Does the JTES help us Create Deeper Personal Meanings for Sustainable Education?

Five years have already passed since the UNESCO Chair on Interplay of Tradition and Innovation in ESD initiated a targeted development of the *Journal of Teacher Education for Sustainability* (JTES) and the *Baltic and Black Sea Circle Consortium* (BBCC) for educational research, which would allow for more effective implementation of the Sustainable Development Goals (SDG) set for teacher education and higher education after 2015.

The implementation of these intentions started in 2016. Historically, the creation of the JTES and the establishment of an international network emerged simultaneously as inseparable ideas aimed at promoting the reorientation of teacher education and higher education towards sustainability. The implementation of the ideas of the JTES and the international cooperation network started in the form of participatory action research at the very beginning of the 21st century. The organization of such a network on the basis of a participatory action research approach was maintained later in the UNESCO Chair network after the establishment of the UNESCO Chair in 2013.

The experience of the JTES development and journal networking was, and continues to be, a participatory value that provided ESD researchers and practitioners engaged in the networking with a personal perspective on sustainability, sustainable development and sustainable education, as well as highlighted more modern perspectives to be used in their research and professional activities.


Since 2016, there have been changes in the development of the JTES formal indicators, changes in the way the JTES international network is understood and implemented, and changes have continued in the search for the identity of JTES to harmonize adaptive and innovative approaches according to the level of understanding of the phenomenon of sustainability achieved in the age of Anthropocene wicked problems, seeking a scientific basis for creating conditions for decent survival of humanity.

Readers have been informed about the changes in the JTES formal indicators through *editorial* articles. Now, after five years, they are clearly visible: in 2015, the JTES CiteScore was 0.64, but in 2019 it was already 3.4. In 2019, the SJR was 0.418 and the level of Q2 was reached, and the SNIP was 1.462 (https://www.scopus.com/sourceid/17700156732; https://ej.uz/JTEfS). The changes in the JTES formal indicators currently meet the requirements imposed on universities for scientific publication evaluation, so there is no doubt that the intention to focus on improving the quality of the JTES has been timely made and not all reserves for the development of the JTES have been exhausted. This work is ongoing and the greatest opportunities will be created by the network of the JTES article authors that has been identified and directed for use over the past five years.
Changes in the requirements for higher education and universities after 2015 have influenced the changes in the understanding of the idea of the BBCC network and the JTES, as well as affected the way in which cooperation is implemented. The most visible change is the gradual transformation of the BBCC network from a network recognized through the annual JTES international conferences to the network of the JTES authors. The focus has shifted from organizing conferences to collaborating with authors on sustainable phenomena and ESD research. The transformation maintained the same feature, the type of cooperation tested in previous years remained: open participation network. The need to change the old tradition of the JTES network of organizing the annual JTES conferences has raised concerns about the real difficulties in maintaining this tradition. Traditionally, since 2005, the annual conferences of the BBCC have been held at the universities included in the BBCC network. Funding for the conferences was obtained through participation fees of conference participants covered by their universities, and the volunteer work of the network members was used to organize the conferences. After the last conference, the reality for further planning of conferences called for funding, which after 2016 became more obvious at universities. At a number of universities, negotiations on the organization of conferences with the administration of a respective institution started on a simple condition: if funding is provided, a conference will be organized. The participation fee approach was ruled out as insufficient. The attitude of higher education institutions towards the issue of conference funding became a signal that the maintenance of the network required changes appropriate at the time. This highlighted the need to link the idea of the JTES network not to the annual conferences at one of the universities or teacher training institutions involved in the BBCC network, but to use the direct cooperation of the JTES with the authors of the articles.

