm shift and a change in the university curricula that addresses students' sustainability needs, aspirations and concerns [3,11].

At the international level, the integration and achievement of learning outcomes in the form of attributes, competencies, capacities and skills have become relevant in higher education agendas [8]. According to Wiek, Withycombe and Redman [13] (p. 204), "despite some criticism, there is convergence in the educational literature about the critical role of defining key competencies and specific learning outcomes in order to successfully design and teach in academic programs". In a similar sense, the introduction of key competencies for sustainable development could be an important step towards the integration of sustainability in higher education [7,13]. "These key competencies represent a distinct and recognizable qualifications profile for research and teaching projects, academic schools, graduates, professions, and jobs in the sustainability field" [13] (p. 211).

Although numerous authors have sought to define sustainability key competencies in higher education [6,7,11,13–16], there is still no agreement on what these key competencies really are [6,12,17].

That is why the aim of this paper is to determine which are the sustainability core competencies, adding the novelty that they will be defined for three different geographical regions, and taking into consideration the perspective of four different stakeholders. The framework of the research is the development of Tuning projects, which, as it will be further explained, aim to design comparable and compatible higher education degrees in different regions of the world, based on student-centered and competency-based learning.

To achieve this, this article is structured as follows. After this introduction, in Section 2 (literature review) we will address the concept of sustainability based on three axes (economic, environmental and social), we will defend the crucial role of higher education in education for sustainability, and we will review existing proposals of key competencies for sustainability in higher education. In addition, we will briefly introduce the role of Tuning projects in the development of competencies in higher education, as this is the field in which our research takes place. In Section 3 (research objectives and methodology) we present the research objectives and research questions, the methodology and the sample. Taking as a basis three lists of generic competencies in the business and management area in different regions of the world, we will determine whether competencies linked to the key elements of sustainability in the light of academic literature, measured in terms of importance for a diversity of stakeholders (graduates, employers, students and academics), effectively create a valid construct of sustainability in different geographical regions. Concretely, we have information collected in three geographical areas (corresponding to Tuning projects in Europe, Latin America and Central Asia) and more than 10,000 questionnaires from graduates, employers, students and academics. In Section 4 (discussion of results) we analyze the results, and then present the conclusions, limitations and future lines of research (Section 5), to finally compile the bibliographical references.

2. Literature Review

2.1. What Is Sustainable Development

In recent years there has been, and still is, a great debate regarding what the term sustainable development means and what their main components should be. The roots of the term sustainability come from so many sources and there are so many areas from which it can be understood that it is difficult to find a definition that satisfies everyone [18]. For Ruta and Hamilton [19] (p. 45), "the problem is not in the idea of sustainability per se, but in the object of what must be sustained or maintained".

Natural scientists and ecologists would say it is the capacity of the ecosystem what must be maintained, while a sociologist, philosopher or economist could refer to the maintenance of the humanity or the economic development.

In many cases, concepts such as social responsibility, ethics, triple bottom line, corporate governance, social accountability or sustainability are used indistinctly, and there is no universal definition of each of them [20–23]. From our point of view, these concepts share some elements and are related to each other. Since the focus of our research is on competencies for sustainability, in the following lines we will try to present the defining elements of the sustainability concept.

Although there are more than one hundred definitions of sustainability [24], most researchers base their work on the definition of sustainable development given by the World Commission on Environment and Development, and agree that the origins of the term are in the 1987 publication of "Our Common Future", better known as the "Brundtland Report" [3]. The World Commission on Environment and Development defined sustainable development as "development that meets the needs of current generations without compromising the ability of future generations to meet their needs and aspirations" [25] (p. 43).

This definition has most often been operationalized through a triangular vision of sustainability, which includes ecological, social or socio-cultural, and economic aspects [26–28]. Curran [29] (p. 8) notes, for example, that "sustainable practices allow for satisfactory outcomes for humans and the environment while fulfilling the social and economic needs of current and future generations". It would be what some authors call the 3 P's, "planet", "people", and "profits" or "prosperity", or the 3 E's, "environment", "equity", and "economy" [26,27,30]. Under this perspective, the ecological pillar would refer to concerns such as the use of natural resources (water, energy, agriculture...), biodiversity, climate change, rural development, sustainable urbanization or the prevention of natural disasters; the social pillar would include protection of human rights, health, social cohesion, peace and security, gender equality, cultural diversity and intercultural understanding, participation, or the different opportunities for self-development that can be attributed to education and freedom; and the economic pillar would focus on the generation of wealth and work, the distribution of resources, poverty reduction, corporate social responsibility, etc. [27,31,32].

Despite being a very common classification and approximation to the term, many authors consider it simplistic and reductionist [26,33,34]. Some believe that the social dimension, for example, has received less focus than the economic or environmental dimension [26,30,35]. Other researchers consider that more pillars need to be added, or existing ones should be reformulated. For example, Seghezzo [34] proposes a five-dimensional framework, which he calls the 5 P's. In his approach, he maintains the traditional "planet", and "prosperity"; he changes "people" for "persons", as a symbol that people are individual human beings and not undifferentiated members of society; he adds the fourth dimension of "place", to incorporate the cultural, geographical and spatial dimension, which has a clear impact on the understanding of sustainability; and, finally, he adds the fifth dimension of "permanence", which represents the temporal dimension, to strengthen the concept of long-term and intergenerational justice.

For most authors, the greatest problem lies in the difficulty of integrating the three perspectives without any of them ceasing to be relevant or being reduced. This is due to the fact that, in the current socio-economic system, improving indicators related to one of the dimensions usually implies worsening those related to another [13,19]. Thus, many researchers stress the need for integration of the three aspects at all levels, in the short, medium and long term [3]. Lozano [2] points out that a holistic perspective is essential, one that truly integrates the three dimensions (he even points out a fourth one, time).

However, despite the criticisms, this vagueness and flexibility of the sustainability term also make it attractive and relevant to many areas of knowledge. For this reason, as stated by Kidd [18], the existence of multiple meanings of the term is not a problem if researchers and analysts clearly describe what they are referring to when using the word sustainability. For the purpose of this article,

we accept the threefold slope of the term sustainability and will argue that it is the competencies related to these three areas the ones that should be developed with students.

2.2. The Role of Higher Education in Sustainable Development and Its Inclusion in the Curricula

There seems to be a clear consensus regarding the important role of learning and education as tools for achieving change and sustainable development [17,36–38]. In McGregor's terms [39] (p. 3563) "education plays a pivotal role in communicating the normative notion of sustainability so that people's judgments and actions as human beings are more accountable relative to nature and the future".

That is why the terms education for sustainable development (ESD) or education for sustainability (ES) appear. As defined by UNESCO (The United Nations Educational, Scientific and Cultural Organization), "education for sustainable development means including key sustainable development issues into teaching and learning; for example, climate change, disaster risk reduction, biodiversity, poverty reduction, and sustainable consumption. It also requires participatory teaching and learning methods that motivate and empower learners to change their behavior and act for sustainable development. Education for sustainable development consequently promotes competencies like critical thinking, imagining future scenarios and making decisions in a collaborative way" [40].

Within education, a special focus is placed on higher education institutions. Universities are considered change agents in general, and in relation to sustainability as well [17]. In 2007, United Nations Global Compact [41] pointed out that any significant and lasting change in the behavior of society and business towards sustainability must involve the institutions that act most directly as drivers of one type of business behavior or another. Specifically, academia has a relevant role to play. Universities help shape the attitudes and behavior of future business managers through education, research, management development programs and the dissemination and promotion of new values, attitudes and ideas.

Thus, many universities today actively seek to integrate education for sustainable development in their various activities, not only in the curriculum and in research, but in operations, management, assessment and reporting, and in the relationship with internal and external stakeholders as well [22,37,42,43]. In fact, there is a growing interest in academic literature in the concept of University Social Responsibility (USR). According to Vallaeys and Álvarez Rodríguez (2019) [44], it can be defined as the responsibility of the university for its social and environmental impact, through an ethical and efficient management of its administrative processes and substantive academic functions, in order to participate, together with the other actors in its territory of influence, in the promotion of fair and sustainable human development. "USR is a philosophy, or principle for social movement, which can be perceived as a philosophy of a university to use an ethical approach to develop and engage with the local and global community in order to sustain the social, ecological, environmental, technical, and economic development" [45] (p. 165). This responsibility "to work for people's lives improvement and for global important issue solutions" is sometimes refer to as the "third university's mission" [22] (pp. 60–61), adding to the development of teaching activities and knowledge transfer.

Considering that universities are one of the main providers of education, the integration of the principles of sustainability into their curricula could provide students with knowledge and skills about the changes, systems and requirements of the new business paradigm [3].

However, this paradigm shift is complicated, as it needs to be disseminated and implemented through the entire university system [46]. In practice, therefore, and although progress has been made [6,15], there are doubts about the extent to which this has been significant in relation to the incorporation of sustainable development in higher education [10,47].

One of the main difficulties is that education for sustainability is different from education in traditional disciplines because of its broad-based and multi-disciplinary content. And this means that teaching and learning of these contents require new approaches and different formats [10,38,48].