After 2016, Daugavpils University (DU) in­cur­red fi­nan­cial ex­pen­ses for the prepa­ration and pub­li­ca­tion of the JTES and DCSE links, envi­saging them as ex­pen­ses for the main­tenance of the DU UNESCO Chair. The covers of both JTES and DCSE indicated the re­spon­sib­il­i­ty of the DU UNESCO Chair for pub­lish­ing the jour­nals. Arti­cles are pub­lished free of charge if they meet the re­quire­ments of the JTES and DCSE and have suc­cess­fully un­der­gone dou­ble­blind peer re­view. The team of the JTES re­view­ers and ed­i­tors was re­ady for the de­vel­op­ment of JTES in the trans­i­tion from a con­fer­ence ap­proach to a de­eper di­a­ogue on the study of a sus­tain­abil­i­ty phe­nom­enon from the per­spec­tive of teach­ers and higher ed­u­ca­tion. Within five years, this trans­i­tion has taken place and real re­sults have been ob­tained, con­firm­ing the ac­com­plish­ments of teams of both jour­nals and the net­work­ing changes that have re­sulted in a global net­work of the JTES and DCSE of DU UNESCO Chair. In the pe­ri­od of 2016–2020, JTES au­thors from 41 coun­tries of the world par­ti­ci­pated in the net­work: Au­strali­a, Au­stri­a, Bang­lad­esh, Can­ada, Co­lo­mbia, Croa­tia, Egyp­t, Est­o­nia, Fiji, Fin­land, Ger­many, In­dia, In­do­nes­ia, Iran, Ire­land, Ja­pan, Jordan, Kos­so­vo, Lat­via, Lith­u­a­nia, Mal­aysia, Mal­ta, Na­mibia, New Ze­aland, Ni­geria, Nor­way, Po­land, Por­tu­gal, Sa­udi Ara­bia, Se­ri­ba, Sin­ga­po­re, Slo­va­kia, Slo­ve­nia, South Af­rica, Sp­ain, Swe­den, Tha­i­land, Tur­key, Uk­ra­ine, the United King­dom, and the USA. In the given pe­ri­od, 101 art­i­cles were pub­lished by the JTES au­thors and the DCSE au­thors from 29 coun­tries of the world pub­lished 105 art­i­cles. The ac­com­plish­ments of five years give hope that the task of the DU UNESCO Chair to cre­ate a global re­source cen­ter for ESD re­search has gained a real ba­sis for its im­ple­men­ta­tion in the next five years. From 2021, it is planned to spe­ci­fy the name of the net­work as the In­ter­na­tion­al Net­work of JTES & DCSE Jour­nals of UNESCO Chair at Daugavpils Uni­ver­sity.
What is unique, what does the JTES team offer to authors whose research is being prepared for publication? It can now be called a tradition that has established in the development of the JTES. Both in this volume and in the previous ones, the authors of the articles mention and in some way recognize the philosophy of the JTES. There is no doubt that its recognition has developed through participatory action research gradually since the creation of the JTES, and its formation has been based on the real experiences of researchers, coming from their lived experiences and current interests. There is no doubt that it developed at the beginning of the century on the basis of a holistic approach, which was a natural approach, while environmental or ecological education was not overwhelmed by the current wicked problems that gradually entered current education. Therefore, the interest of the JTES authors in highlighting the causes of Anthropocene problems and pedagogical opportunities to reduce the current unsustainability of education has become more recognizable.

The idea of Anthropocene has been used by several JTES authors as a context in its broadest sense. The Anthropocene era in the 21st century has acquired the status of an era and has already been given several designations: an era of uncertainty, an era of wicked problems, an era of unsustainable development, which is recognized by the enumeration of various crises and problems. All of these names are clearly associated with the quality of unsustainability that has manifested itself in our planetary system around the relationship between human and nature. And just as clearly, the authors find, directly or indirectly, a perspective in which sustainability is present in every human activity or experience. We usually see this in collaboration with authors and reviewers.

The causes of Anthropocene problems can be found in the perspective of anthropocentrism, in which a number of cultural, social and educational studies are performed without a natural (biological) fundamental basis, ignoring the fact that human species formation is also related to fundamental unit species formation and cannot be arbitrarily removed from history. Without the use of a species unit, only a natural distortion of historical experience can be promoted, where humans are seen only as creators and consumers of cultural and social values. Unfortunately, human origins from living things and the origin of living things from the life-sustaining system, or human biological origins from nature, can be lost if researchers do not use the evolutionary and ecological interrelationships and ontological foundations to study complex processes. Many rejected articles ignore the reality of the species, replacing it with the omnipotent influence of technology, which is more often unjustified or based on illusions about progress.