There are different proposals regarding how content and competencies linked to sustainability can be incorporated into higher education curricula. Watson, Lozano, Noyes and Rodgers [37] refer

to two methods: horizontal integration, which involves incorporating sustainability into different courses throughout the curriculum; and vertical integration, which refers to adding new sustainability courses to existing ones. Similarly, Aktas, Whelan, Stoffer, Todd and Kern [10] point out how there are some authors who defend the incorporation of sustainability at the level of a course, a program or the university, as opposed to those who propose a complete restructuring of the university system must take place in order to confront the complex problems of the 21st century. Lozano, Ceulemans and Seatter [49] also refer to the following options for incorporating sustainability into the university curriculum: from including specific contents into one of the subjects or courses, to developing an undergraduate or postgraduate program on sustainability, to designing specific courses on the topic. These authors also highlight the need to work not only on technical skills (hard skills) but especially on those soft aspects, linked to a constructivist and holistic position, which make it possible to face the complexities involved in the challenges associated with sustainability [49].

In a different, but complementary line, Setó-Pamiés and Papaoikonomou [3] highlight the importance of integrating three different levels in order to produce significant student learning in relation to sustainability: the institutional level (mission, vision and values of the university or faculty, strategic plan, organizational culture, resource management ...); the curricular level (subject, module and course design, concentration/dispersion, single discipline/multidisciplinary perspective, obligatory/elective, temporal distribution, new/current structures ...); the instrumental level (specific methodologies and learning objectives). These same authors also point out that, in addition to the pillar of knowledge, skills and competencies development, universities need to take care of two other important pillars: research and knowledge generation, and their everyday operations, which can reduce their environmental impact and increase their positive social impact.

The other great difficulty for the implementation of sustainable development in higher education is the confusion regarding which the sustainability key competencies are [15]. Therefore, in the following section, we will focus on reviewing competencies related to sustainability, as a necessary preliminary step to deciding how to incorporate them into the university curricula.

2.3. Sustainability Competencies in Higher Education Curricula

As stated by Wiek, Withycombe and Redman [13] (p. 204), "key competencies provide the reference scheme for transparently evaluating student learning and teaching effectiveness". According to Segalàs, Ferrer-Balas, Svanström, Lundqvist and Mulder [42] competencies cover three areas: knowledge and understanding, skills and abilities, and attitudes. In a similar sense, Wiek, Withycombe and Redman [13] define competencies as a functionally linked complex of knowledge, skills and attitudes that enable successful task performance and problem-solving. More recently, Lozano, Merrill, Sammalisto, Ceulemans and Lozano [15] define them as the important knowledge, values, skills and attitudes needed to address complex problems students will encounter in their personal lives and future professional careers.

It is relevant to note that there is some criticism of competency-based approaches. For example, Lotz-Sisitka and Raven [50] discuss the difficulty of articulating competency in the development of real educational programs, which may limit the transformative potential of education to turn students into change agents. For these authors, the criticism is not of the concept of competency itself, but of "shallow or inadequate interpretations of the competency framework" [50] (p. 317).

Lozano, Merrill, Sammalisto, Ceulemans and Lozano [15] (p. 1) argue that "to better develop mindsets and actions of future generations, we must provide students with a complete set of sustainability competencies". However, McGregor [39] (p. 3574) states that one must be alert because "ideally, education would not be 'for' anything (risk of indoctrination is too great) and definitely not 'for' sustainable development. If education is 'for' anything, it would be for the greater good or for a sustainable future: education for the 21st century, education for a sustainable society, education for sustainability".

Over the years, different competencies for sustainable development have been defined in different contexts [7,14,51], offering a complete set of knowledge, skills, values and attitudes needed to ensure that today's students and future leaders are prepared to address complex sustainability issues and achieve a sustainable future [7,48]. This is because "the conceptualizations of the nature of sustainability problems and the degree of change required for transition to sustainability on the part of people and educational and other institutions differ significantly, and this leads to both converging and diverging definitions of competencies for sustainable development and sustainability" [17] (p. 391).

Therefore, there is no agreement on what the key competencies for sustainability in higher education really are [12], nor there is a single agreed list of competencies for sustainable development [6,17].

In line with what Wiek, Withycombe and Redman [13] (p. 204) propose, key competencies are "a critical reference point for developing the ambitious profile of knowledge and skills of students who are expected to be future 'problem solvers', 'change agents' and 'transition managers'". Thus, in the following pages, we will review the proposals that different authors make of competencies for sustainability.

UNESCO [32] (p. 29) formulated in its "International Implementation Scheme" on the World Decade for ESD: "Creating a more sustainable future will not occur simply by increasing the amount of education; instead, it is an issue of content and relevance. Questioning, rethinking, and revising education from preschool through university to include more principles, knowledge, skills, perspectives and values related to sustainability in each of the three realms—environment, society, and economy—is important to our current and future societies. This should be done in a holistic and interdisciplinary context, engaging society at large, but carried out by individual nations in a locally relevant and culturally appropriate manner".

Kagawa [11] (p. 319) also states that "against this backdrop, there are endless discussions about what constitutes education for sustainability (. . .). Many academics have agreed that there is no single framework, conceptualization, and understanding of either sustainable development or sustainability. They think that the concept is rather an evolving one".

Lambrechts, Mulà, Ceulemans, Molderez and Gaeremynck [7] highlight that all competency schemes contain elements of sustainability development in a fragmented way. This means that there are few competencies that focus on the concept of sustainable development, but many of them include partial elements of it. Competencies for sustainable development are often more closely related to ethical and moral attitudes, and less so to system orientation, future orientation and action. Elements of sustainability are often implicitly present in competency frameworks. This implies that competencies for sustainable development are transmitted to students in an "unconscious" or "unofficial" way because they are not explicitly positioned in its context.

Following academic literature's call, we will now review some of the main existing proposals on competencies for sustainability.

"In Germany, developing 'Gestaltungskompetenz' has been discussed as the central educational objective of ESD" [12] (p. 418). This word comprises eight key competencies: "(1) competency in foresighted thinking; (2) competency in interdisciplinary work; (3) competency in cosmopolitan perception, transcultural understanding and cooperation; (4) participatory skills; (5) competency in planning and implementation; (6) capacity for empathy, compassion and solidarity; (7) competency in self-motivation and in motivating others; and (8) competency in distanced reflection on individual and cultural models" [14] (pp. 22–25).

Kagawa [11] (pp. 318–319) notes that the Higher Education Academy in 2006 described skills and knowledge necessary for "an action-oriented, sustainability literate graduate" as follows: "(1) an appreciation of the importance of environmental, social, political and economic contexts for each discipline; (2) a broad and balanced foundation knowledge of sustainable development, its key principles and the main debate within them, including its contested and expanding boundaries; (3) problem-solving skills in a non-reductionist manner for highly complex real-life problems; (4) ability to think creatively and holistically and to make critical judgements; (5) ability to develop a high-level of

self-reflection (both personal and professional); (6) ability to identify, understand, evaluate and adopt values conducive to sustainability; (7) ability to bridge the gap between theory and practice; (8) ability to practice creatively in interdisciplinary teams; and (9) ability to initiate and manage change".

Wiek, Withycombe and Redman [13] (p. 207), on their side, conduct a literature review and point out that "the goal of academic sustainability programs is to enable students to plan, conduct, and engage in sustainability research and problem solving based on the interplay of systems-thinking, anticipatory, normative, strategic, and interpersonal competencies".

Lambrechts, Mulà, Ceulemans, Molderez and Gaeremynck [7] state that education for sustainable development tries to incorporate competencies for sustainable development linked to responsibility, emotional intelligence, system orientation, future orientation, personal involvement, and action taking.

Cebrián and Junyent [52] develop a theoretical framework of the professional competencies in ESD, configured by eight competencies: (1) visualize alternate/future scenarios; (2) contextualize; (3) work and live with complexity; (4) think critically; (5) make decisions, participate and work for change; (6) clarify values; (7) create dialog between disciplines; and (8) deal with emotions. These same authors later point out that "integrative and interdisciplinary teaching and learning approaches that can foster sustainability skills, such as problem-solving, critical thinking, action competency and systems thinking, seem appropriate because of the complexity that sustainability presents" [6] (p. 2769).

Lozano, Merrill, Sammalisto, Ceulemans and Lozano [15] undertake a literature review and conclude that the key competencies for sustainability are: (1) systemic thinking; (2) interdisciplinary work; (3) anticipatory thinking; (4) justice, responsibility, and ethics; (5) critical thinking and analytical work; (6) interpersonal relationships and collaboration; (7) empathy and change of perspectives; (8) communication and use of the media; (9) strategic thinking; (10) personal engagement; (11) assessment and evaluation; and (12) tolerance for ambiguity and uncertainty.

Finally, UNESCO [16] in the document "Education for Sustainable Development Goals. Learning Objectives" states that the key competencies for sustainability are: (1) systems thinking competency, (2) anticipatory competency, (3) normative competency, (4) strategic competency, (5) collaboration competency (6) critical thinking competency, and (7) self-awareness competency; and (8) integrated problem-solving competency.