Unfortunately, the era of Anthropocene wicked problems in the early 21st century changed attitudes towards holism, diminishing its role. As sad as it may seem, to reduce the prospect of holism in education in the first two decades of the 21st century, current part of education reformers sometimes call holism a dirty word, or when small changes in opaque relationships can have the effect of limiting more holistic views of sustainability. Especially if the choice of priorities is linked to the allocation of funding. It works in all cases. For example, in the early 21st century, there were real cases when even in the expert councils of science academies experts in pedagogy and psychology were not elected because among voters the interests of legal, economic and other social sciences were more represented, which also succeeded in the elections. Interestingly, such cases appeared shortly before or at the beginning of the first signs of economic crises in the first decade of the 21st century. At present, these cases illustrate agile or proactive preparations for the fight for science funding. In this case, the highest goals of human education were
shifted from pedagogy and psychology to the top priority issues related to economics, or educational technologies, or technological tools, etc.

This undermined the achievements of the 20th century in strengthening the holistic approach to environmental education and pedagogy and opened the door to faster development of Anthropocene relations in the sense of “fair” competition. Thus, with development and illusions about progress, the perspective of holism has been fragmented into many small goals and objectives, for the study of which the piecemeal approach fits well, which currently hinders the conceptualization of research results and recommendations. Such techniques have contributed to a situation in which the state of unsustainable system quality, characteristic of the Anthropocene era, has become even more recognizable. The pursuit of many different immediate goals and the contradictions that developed in all kinds of discussions about democracy during the first two decades of the 21st century have exposed the foundations of unsustainable democracy, which in our view is characteristic of the Anthropocene era. At the global and local levels, the Anthropocene era has manifested itself through an unsustainable development path and multiplying patterns of unsustainable behavior in education (UN. (2011). Learning for the Future: Competences in Education for Sustainable Development. Economic and Societal Council. ECE /CEP/AC.13.2011/6).

The use of an action research strategy has a strong potential for adaptation and makes it possible to recognize changes in the action research process, allowing us to see the relationship between adaptive and innovative approaches. The past five years have brought visible changes in the development of the JTES and the network: (1) there is a need to clarify the name of the JTES network taking into account the achievements of previous years, so from 2021 its name will be the International Network of JTES & DCSE Journals of UNESCO Chair at Daugavpils University; (2) there is a growing need to promote the development of the JTES and JTES & DCSE journal network by engaging in Education 2030 to achieve SDGs by 2050. It is clear that this will not be possible without researching and understanding the importance of the currently underestimated meanings of humanity and human experience that integrate and synthesize the picture of the world we live in. The JTES experience shows that an in-depth understanding of the role of the individual and human species will lead to a more holistic understanding of the unique, natural mission and significance of man-made cultural and social values. The development of educational research is not possible without a more holistic framework for the sustainability phenomenon and ESD.

From a broader perspective, this volume mentions, both directly and indirectly, the JTES philosophy, which has already become recognizable. The formation of philosophy begins with individual philosophy. It looks like that in the next five years it is time to address the question: Does the JTES help us Create Deeper Personal Meanings for Sustainable Education? On behalf of the future of the JTES, we invite everyone involved in the maintenance of the JTES (authors, reviewers and all supporters) to accept this question as a contextual issue of personal importance and to seek one’s own suggestions by sharing them in the JTES publications. In this volume, the authors of ten articles will share their ideas and experience. Thanks to the authors for their research and inspiration for us and JTES readers.

The paper by Guillermo Murillo-Vargas, Carlos Hector Gonzalez-Campo and Diony Ico Brath from Colombia answers the following research question: Is the integration of the Sustainable Development Goals and Universities a field of study? It is a bibliometric study of the intellectual production of the last 20 years. The paper is related to the topics
of the Journal of Teacher Education for Sustainability because it allows evidence of increased academic output from the universities and the Sustainable Development Goals (SDG) issues. Addressed in different studies for decades, from 2015, they gained greater prominence due to the inclusion of higher education as an important actor in fulfilling the 2030 agenda and the United Nations SDGs.

**Maritana Gorina, Oksana Ivanova and Marite Kravale-Paulina** in their paper discuss the mission of foster family pedagogy as an innovative and constantly changing social and pedagogical phenomenon in education for sustainable development. The authors considered a number of real cases in a broader perspective from the point of view of foster family pedagogy, identified the choice of foster care approaches and evaluated the results obtained. The readiness of foster parents to overcome the effects of Anthropocene unsustainability was also examined taking into account the mutual influence and interaction of foster parents and foster children. The authors of the study emphasized that the Latvian society should find its own new perspectives and methods to implement foster family pedagogy.

The paper by **Liene Briede** and **Elga Drelinga** explores vocational education students’ personal sustainability as a predictor to sustainable employability in the future. The results have shown that the most valuable self-characteristics are being good tempered, helpful and kind. Students’ attitudes to being responsible and honest change during school years – 1st and 2nd-year students do not consider them important values but senior students acknowledge them. It means that their lived experiences have promoted personal sustainability development ensuring more sustainable employability in the future.

**Janis Kapenieks sen. and Janis Kapenieks jun.** in their paper declare that the latest streamy implementation of online learning methods in the learning process requires new solutions based on pedagogical science. New developments in the design and content must provide personal development in the framework of sustainable education. The goal of the research is to find pedagogical and technological solutions for inclusion of the “spaced learning” method in the e-learning process for the fostering of personality. In the spaced e-learning process, a few-minute-long content includes pauses between repetitions, during which students let their brain “rest” with different content and then return to the course. In the research, the e-learning environment is designed to link the content of spaces to the individual learners’ interests and to raise their awareness of sustainable development issues.

In their research paper, **Zahra Tavakkoli and Naser Rashidi** from Iran show a picture of Sustainability Education among EFL instructors. The study provided education systems and policymakers with the necessary Sustainability Education competencies so that the system can help teachers and learners identify the relationship among sustainability issues such as culture, ecology, and power structures of their societies. The study is directly related to the philosophy of the *Journal of Teacher Education for Sustainability*. The logic behind the study is that English as a foreign language plays a significant role in ESD, as the knowledge of this language can provide scholars with a key to have access to the ways of sustainability development.

**Katrin Kohl and Charles A. Hopkins** from Canada view the #IndigenousESD research as a community-based participatory global research project aiming at enhancing knowledge on how to create relevant educational experiences for Indigenous children and youth. As required by SDG 4, quality education for all is of crucial relevance for achieving the Goals of the 2030 Agenda but little is known about how to serve Indigenous communities. This in-depth analysis has a focus on knowledge, attitudes and skills, often perceived
as twenty-first century skills, as they were suggested themes by a broad spectrum of Indigenous communities and other stakeholders in various regions of the world. The authors provide recommendations to make systemic changes with the consent and the support of the community.

Ehsan Namaziandost, Maryam Khodaverdian Dehkordi, Poupak Alipour from Iran and Shouket Ahmad Tilwani from Saudi Arabia investigate the impact of spaced and massed instruction on foreign language reading motivation and reading attitude among Iranian pre-intermediate EFL learners. These two techniques, i.e., spaced instruction and massed instruction, are two beneficial techniques implemented by teachers in the teaching process, which is related to Teacher Education for Sustainability. The results of this research project provide evidence that spaced and massed instructions facilitate the learning process and promote the learning of reading skills, reading motivation and reading attitude, which are necessary to foster and maintain sustainable education.

The paper by Amani K. Hamdan Alghamdi representing Saudi Arabia and Wai Si El-Hassan representing the United Kingdom highlights that we often find students incapable of engaging with sustainability issues because of the educational material that fails to reflect the local problems students are facing. Take Saudi Arabia, a desert country geographically, as an example, deforestation, is not a relevant case study to raise Saudi students' awareness of sustainable development. By employing an inquiry-based approach, teachers can inspire students to conduct investigation of local environmental issues that challenge their own environment. Our fellow contributors to the JTES and we have formed a strong community to share our best practices in educating younger generations who need to build a better, sustainable future.

The goal of the paper by Yodsaphon Wanchana, Pram Inprom and Wee Rawang from Thailand was to find out how to enhance the environmental education competency of secondary school teachers. Data were collected from teacher advisors as mentors in eco-schools covering six regions in Thailand. The research findings revealed that most respondents presented a moderate level of environmental education in six aspects: knowledge of the environment, basic understanding of the environment, responsibility for the environmental education of professional teachers, planning and practice with regard to the environmental education, promoting learning about the environmental education and evaluation of the environmental education. The approach to the improvement of environmental education should be integrated with multidisciplinary learning, community-based learning, project-based learning, happy teaching and learning, as well as holistic learning management.