In the previous lists, it can be seen the most frequently mentioned competencies are systemic thinking (five times) and critical thinking or the ability to make critical judgments (five times as well). The next one is strategic competency (four times), empathy (twice), and collaboration (twice). Several competencies related to self-motivation, self-reflection and self-awareness are mentioned, each of them once.

After reviewing both the concept of sustainability itself and the different proposals for sustainability competencies, in this paper, we will focus on those competencies specific and intrinsic to sustainability, which we will call sustainability core competencies, and not on the competencies that contribute to education in sustainable development.

2.4. Educational Harmonization Projects for the Development of Competencies: Tuning Projects

Since the early 1990s, higher education has been influenced by key developments such as the Bologna Process in Europe or the Australian Quality Framework (AQF) in Australia [8]. This evolution led to higher education reforms focused on the development of basic competencies and generic learning outcomes.

In Europe, the creation of the European Higher Education Area (EHEA) provided an opportunity to incorporate relevant competencies into the higher education curriculum. The new educational model offered by the EHEA focuses on student-centered teaching and learning approaches and the development of competencies.

The first Tuning project, a pioneer in higher education, was launched in Europe in 2000 with the participation of 100 universities, which reflected on the different ways in which a competency-based approach could serve as a basis for building a common area for higher education [53,54]. After a major

process of surveying different stakeholders, a list of competencies to be developed through university degree programs in different fields of knowledge was proposed [17].

One of the great benefits attributed to the Tuning projects is that they have proved to be a valuable tool for promoting cooperation between universities and regions, thanks to encouraging the meeting and debate between experts from many institutions, and the completion of a common work of defining competencies for each educational level. They focus on the development of learner-centered learning based on competencies, where the real protagonist is the learner and his or her learning process, and where academics are facilitating agents of the process. The aim of the projects is to develop comparable and compatible areas of higher education [42,55]. They have two major strengths: their openness to the different cultural contexts, integrating working groups beyond the direct participants of the project; the active search for mutually understood narrative, through a horizontal and negotiated process. Within the framework of Tuning projects, a methodology has been designed to understand the curricula of each area of knowledge (law, business and management, engineering ...) and make the comparison among universities and countries possible. Habitually, five lines of work are considered, to debate in each one of the areas of knowledge: (1) generic competencies, (2) specific competencies, (3) the role of credits, that is to say, the workload assumed by the student in a course, (4) teaching-learning and assessment approaches and (5) the role of quality improvement in teaching-learning processes, giving great importance to all stakeholders.

In Tuning projects, a distinction is made between learning outcomes and competencies. In addition, relevance is given to the voice of both academics and students. The desired learning outcomes of a learning process are formulated by academics, but it is very important to consider student representatives' views as well. On the other hand, it is relevant to consider the internal agents of the university, but also the external agents (employers, graduates ...).

Competencies represent a dynamic combination of cognitive and meta-cognitive skills, knowledge and understanding, interpersonal, intellectual and practical skills, and ethical values [42]. Thus, for a person to have a competency (or reach a learning outcome), he/she must be able to put into play a certain capacity or ability, and perform a task in which he/she is able to demonstrate the ability to perform in a way that the level of achievement can be assessed [42].

According to Tuning projects methodology, a distinction is made between generic competencies (those that are transversal and relevant for students in different degrees, e.g., teamwork) and specific competencies (those that are specific and genuine to a particular degree, e.g., to develop a marketing plan for a graduate in business and management) [56]. Tuning projects recognize the importance of creating and developing specific knowledge and skills as a basis for university degree programs, but also place great emphasis on devoting time and attention to the development of generic skills (teamwork, oral communication, etc.). These generic competencies are often the ones that make the difference and are crucial for the future of the graduates, both professionally and socially. Following the Tuning methodology, in each of the projects, a large-scale consultation is carried out to listen to all the stakeholders (graduates, employers, students and academics) and thus identify the most important competencies in each area of knowledge (engineering, law, business and management, medicine ...).

To date, 34 projects with the collaboration of over 600 academics in 118 countries have been carried out. These projects have been backed and financed by the European Commission, which has invested over 22 million euros in their execution, and they have been supported by national governments and universities. As a result, over 70 different publications in 17 different languages have been produced [55].

3. Research Objectives and Methodology

In the previous section we dealt with the general framework of what sustainable development is; then what role higher education institutions should play in developing the competency profile of students; then what competencies should be developed for graduates to contribute to a more sustainable society; and finally we explained the existence and nature of the Tuning projects.

3.1. Objectives and Research Questions

The aim of this research is to find out which are the main competencies linked to sustainability, considering graduates, employers... and other stakeholders' opinions in different regions of the world. That is to say, we would like to determine which the sustainability core competencies are. As Wiek, Withycombe and Redman [13] (p. 212) point out "the literature is still dominated by 'laundry lists' of competencies rather than conceptually embedded sets of interlinked competencies". In previous pages, some of these lists of competencies have been reviewed. In this paper, we want to infer from the responses of graduates, employers, students and academics in different regions of the world, which competencies could be truly connected with sustainability.

For this purpose, we start from a list of generic competencies from the "Degree in business and management" studies generated within the framework of different Tuning projects. These projects carry out extensive surveys among different types of stakeholders, who are asked which are the most important generic competencies to develop in graduates. Since they are asked which competencies are most important, we will use this valuable information with the objectives we will explain below. Stakeholders are not explicitly asked about sustainability, and that is why it is relevant to discover the way they think about it or if they identify competencies linked to the concept.

Our main research objective is to determine whether competencies linked to the main elements of sustainability according to the academic literature, measured in terms of importance to stakeholders (graduates, employers, students and academics), effectively create a valid construct of sustainability in each of the chosen geographical regions. In addition, and considering that the purpose of sustainability education is to bring about change in educational institutions, community and business operations, another objective of our research is to find out which these competencies valued and supported by stakeholders, and that lead to sustainability, are.

Therefore, our research questions are the following: Do the data show a linkability between competencies associated with sustainability? What are these competencies associated with sustainability considering a wide range of stakeholders in three different geographic regions?

The answers to these questions will allow us to know which the competencies that must be developed by business and management students in order to advance towards sustainability are.

3.2. Selection of the Projects

In this paper, we will specifically analyze business and management studies, in three multi-country Tuning projects, and considering the responses given by four stakeholder groups. The reasons that led us to this decision are explained below.

Business and management studies: Although sustainability is crucial in all areas of knowledge, many authors point to business and management studies as especially relevant, given their future graduates will be part of the economic and business context, and therefore, their education will be essential to generate one impact or another in society [28,39,57]. The truth is that business and management graduates develop their professional careers in very varied organizations such as all kinds of industries, productive companies, service companies (distribution, banking, energy, tourism, education ...), etc. A greater or lesser development of competencies for sustainability has its impact in a multitude of areas. In addition, not infrequently business and management graduates occupy relevant positions in decision-making in organizations (general management, marketing management, financial management, production management ...) and these decisions not only impact on their companies but also on competitors, suppliers, customers and society in general.

Three multi-country Tuning projects: Several authors acknowledge that, on many occasions, competency schemes for sustainability do not take into account different cultural and local contexts, even though it is an essential element impacting on different levels of sustainable development [6,30,58]. Thus, in this research, we will analyze sustainability core competencies in three different geographical areas, through three Tuning projects, in Europe, Latin America, and Central Asia. For the selection of the projects, we have only considered projects with a working group in the area of business and

management (since not all areas of knowledge are represented in all projects), as well as the fact that they were regional projects, and therefore covered different countries (thus eliminating Tuning mono-country projects).

Four different stakeholders: As stated by Cebrián and Junyent [6] there are numerous studies focusing on the perception, understanding, knowledge and attitudes of university students in relation to sustainability. However, there is little research that considers other social partners, specifically, for example, teachers. In a similar way, there are authors [37,46] who point out that the knowledge and attitudes towards sustainability of different stakeholders are critical to promoting sustainable practices on campuses, and makes it possible to reduce the gap between what is actually being done and what is perceived to be being done. For Watson, Lozano, Noyes and Rodgers [37] the inclusion of different stakeholders' perspectives is still a new and growing research field. In this sense, in this article, we present the results of the consultation to four different groups of university stakeholders: graduates, employers, students and academics.

Following this reasoning, the three Tuning projects selected for this study are the following: Tuning Europe, Tuning Latin America and Tuning Central Asia.

Tuning Europe [59] took place between December 2006 and March 2009 (Socrates-financed partners); between June 2007 and September 2008 as well (Tempus-financed partners). The 32 countries participating in this project, in alphabetical order, were Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kosovo, Latvia, Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Republic of Macedonia, Romania, Serbia, Slovakia, Spain, Sweden, Switzerland, Ukraine and United Kingdom.

Tuning Latin America [60] was developed between 2004 and 2007 and was supported by the ALFA Program (financed directly by the European Commission). There were eight participating countries. Specifically, Argentina, Brazil, Chile, Colombia, Costa Rica, Guatemala, Mexico and Venezuela.

The third project was called TuCAHEA, a name that responds to the initials of "Towards a Central Asia Higher Education Area" [61]. It was a Tempus Structural Measures project that took place from 2012 to 2015. The project actively involved 34 universities in Central Asia, the Ministries of Education of the five partner countries (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan) and experts from eight European universities as facilitating agents.

The main objective of the Tuning projects developed in Latin America and Central Asia was to contribute to the construction of a Higher Education Area in those regions, aligned with the European Higher Education Area (EHEA). Furthermore, it was important that in this creation of a common education space, the specificities of the regions involved, and the economic and social needs of those areas were considered. In other words, it was not an attempt to impose a higher education system created in the image and likeness of the European one but adapted to the specificities of the regions involved. The aim of the projects was to rethink the curricula at different levels (undergraduate, postgraduate and doctorate); to include in the reflection the opinion of different stakeholders; to define the curricula in terms of competencies to be developed by the students; and to measure the workload of the student in each of the academic years and for each of the subjects. Moreover, the exchange of students from different regions is made possible and a comparison of curricula is allowed, resulting in the improvement of the educational systems of each region.

In these three projects, following the already explained Tuning methodology, large scale consultations to four different stakeholders regarding competencies were made. In each project, the list of generic competencies was slightly different, since the group of experts participating in the project had the capacity to adapt, expand or qualify the starting list, in order to make it more adequate for the specific geographical and sociocultural context.

Table 1 shows the starting list of generic competencies that was used for consultation and therefore were rated in terms of importance by the four collectives, in each of the projects [59–61].

Table 1. Complete generic competencies list in Europe, Latin America and Central Asia Tuning projects.

List of generic competencies used in the Tuning Europe project (2006–2009)
Ability for abstract thinking, analysis and synthesis; Ability to apply knowledge in practical situations; Ability to plan and manage time; Knowledge and understanding of the subject area and understanding of the profession; Ability to communicate both orally and through the written word in native language; Ability to communicate in a second language; Skills in the use of information and communication technologies; Ability to undertake research at an appropriate level; Capacity to learn and stay up-to-date with learning; Ability to search for, process and analyze information from a variety of sources; Ability to be critical and self-critical; Ability to adapt to and act in new situations; Capacity to generate new ideas (creativity); Ability to identify, pose and resolve problems; Ability to make reasoned decisions; Ability to work in a team; Interpersonal and interaction skills; Ability to motivate people and move toward common goals; Ability to communicate with non-experts of one's field; Appreciation and respect for diversity and multiculturality; Ability to work in an international context; Ability to work autonomously; Ability to design and manage projects; Commitment to safety; Spirit of enterprise, ability to take initiative; Ability to act on the basis of ethical reasoning; Ability to evaluate and maintain quality of work produced; Determination and perseverance in the tasks given and responsibilities taken; Commitment to the conservation of the environment; Ability to act with social responsibility and civic awareness; Ability to show awareness of equal opportunities and gender issues.
List of generic competencies used in the Tuning Latin America project (2004–2007)
Capacity for abstraction, analysis, and synthesis; Ability to apply knowledge in practice; Ability to organize and plan time; Knowledge regarding the area of study and related professions; Social responsibility and commitment to citizenship; Capacity for oral and written communication; Ability to communicate in a second language; Ability to use information and communication technology; Capacity for investigation; Ability to learn and update learning; Ability to search for, process, and analyze information from a variety of sources; Critical and self-critical abilities; Ability to react to new situations; Creative skills; Ability to identify, pose, and solve problems; Ability to make decisions; Ability to work as part of a team; Interpersonal skills; Ability to motivate and work towards common goals; Commitment to look after the environment; Commitment to socio-cultural environment; Value and respect for diversity and multiculturality; Ability to work in international contexts; Ability to work autonomously; Ability to formulate and manage projects; Ethical commitment; Commitment to quality.
List of generic competencies used in the Tuning Central Asia project (2012–2016)
Ability to analyze and synthesize; Ability to use logical and critical. thinking for solving problems; Ability to model, design and forecast; Ability to carry out research applying appropriate methods; Ability to take initiatives and entrepreneurship; Ability to innovate; Ability to develop general knowledge; Ability to learn including autonomous learning; Ability to communicate interactively and receive feedback; Knowledge of the professional field; Ability to communicate in multicultural context; Ability to communicate in official state, Russian and foreign languages; Ability to lead people and work in a team; Ability to manage information; Ability to use information and communication technologies; Social responsibility; Ability to follow a healthy lifestyle; Ecological and environmental responsibility; Knowledge of the laws; Ability to prevent and resolve conflicts; Patriotism and preservation of own cultural values; Tolerance and respect for others; Commitment to quality result; Flexibility; Ability to apply knowledge in practice; Orientation toward the needs of the user; Ability to work autonomously; Ability to adapt to change; Ability to make decisions; Time-management.

3.3. Sample and Methodology

Following the standard sample selection procedures applied in all Tuning projects, the sample was distributed among the participating institutions who were responsible to contact individuals from each group and distribute the link to the online questionnaire. Below, in Table 2, we present the number of responses in each of the projects chosen and by type of stakeholders (academics, employers, students and graduates).

Exploratory factor analysis (EFA) was applied separately in each of the projects using the variables of the evaluation of the importance assigned to each generic competency which was rated in terms of importance in an ascending scale from one to four.

All four groups of stakeholders were kept together in each of the three separate analyses so the expected differences between stakeholders would contribute to the overall variability, which enhances the identification of the underlying factors.

The aim of EFA is precisely to detect separate clusters of competencies sharing an inner strong correlation structure. When the rating of the importance of a given cluster of competencies is strongly related, it means that such competencies are perceived as similar by the stakeholders and they all share one common factor.

The interpretation of the factors is determined by the content of the competencies clustered around them and therefore a more synthetic index may be proposed joining them in one single construct whose degree of reliability is measured by Cronbach's alpha.

This methodology aims to corroborate that in all three regions there is one common factor shared by those competencies associated with sustainability.

Attending to the ordinal nature of the scale of importance the freely available software package FACTOR [62] was used as it offers more advanced and adequate choices compared to other standard available packages such as SPSS or SAS. One of the strongest improvements of this choice is the possibility of using polychoric correlations instead of the standard Pearson correlations [63].

Table 2. Distribution of responses by type of stakeholder for each of the regions.

	Tuning Europe (2006–2009)		**Tuning Latin America (2004–2007)**		**Tuning Central Asia (2012–2016)**	
Number of Responses Obtained with Respect to Generic Competencies	**1081**	**100.0%**	**7797**	**100.0%**	**1411**	**100.0%**
• Academics	232	21.5%	815	9.7%	434	30.8%
• Employers	158	14.6%	714	8.5%	123	8.7%
• Students	452	41.8%	2922	34.8%	682	48.3%
• Graduates	239	22.1%	3944	47.0%	172	12.2%

4. Discussion of Results

As it is shown in Table 3 the multivariate test for kurtosis supports the need to perform the Exploratory Factor Analysis based on polychoric correlations and both the Kaiser-Meyer-Olkin and Bartlett's tests clearly show the suitability of the data for factor analysis.

Table 3. Exploratory factor analysis summary.

	Multivariate Test for Skewness	**Multivariate Test for Kurtosis**	**Kaiser-Meyer-Olkin (KMO) Test**	**Bartlett's Test**	**Factors Retained**	**% Explained Variance**
Europe	13,659.6 d.f. = 54565 $p = 1.00$	59.19 $p < 0.001$	0.91	8850.81 d.f. = 465 $p < 0.001$	7	76.47
Latin America	84,982.8 d.f. = 3654 $p = 1.00$	427.79 $p < 0.001$	0.96	8876.80 d.f. = 351 $p < 0.001$	4	82.09
Central Asia	61,152.9 d.f. = 4960 $p = 1.00$	488.1 $p < 0.001$	0.96	25,192.3 d.f. = 435 $p < 0.001$	4	73.21

Results from factor analysis are shown separately for Europe (Table 4 and Figure 1), Latin America (Table 5 and Figure 2) and Central Asia (Table 6 and Figure 3). The order of the factors is not related with its importance, as it shows the rotated solution.

Table 4. Rotated loading matrix. Exploratory factor analysis using polychoric correlations. Importance of competencies in Europe (showing factor loadings higher than absolute 0.3).