The final paper of this volume by Agne Brandisauskiene, Jurate Cesnaviciene, Rita Miculiene and Lina Kaminskiene from Lithuania contributes to the philosophy of the Journal of Teacher Education for Sustainability in multiple perspectives: characteristics of sustainable professional development of teachers, value of sustainable professional development of teachers, its links to the quality of education, factors and prerequisites for sustainable professional development of teachers. The paper empirically identifies how specific factors of the process of sustainable professional development are manifested in four countries: Lithuania, Latvia, Estonia and Finland based on the data of TALIS 2018. The identified peculiarities within each country might be further investigated in terms of the differences in academic achievements of students, innovations, and systemic changes in education.

Ilga Salite, Ilona Fjodorova and Oksana Ivanova
Abstract
This article maps the scientific production and the contents associated with the sustainable development goals and their integration with universities during the past 21 years. Although many of the topics related to sustainable development goals (SDGs) have been addressed in different studies for decades, it is since 2015 onwards that they gained greater prominence due to the inclusion of higher education as an important actor in the fulfillment of the 2030 agenda and the United Nations SDGs. For the purpose of this paper, a bibliometric analysis of 871 papers, 535 documents in Scopus, and 336 in Web of Science (WoS) from 1998 to 2019 was performed, and the Bibliometrix analysis tool was used. The objective of this mapping is to answer the following research question: Is the integration of the Sustainable Development Goals and Universities a field of study? An analysis of the network of collaborators and trend topics in Scopus and WoS allows us to identify the concurrence and relationships of some keywords, such as sustainable development, sustainability and planning, and some background words, such as humans and global health. In another analysis, the word “higher education” is related to change. This article suggests that the integration of the Sustainable Development Goals in Universities is becoming a field of study under exploration, with a peak of production in 2016 and that has remained stable in the last three years, but thanks to the leading role assigned to Universities, intellectual production should increase in the following years.

Key words: sustainable development, objectives, universities, higher education, science mapping

Introduction
The United Nations Educational, Scientific and Cultural Organization (UNESCO), the UN, the United Nations Development Program (UNDP), and the World Bank (WB), among others, are actors that influence, through their policies and programs, how universities are seen (Beynaghi et al., 2016; Boni & Walker, 2016). For example, the World Bank has been a notable financier in educational projects, therefore, an important actor
in the generation of global policies since 1946. However, universities appeared or disappeared as the WB or other organizations decided if they had not complied with the development or established the approach that would be taken by the agendas around education, which sometimes did not include higher education (Boni et al., 2016).

Since the 1970s, environmental education has been part of both political and academic and scientific discourse; however, advances seem to be more rhetorical than real (Sherren, 2006). However, higher education institutions (HEIs) expose their commitment to future generations through curricula with an emphasis on the environment or sustainable development (Cusick, 2009).

At the Cairo Conference held on 5–13 September 1994, the 20-year program of action was approved, which sought to achieve gender equality, improved reproductive health, and stabilization of the population, thus achieving a wide range of sustainable development goals (Maguire, 1998). According to Maguire (1998), the United States Agency for International Development (USAID) has been one of the largest donors in favor of achieving the objectives established in the Cairo Conference. Still, the most relevant aspect is the joint work with universities, which allowed for the generation of specialized knowledge to achieve the respective reproductive health action programs.

On the other hand, Juma (2002), based on little progress in meeting the objectives of the work program of the United Nations Conference on Environment and Development (UNCED) of 1992 in Rio de Janeiro, recognizes the role that universities should play and affirms that they have been underused institutions. However, it is essential to promote sustainable development through professionals with multidisciplinary and ethically oriented training (Moghaddam et al., 2007). In addition, it is necessary to understand the knowledge, attitudes, and practices in different populations to execute a successful transition towards sustainability and not only understand the aspects related to the environment, conservation, ecosystem, natural resources, since human groups are the ones responsible for establishing harmonious relationships with natural systems through a modification of values, beliefs and social behaviors (Salas-Zapata et al., 2018).

The Sustainable Development Goals (SDGs) established in the 2030 Agenda and approved by the United Nations (UN) in September 2015, include for the first time universities to achieve these goals. Consequently, it has been evidenced in various academic documents that it is the first time that higher education is included in the declaration of sustainable development as an important actor. According to Clifford and Zaman (2016), the SDG “challenges the research community to rethink the traditional approach to global health and provides the opportunity for science, technology, engineering, and mathematical (STEM) disciplines, particularly engineering, to demonstrate their benefit to the field”. Additionally, universities have gained recognition in recent years from both national and international governments; however, contributions depend on the type of institution (McCowan, 2016).