	F1	F2	F3	F4	F5	F6	F7
Interpersonal and interaction skills	0.837	—	—	—	—	—	—
Ability to work in a team	0.539	—	—	—	—	—	—
Ability to motivate people and move to common goals	0.442	—	—	—	—	0.406	—
Ability to work autonomously	—	0.609	—	—	—	—	—
Determination and perseverance tasks given and response.	—	0.526	—	—	—	0.356	—
Ability to communicate orally and written native language	—	0.452	—	—	—	—	—
Ability to evaluate and maintain quality work produced	—	0.417	0.313	—	—	—	0.300
Ability to make reasoned decisions	—	0.404	—	—	—	0.333	—
Ability to be critical and self-critical	—	0.384	—	—	—	—	—
Ability to identify, pose and resolve problems	—	0.373	—	0.364	—	0.359	—
Ability to plan and manage time	—	0.359	—	0.303	—	—	—
Capacity to learn and stay up-to-date with learning	—	0.316	0.409	—	—	—	—
Ability to undertake research at an appropriate level	—	—	0.729	—	—	—	—
Ability to search for, process and analyze information...	—	—	0.547	—	—	—	—
Ability for abstract thinking, analysis and synthesis	—	—	0.475	—	—	—	—
Capacity to generate new ideas (creativity)	—	—	0.417	—	—	0.468	—
Knowledge and und. of the subject area and profession	—	—	0.387	—	—	—	—
Ability to apply knowledge in practical situations	—	—	—	0.553	—	—	—
Ability to adapt to and act in new situations	—	—	—	0.438	—	0.373	—
Skills in the use of information and comm. technologies	—	—	—	0.360	—	—	—
Ability to communicate in a second language	—	—	—	—	0.692	—	—
Ability to work in an international context	—	—	—	—	0.618	—	—
Ability to design and manage projects	—	—	—	—	—	0.552	—
Spirit of enterprise, ability to take initiative	—	—	—	—	—	0.510	0.342
Commitment to the conservation of the environment	—	—	—	—	—	—	0.714
Ability to act with social responsibility and civic awareness	—	—	—	—	—	—	0.662
Ability to show awareness equal oppo. and gender issues	—	—	—	—	—	—	0.650
Ability to act on the basis of ethical reasoning	—	—	—	—	—	—	0.631
Commitment to safety	—	—	—	—	—	—	0.553
Appreciation of and respect for diversity and multicult.	—	—	—	—	0.404	—	0.453
Ability to communicate with non-experts of one's field	—	—	—	—	—	—	—

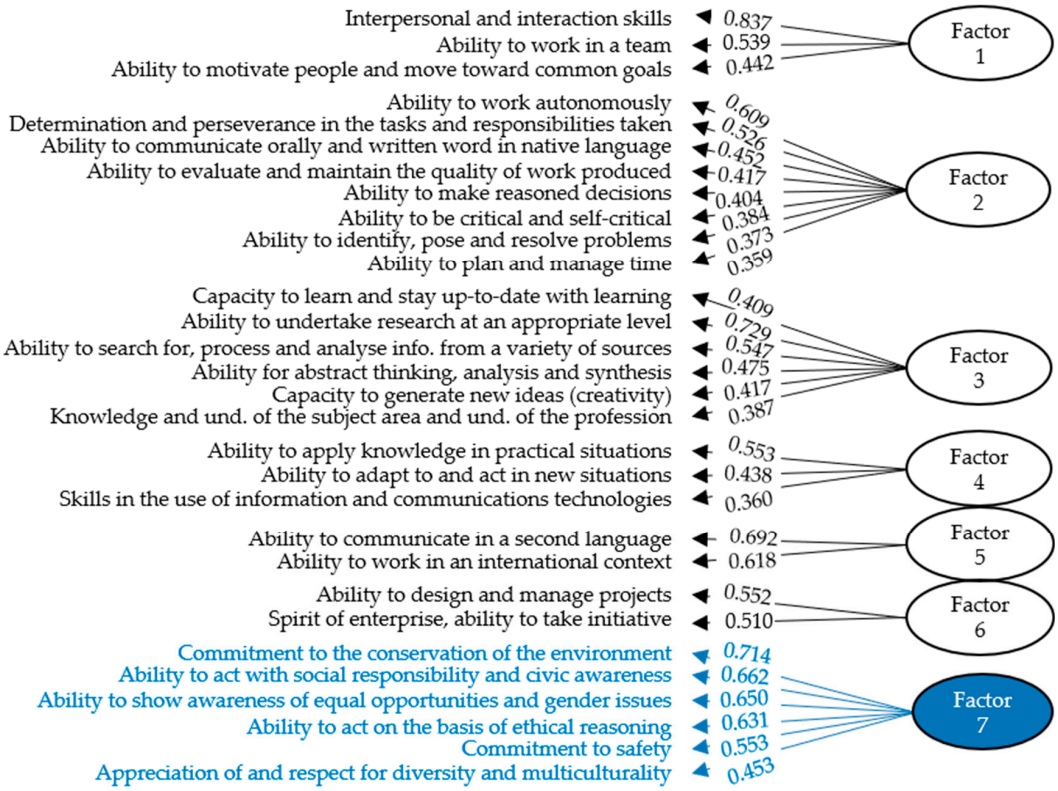

Figure 1. Visual representation of the exploratory factor analysis in Europe. Importance of competencies (showing factor loadings higher than absolute 0.3).

Table 5. Rotated loading matrix. Exploratory factor analysis using polychoric correlations. Importance of competencies in Latin America (showing factor loadings higher than absolute 0.3).

	F1	F2	F3	F4
Commitment to their socio-cultural environment	0.911	—	—	—
Commitment to preserving the environment	0.831	—	—	—
Social responsibility and citizenship	0.725	—	−0.305	0.402
Regard and respect for diversity and multiculturalism	0.699	—	—	—
Ethical commitment	0.439	0.551	—	—
Capacity for teamwork	—	0.883	—	—
Interpersonal skills	—	0.875	—	—
Capacity for decision-making	—	0.805	—	—
Capacity to motivate and drive people towards common goals	—	0.769	—	—
Capacity to identify, consider and deal with problems	—	0.649	—	—
Capacity to act in new situations	—	0.643	—	—
Commitment to quality	—	0.638	—	—
Ability to organize and plan time	—	0.449	—	0.311
Creative capacity	—	0.424	—	—
Capacity for criticism and self-criticism	—	0.399	—	—
Capacity for oral and written communication	—	0.344	—	0.371
Capacity to formulate and administer projects	—	0.302	0.499	—
Ability to work independently	—	—	1.114	−0.303
Ability to communicate in a second language	—	—	0.829	—
Ability to work within international contexts	—	—	0.367	—
Ability to apply knowledge in practice	—	—	—	0.786
Knowledge about the area of study and profession	—	—	—	0.680
Capacity to learn and keep up-to-date permanently	—	—	—	0.654
Skills for seeking out, processing and analyzing info from different sources	—	—	—	0.483
Capacity for abstraction, analysis and synthesis	—	—	—	0.481
Research capacity	—	−0.316	—	0.609
Skills in the use of information and communications technologies	—	—	0.369	0.415

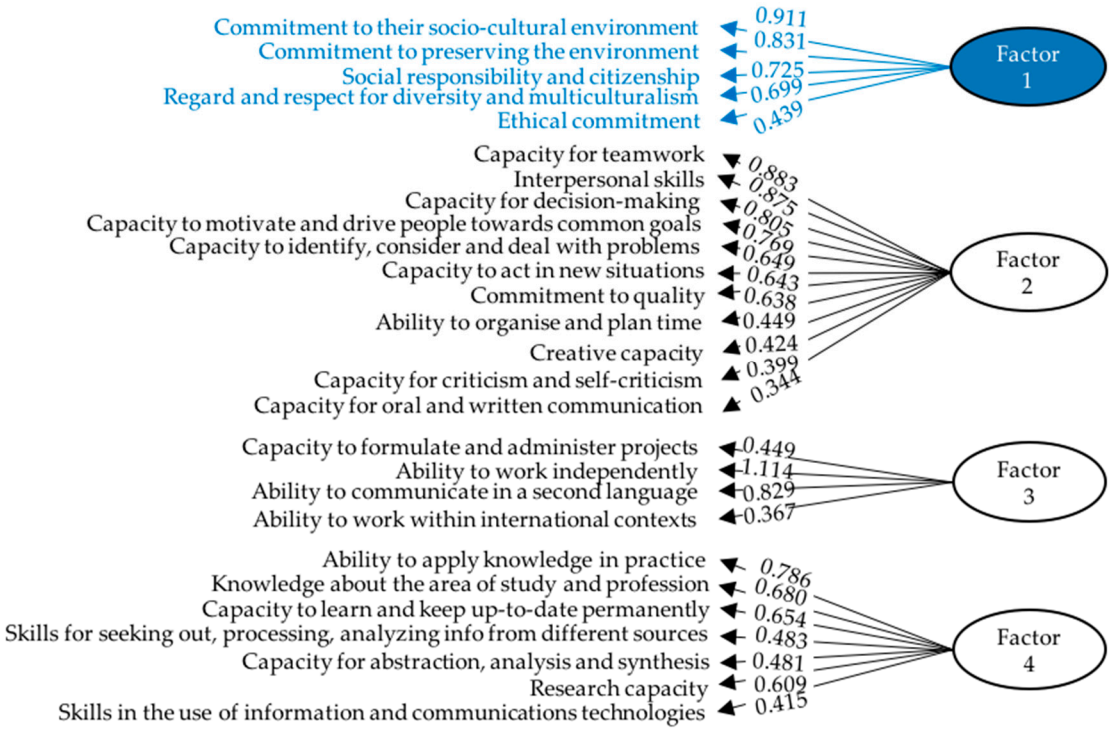

Figure 2. Visual representation of the exploratory factor analysis in Latin America. Importance of competencies (showing factor loadings higher than absolute 0.3).

Table 6. Rotated loading matrix. Exploratory factor analysis using polychoric correlations. Importance of competencies in Central Asia (showing factor loadings higher than absolute 0.3).

	F1	F2	F3	F4
Ability to model, design and forecast	0.994	—	—	—
Ability to innovate	0.987	—	—	—
Ability to develop general knowledge	0.972	—	—	—
Ability to take initiatives and entrepreneurship	0.917	−0.329	—	—
Ability to use logical and critical thinking for solving problems	0.862	—	—	—
Ability to carry out research applying appropriate methods	0.762	—	—	—
Ability to learn including autonomous learning	0.755	—	—	—
Ability to communicate in multicultural context	0.741	—	—	—
Knowledge of the professional field	0.704	—	—	—
Ability to communicate interactively and receive feedback	0.697	—	—	0.322
Ability to analyze and synthesize	0.684	—	—	—
Ability to communicate in office, state, Russian and foreign languages	0.681	—	—	—
Knowledge of the laws	0.575	—	—	—
Ability to use information and communication technologies	0.570	0.351	—	—
Ability to lead people and work in a team	0.469	—	0.320	—
Ecological and environmental responsibility. Ability to prevent and resolve conflicts	—	1.247	−0.592	—
Ability to follow a healthy lifestyle	—	1.226	−0.609	—
Time-management	−0.412	1.027	—	—
Tolerance and respect for others	—	0.966	—	—
Orientation toward the needs of the user	−0.331	0.909	—	—
Social responsibility	0.410	0.832	−0.476	—
Flexibility	—	0.822	—	—
Patriotism and preservation of own cultural values	—	0.758	—	—
Ability to manage information	—	0.677	—	—
Ability to apply knowledge in practice	—	0.585	—	−0.526
Ability to prevent and resolve conflicts	—	0.354	0.313	—
Ability to make decisions	—	—	0.943	—
Ability to work autonomously	—	—	0.740	—
Ability to adapt to change	—	—	0.704	—
Commitment to quality results	—	—	0.576	—

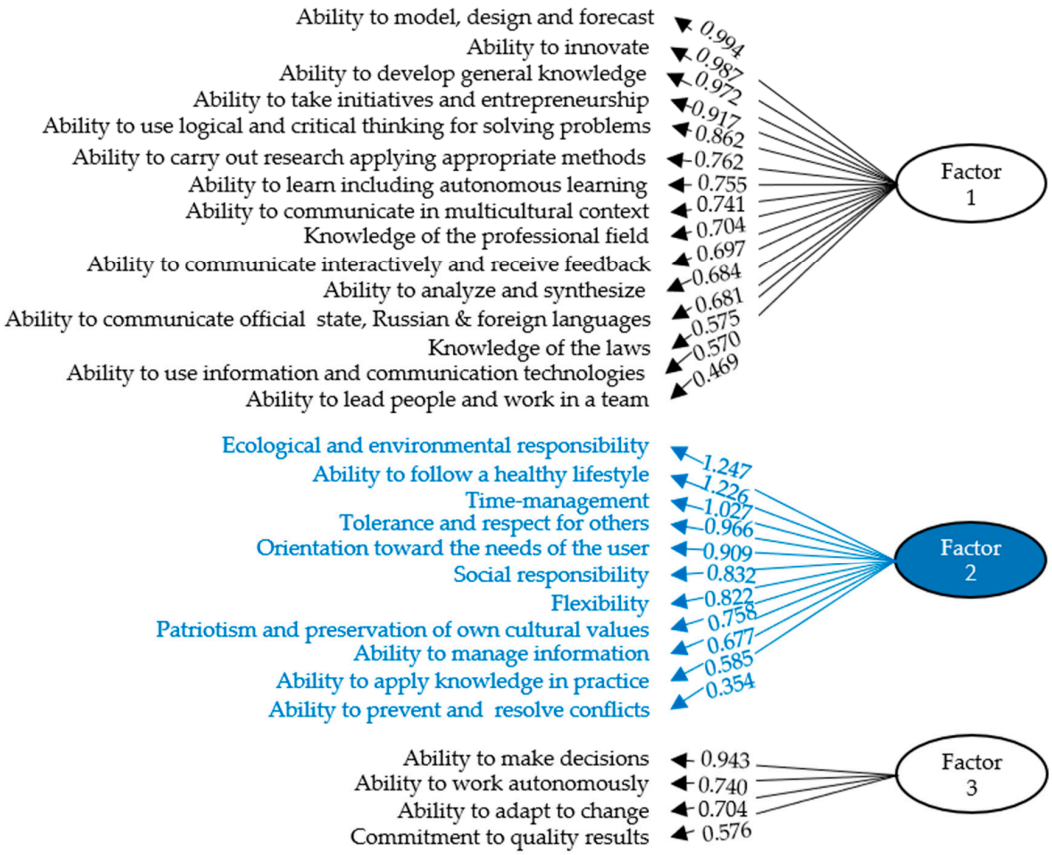

Figure 3. Visual representation of the exploratory factor analysis in Central Asia. Importance of competencies (showing factor loadings higher than absolute 0,3).

In terms of our research goals, it is not our aim to provide a thorough interpretation of all different factors arising in each region but to detect that in all three regions there is one underlying factor related to sustainability. And this is the case for Factor 7 in Europe, Factor 1 in Latin America and Factor 2 in Central Asia, as summarized in Table 7.

Table 7. Generic competencies related to the sustainability concept.

Europe	**Latin America**	**Central Asia**
Factor 7	Factor 1	Factor 2
• Commitment to the conservation of the environment. • Ability to show awareness of equal opportunities and gender issues. • Ability to act with social responsibility and civic awareness. • Ability to act on the basis of ethical reasoning. • Commitment to safety. • Appreciation and respect for diversity and multiculturality.	• Commitment to their socio-cultural environment. • Commitment to preserving the environment. • Social responsibility and citizenship. • Regard and respect for diversity and multiculturalism. • Ethical commitment	• Ability to follow a healthy lifestyle. • Tolerance and respect for others. • Ecological and environmental responsibility. • Patriotism and preservation of own cultural values. • Social responsibility.
Cronbach's Alpha = 0.823	Cronbach's Alpha = 0.818	Cronbach's Alpha = 0.861

Furthermore, Cronbach's alpha was computed in each region using the set of items as shown in Table 7 in order to estimate the reliability, or internal consistency, of a composite score on sustainability. In all three cases, this coefficient was above 0.8 indicating a good level of internal consistency for all three regions.

The first idea to highlight is that the factor detected in each region associated with sustainability does not reflect its economic dimension. This is probably due to the very nature of the studies. Probably in business and management studies these aspects are developed through the specific competencies of the degree, and not through the generic ones (which are those included in the lists used for this research). Besides, it could be also assumed that students in these areas would have a background in economics (previous interest, training, understanding . . .) so there would be no need to emphasize these topics or develop them further.

In relation to the ecological aspect, the three projects, and therefore the three geographical regions, present a clearly linked competency, which could be defined as the commitment, concern or responsibility for the care and preservation of ecology and the environment.

In general, it can be pointed out that it is the social dimension the most represented, with a greater number of associated competencies. It is also the aspect where more differences among regions can be found. In Europe, there are five competencies that make up the sustainability factor related to the social sphere, while in Latin America and in Central Asia there are four. Both social responsibility and respect for diversity and multiculturality (or tolerance and respect for others) appear as competencies in the three regions considered; while civic awareness/citizenship and ethical reasoning/ethical commitment appear in two of the regions (Europe and Latin America). The remaining competencies related to sustainability appear in only one of the regions: commitment to safety, and awareness of equal opportunities and gender issues (Europe); commitment to the socio-cultural environment (Latin America); ability to follow a healthy lifestyle, and patriotism and preservation of own cultural values (Central Asia).

5. Conclusions, Implications, Limitations and Future Lines of Research

5.1. Conclusions and Implications

The first conclusion and main insight of this research is that, in the three analyzed regions (Europe, Latin America and Central Asia), and considering the perspective of four different stakeholders (graduates, employers, students and academics), there is a factor that brings together a set of generic competencies closely related to sustainability. That is, based on empirical data and conducting an exploratory factor analysis, we conclude that competencies rated in terms of importance by different stakeholders in different regions work as an individual construct. This provides a positive answer to our first research question.

The identified sustainability factor, in each of the regions, presents elements related to both ecological and social aspects, which is completely consistent with the literature reviewed in the first part of the paper. Nowadays, academics agree on a threefold perspective of sustainability, containing economic, ecological and social elements. This is shown in our results as well, where the elements of environmental preservation are the clearest, followed by social aspects of sustainability (people's rights, women's rights, respect for others, socio-cultural aspects...). However, it is not so clear to see the economic elements of sustainability. We consider that, being the research context business and management studies, this type of elements will be very present in the specific competencies, but not in the generic ones. Our interpretation is that competencies that in other disciplines can be seen as important generic competencies (strategic planning, social responsibility, or systemic vision) in business and management studies are considered as crucial specific competencies and are not expressly linked to sustainability.

Another conclusion of the study is the identification of which sustainability core competencies are, giving an answer to our second research question. These are what we call sustainability core competencies. The literature reviewed has shown the key role played by education, and in particular, higher education, for the development of sustainability. As pointed out in the first pages of the article, today's students are tomorrow's professionals and their work will have a positive or negative impact in both organizations and society. Among other activities (research, management, social projection ...) introduction of key competencies for sustainable development in the curricula could be an important step towards the integration of sustainability in higher education. To the extent that graduates incorporate competencies for sustainability, educators and higher education institutions will be working to incorporate sustainability into companies, organizations and society. However, it seems that there is no consensus regarding what competencies for sustainability should be included in university curricula. While several authors agree that systems thinking, critical thinking, strategic thinking or empathy and ability to collaborate with others are key competencies, there is no universal list or agreement regarding these competencies.

Adding to and enriching this debate, in this research, we propose a set of interconnected competencies that are at the heart of the sustainability concept according to the consulted stakeholders. In this sense, we consider they could be the starting point to work towards sustainability in higher education.

The results of our work have some implications for educators and higher education institutions. First, we would like to point out the importance of having identified core sustainability competencies. This can help universities and educators to prioritize their work in competencies for sustainable development. Moreover, having found connected competencies according to different stakeholders' perceptions can help them to identify the main competencies they should develop in their students, considering not only their internal opinions but also the ones of external agents.

A second implication has to do with the fact that, having several generic competencies, closely related to each other and forming a single factor, implies that to work with one of them is to work for the whole. This means that educators can approach the work of developing competencies for sustainability through any of its components. In other words, if we want to develop the competency

profile of students related to sustainability, encouraging the development of any of the competencies that are part of the construct is a contribution to that profile.

A third implication, related to the second one, is the relevance and need for coordination. Any action that is not coordinated (for example, giving a lot of importance in the curricula to the development of one of the competencies, and very little to another that is closely related), or that is not consistent (for example, saying that one competency is desirable for students, and that another very related to the first, should not be developed) would generate a conflict. The explanation is that our findings allow us to conclude that several generic competencies are intimately related in the mind of stakeholders, and it would not be desirable to approach one of them in such a way that it generates distortion in the others.

Finally, it should be noted that when the institution gives messages related to sustainability, it must be aware that certain competencies are closely related to each other in the mind of the stakeholders, and the messages must be coherent with this evidence. As it has been highlighted in the literature review, working for sustainability has not only to do with teaching but with other university activities as well (research, management, social projection, etc.).

5.2. Limitations and Future Lines of Research

The main limitation of our study is that the purpose for which data were collected differs from the purpose of the current research. Data were collected in the scope of three different Tuning projects, with the intention of, based on the consultation carried out on the list of competencies, reaching a consensus in relation to the competencies that should be included in the design of the degrees of different areas of knowledge in each region (and thus achieve a harmonization and compatibility of the studies). The use of these data has not only allowed us to have lists of generic competencies but has also given us access to a very wide sample of participants. However, this also implies that the lists of competencies used and the dates for data collection are different. This implies mainly two biases that must be taken into account when interpreting the results and carrying out new research on the topic. The first one has to do with the fact that the linked elements that generate each factor are not the same in the three regions, which has forced us to maintain three comparable exploratory factor analyses and not one. This is a bias, but also a richness, as it will allow us to carry out future comparative research projects. The second bias is that the passing of time can affect stakeholders' perceptions of the concept of sustainability.

In addition, we have taken the data from each geographic block as a unit of study. Given the large size of some regions, as well as internal cultural and socio-economic differences, it would be interesting to analyze the specificities of the countries in future research.

Finally, we consider that another limitation is the very scope of the study. The analysis carried out is that of the competencies to be developed by business and management graduates in the curricula, including the vision of four different stakeholders. Firstly, we have focused on a specific area of knowledge. It would be interesting to know whether the competencies associated with sustainability are the same or not in other areas (paying special attention, for example, to how the economic dimension of sustainability materializes in other types of disciplines). Secondly, we have not discussed how to develop and assess competencies. We believe that in the future it would be relevant to investigate what the real performance in these competencies is, as well as to analyze which are the most effective ways to develop them (methodologies, course design and development, assessment, teacher training, university management considerations ...). Thirdly and lastly, we have not explored the different stakeholders' opinions and perceptions. We consider that it would be relevant to measure these differences among groups (between academics and employers, for example), in order to detect the impact that perceptions may have on the effective work for developing sustainability core competencies.

Author Contributions: A.E. was PI for the project and developed the paper plan. A.E. and M.G.-F. did the literature review. J.P.L. did the statistical analysis. M.G.-F., A.E. and J.P.L. interpreted the outcomes of the statistical analysis and wrote the paper.

Funding: This research received no external funding.

Acknowledgments: The authors gratefully acknowledge Tuning Academy, for giving them the opportunity to participate in different Tuning Projects, financed by the European Commission.

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

References

1. Bergman, M.M.; Bergman, Z.; Berger, L. An Empirical Exploration, Typology, and Definition of Corporate Sustainability. *Sustainability* **2017**, *9*, 753. [CrossRef]
2. Lozano, R. Envisioning sustainability three-dimensionally. *J. Clean. Prod.* **2008**, *16*, 1838–1846. [CrossRef]
3. Setó-Pamies, D.; Papaoikonomou, E. A Multi-level Perspective for the Integration of Ethics, Corporate Social Responsibility and Sustainability (ECSRS) in Management Education. *J. Bus. Ethics* **2016**, *136*, 523–538. [CrossRef]
4. Piza, V.; Aparicio, J.; Rodríguez, C.; Marín, R.; Beltrán, J.; Bedolla, R. Sustainability in Higher Education: A Didactic Strategy for Environmental Mainstreaming. *Sustainability* **2018**, *10*, 4556. [CrossRef]
5. UNESCO. UNESCO World Conference on Education for Sustainable Development: Bonn Declaration. UNESCO: Paris, France, 2009. Available online: http://www.esd-world-conference-2009.org/fileadmin/download/ESD2009_BonnDeclaration080409.pdf (accessed on 1 February 2019).
6. Cebrián, G.; Junyent, M. Competencies in Education for Sustainable Development: Exploring the Student Teachers' Views. *Sustainability* **2015**, *7*, 2768–2786. [CrossRef]
7. Lambrechts, W.; Mulà, I.; Ceulemans, K.; Molderez, I.; Gaeremynck, V. The integration of competences for sustainable development in higher education: An analysis of bachelor programs in management. *J. Clean. Prod.* **2013**, *48*, 65–73. [CrossRef]
8. Sandri, O.; Holdsworth, S.; Thomas, I. Vignette question design for the assessment of graduate sustainability learning outcomes. *Environ. Educ. Res.* **2018**, *24*, 406–426. [CrossRef]
9. Lozano, R.; Ceulemans, K.; Alonso-Almeida, M.; Huisingh, D.; Lozano, F.J.; Waas, T.; Hugé, J. A review of commitment and implementation of sustainable development in higher education: Results from a worldwide survey. *J. Clean. Prod.* **2015**, *108*, 1–18. [CrossRef]
10. Aktas, C.B.; Whelan, R.; Stoffer, H.; Todd, E.; Kern, C.L. Developing a university-wide course on sustainability: A critical evaluation of planning and implementation. *J. Clean. Prod.* **2014**, *106*, 216–221. [CrossRef]
11. Kagawa, F. Dissonance in students' perceptions of sustainable development and sustainability: Implications for curriculum change. *Int. J. Sustain. High. Educ.* **2007**, *8*, 317–338. [CrossRef]
12. Barth, M.; Godemann, J.; Rieckmann, M.; Stoltenberg, U. Developing key competencies for sustainable development in higher education. *Int. J. Sustain. High. Educ.* **2007**, *8*, 416–430. [CrossRef]
13. Wiek, A.; Withycombe, L.; Redman, C.L. Key Competencies in Sustainability: A Reference Framework for Academic Program Development. *Sustain. Sci.* **2011**, *6*, 203–218. [CrossRef]
14. de Haan, G. The BLK '21' programme in Germany: A 'Gestaltungskompetenz'-based model for education for sustainable development. *Environ. Educ. Res.* **2006**, *1*, 19–32. [CrossRef]
15. Lozano, R.; Merrill, M.Y.; Sammalisto, K.; Ceulemans, K.; Lozano, F.J. Connecting Competences and Pedagogical Approaches for Sustainable Development in Higher Education: A Literature Review and Framework Proposal. *Sustainability* **2017**, *9*, 1889. [CrossRef]
16. UNESCO. *Education for Sustainable Development Goals: Learning Objectives*; UNESCO: Paris, France, 2017. Available online: http://unesdoc.unesco.org/images/0024/002474/247444e.pdf (accessed on 15 January 2019).
17. Mochizuki, Y.; Fadeeva, Z. Competences for Sustainable Development and Sustainability. *Int. J. Sustain. High. Educ.* **2010**, *11*, 391–403. [CrossRef]
18. Kidd, C. The evolution of sustainability. *J. Agric. Environ. Ethics* **1992**, *5*, 1–26. [CrossRef]
19. Ruta, G.; Hamilton, K. The capital approach to sustainability. In *Handbook of Sustainable Development*; Atkinson, G., Dietz, S., Neumayer, E., Eds.; Edward Elgar Publishing: Cheltenham, UK, 2007.
20. Godfrey, P.C.; Hatch, N.W. Researching Corporate Social Responsibility: An Agenda for the 21st Century. *J. Bus. Ethics* **2007**, *70*, 87–98. [CrossRef]
21. Martell, J. University Social Responsibility: Origins, Scope, and Potential Future. *J. Int. Bus. Educ.* **2012**, *7*, 77–102.

22. Miotto, G.; Blanco González, A.; Del Castillo Feito, C. Social Responsibility: A Tool for Legitimation in Spanish Universities' Strategic Plans. *Trípodos* **2018**, *42*, 59–79.
23. Wigmore-Álvarez, A.; Ruiz-Lozano, M. University Social Responsibility (USR) in the Global Context: An Overview of Literature. *Bus. Prof. Ethics J.* **2012**, *31*, 475–498. [CrossRef]
24. Elkington, J. *Cannibals with Forks*; New Society: Gabriela Island, BC, Canada, 1999; Available online: www.newsociety.com (accessed on 1 February 2019).
25. World Commission on Environment and Development. *Our Common Future*; Oxford University Press: Oxford, UK, 1987.
26. Boström, M. A missing pillar? Challenges in theorizing and practicing social sustainability: Introduction to the special issue. *Sustain. Sci. Pract. Policy* **2012**, *8*, 3–14. [CrossRef]
27. Kemp, R.; Martens, P. Sustainable Development: How to manage something that is subjective and never can be achieved? *Sustain. Sci. Pract. Policy* **2007**, *3*, 5–14. [CrossRef]
28. Tormo-Carbó, G.; Seguí-Mas, E.; Oltra, V. Business Ethics as a Sustainability Challenge: Higher Education Implications. *Sustainability* **2018**, *10*, 2717. [CrossRef]
29. Curran, M.A. Wrapping our brains around sustainability. *Sustainability* **2009**, *1*, 5–13. [CrossRef]
30. Boyer, R.H.; Peterson, N.D.; Arora, P.; Caldwell, K. Five approaches to social sustainability and an integrated way forward. *Sustainability* **2016**, *8*, 878. [CrossRef]
31. Boeve-de Pauw, J.; Gericke, N.; Olsson, D.; Berglund, T. The effectiveness of education for sustainable development. *Sustainability* **2015**, *7*, 15693–15717. [CrossRef]
32. UNESCO. *United Nations Decade of Education for Sustainable Development (2005–2014): Draft International Implementation Scheme*; UNESCO: Paris, France, 2005; Available online: https://unesdoc.unesco.org/ark:/48223/pf0000148654 (accessed on 1 February 2019).
33. Peterson, N.D. Introduction to the special issue on social sustainability: Integration, context, and governance. *Sustain. Sci. Pract. Policy* **2016**, *12*, 3–7. [CrossRef]
34. Seghezzo, L. The five dimensions of sustainability. *Environ. Politics* **2009**, *18*, 539–556. [CrossRef]
35. Agyeman, J.; Bullard, R.D.; Evans, B. 2002 Exploring the Nexus: Bringing Together Sustainability, Environmental Justice and Equity. *Space Pol.* **2002**, *6*, 77–90. [CrossRef]
36. Boström, M.; Andersson, E.; Berg, M.; Gustafsson, K.; Gustavsson, E.; Hysing, E.; Lidskog, R.; Löfmarck, E.; Ojala, M.; Olsson, J.; et al. Conditions for Transformative Learning for Sustainable Development: A Theoretical Review and Approach. *Sustainability* **2018**, *10*, 4479. [CrossRef]
37. Watson, M.K.; Lozano, R.; Noyes, C.; Rodgers, M. Assessing curricula contribution to sustainability more holistically: Experiences from the integration of curricula assessment and students' perceptions at the Georgia Institute of Technology. *J. Clean. Prod.* **2013**, *61*, 106–116. [CrossRef]
38. Sibbel, A. Pathways towards sustainability through higher education. *Int. J. Sust. High. Educ.* **2009**, *10*, 68–82. [CrossRef]
39. McGregor, S.L.T. Alternative communications about sustainability education. *Sustainability* **2013**, *5*, 3562–3580. [CrossRef]
40. UNESCO. Education for Sustainable Development-Building a Better, Fairer World for the 21st Century. 2012. Available online: https://unesdoc.unesco.org/ark:/48223/pf0000216673 (accessed on 20 February 2019).
41. United Nations Global Impact. *The Principles for Responsible Management Education*; United Nations Global Compact: New York, NY, USA, 2007.
42. Segalàs, J.; Ferrer-Balas, D.; Svanström, M.; Lundqvist, U.; Mulder, K.F. What has to be learnt for sustainability? A comparison of bachelor engineering education competences at three European universities. *Sustain. Sci.* **2009**, *4*, 17–27. [CrossRef]
43. Wigmore-Álvarez, A.; Ruiz-Lozano, M. The United Nations Global Compact Progress Reports as Management Control Instruments for Social Responsibility at Spanish Universities. *SAGE Open* **2014**, *4*, 1–12. [CrossRef]
44. Vallaeys, F.; Álvarez Rodríguez, J. Hacia una definición latinoamericana de Responsabilidad Social Universitaria. Aproximación a las preferencias conceptuales de los universitarios. *Educ. XX1* **2019**, *22*, 93–116. [CrossRef]
45. Chen, S.H.; Nasongkhla, J.; Donaldson, J.A. University Social Responsibility (USR): Identifying an Ethical Foundation within Higher Education Institutions. *Turk. Online J. Educ. Technol.* **2015**, *14*, 165–172.

46. Lozano, R.; Lukman, R.; Lozano, F.J.; Huisingh, D.; Lambrechts, W. Declarations for sustainability in higher education: Becoming better leaders, through addressing the university system. *J. Clean. Prod.* **2013**, *48*, 10–19. [CrossRef]
47. Barth, M.; Adombent, M.; Fischer, D.; Richter, S.; Rieckmann, M. Learning to change universities from within: A service-learning perspective on promoting sustainable consumption in higher education. *J. Clean. Prod.* **2014**, *62*, 72–81. [CrossRef]
48. Cortese, A.D. The critical role of higher education in creating a sustainable future. *Plan. High. Educ.* **2003**, *31*, 15–22.
49. Lozano, R.; Ceulemans, K.; Seatter, C.S. Teaching organisational change management for sustainability: Designing and delivering a course at the University of Leeds to better prepare future sustainability change agents. *J. Clean. Prod.* **2015**, *106*, 205–215. [CrossRef]
50. Lotz-Sisitka, H.; Raven, G. South Africa: Applied competence as the guiding framework for environmental and sustainability education. In *Work, Learning and Sustainable Development*; Springer: Dordrecht, The Netherlands, 2009.
51. Sleurs, W. Competencies for ESD (Education for Sustainable Development) Teachers: A Framework to Integrate ESD in the Curriculum of Teacher Training Institutes-Comenius 2.1 Project 118277-CP-1-2004-BE-Comenius-C2.1. 2008. Available online: http://www.unece.org/fileadmin/DAM/env/esd/inf.meeting.docs/EGonInd/8mtg/CSCT%20Handbook_Extract.pdf (accessed on 1 February 2019).
52. Cebrián, G.; Junyent, M. Competencias profesionales en Educación para la Sostenibilidad: Un estudio exploratorio de la visión de futuros maestros. *Enseñanza de las Ciencias* **2014**, *32*, 29–49. [CrossRef]
53. González, J.; Wagenaar, R. *Tuning Educational Structures in Europe*; Final Report; University of Deusto: Bilbao, Spain, 2003.
54. González, J.; Wagenaar, R.; Beneitone, P. Tuning-América Latina: Un proyecto de las universidades. *Revista iberoamericana de educación* **2004**, *35*, 151–164.
55. Tuning Academy. Available online: http://tuningacademy.org (accessed on 8 March 2019).
56. Chyung, S.Y.; Stepich, D.; Cox, D. Building a competency-based curriculum architecture to educate 21st-century business practitioners. *J. Educ. Bus.* **2006**, *81*, 307–314. [CrossRef]
57. Biedenweg, K.; Monroe, M.C.; Oxarart, A. The importance of teaching ethics of sustainability. *Int. J. Sustain. Higher Educ.* **2013**, *14*, 6–14. [CrossRef]
58. Amekudzi, A.A.; Khayesi, M.; Khisty, J.C. Sustainable development footprint: A framework for assessing sustainable development risks and opportunities in time and space. *Int. J. Sustain. Dev.* **2015**, *18*, 9–40. [CrossRef]
59. Tuning Academy. Tuning Europe. Available online: http://tuningacademy.org/tuning-europe-i-iv/?lang=en (accessed on 8 March 2019).
60. Tuning Academy. Tuning Latin America. Available online: http://tuningacademy.org/tuning-latin-america-i/?lang=en (accessed on 8 March 2019).
61. Tuning Central Asia. Available online: http://www.tucahea.org/ (accessed on 8 March 2019).
62. Lorenzo-Seva, U.; Ferrando, P.J. FACTOR: A computer program to fit the exploratory factor analysis model. *Behav. Res. Methods* **2006**, *38*, 88–91. [CrossRef]
63. Baglin, J. Improving Your Exploratory Factor Analysis for Ordinal Data: A Demonstration Using FACTOR. *Pract. Assess. Res. Eval.* **2014**, *19*, 1–15.