Based on the above, there has been exponential growth in the production of literature around “ODS”, “Higher Education” and “University” since 1998. According to Boni et al. (2016), institutions such as the Organization for Economic Cooperation and Development (OECD), the WB, the UN, and UNESCO, among others, are actors that notably influence the generation of policies at the global level; therefore, they also affect the aspects that are important and unimportant for the achievement of sustainable development goals. Each organization has a different focus; for example, the OECD focuses on
rich countries, while the WB and the UN focus on developing countries. In this order of ideas, it is interesting to explore through bibliometric indices the literature on the concepts related above.

Zamora-Polo & Sánchez-Martín (2019) conducted a hermeneutic study that sought to deepen the contribution of HEIs to the promotion of sustainability in the context of the SDGs. The authors argue that HEIs must go beyond the transfer of knowledge, i.e., create new knowledge that helps meet current challenges, which requires a structural change in universities and a change in the vision of teachers. This article demonstrates the change in the focus of research on the SDGs, higher education, and university.

However, documents that focus on the integration of the SDGs in the teaching process or evaluative documents on how higher education can meet and contribute to the objectives of the SDGs or topics related to inclusion predominate. For example, Maruna (2019) verifies the compatibility of the curricula of the study program of the Master’s degree in Integrated Urbanism of the Faculty of Architecture of the University of Belgrade with the recommendations of the United Nations, UNESCO and CETP-CEU. Atar & Rahman (2019) examine the literature on the history and current situation of higher education in Turkey to determine to what extent they have met the sustainable development agenda. Willats et al. (2018) present practical examples of how to integrate the SDGs in the curriculum of HEI outlining the process of integrating the SDGs into the basic curriculum of the Nottingham Trent University (NTU). Najafian and Karamidehkordi (2018) seek to introduce activities and programs of the University of Zanjan to achieve a sustainable campus emphasizing the environment and infrastructure, waste management, water management and education and research.

Ochoa-Duarte and Pena-Reyes (2020) argue that the SDGs are not enough for social development, it is necessary to take into account the local context, for example, Latin America. Salvia et al. (2019) state that in Latin America, the implementation of the SDGs depends on priority of political agendas that compete with the country’s main problems. Moreover, the scope of the SDGs becomes complicated when the country’s socio-economic conditions are not adequate (Lalama Franco & Bravo Lalama, 2019), and for this reason, the research addresses issues with the goals of Objective No. 1 “End of poverty” (e.g., Tezanos, 2018). However, research by Lorente Rodríguez (2019) exposes the need to evaluate the problems of the Latin American educational system with the aim of creating plans that successfully affect the achievement of goals established in Objective No. 4 “Quality education”.

In short, there is a conceptual and theoretical lack to understand what the university is, what it is for and how it affects society for the achievement of the SDGs (McCowan, 2016). This knowledge is necessary to appease the concern highlighted by Moon et al. (2018) in the XII European Conference on Innovation and Entrepreneurship held in Portugal on 20–21 September 2018, which consists of the impact of HEIs to help achieve the SDGs; the challenges faced by HEIs when integrating the SDGs in the curriculum and institutional strategies; the role of associations for HEIs among students, teachers, government and various stakeholders; and how the adoption of the 2030 Agenda for Sustainable Development, including the SDGs, will transform the work of HEIs and suggest research.
Historical and Current Context

Sustainability is a concept that has become increasingly complex; over the years, it tries to address the preservation of natural resources, of human life, the quality of human life and explores practices that allow for continuity that seeks preservation, i.e., future well-being (Amin & Greenwood, 2018). Therefore, the United Nations Organization promotes a program for educational change, which focuses on the economic, social, and environmental dimensions (The General Assembly, 2015). The educational change began in 1975 when legislative mandates were incorporated into the curriculum of the United Nations International Education Program, which was ratified at the Rio Earth Summit on 14 June 1992, and these actions were supported by Copernicus and the Talloires Declaration (University Leaders for a Sustainable Future) created in 1990 (Iliško et al., 2018). Only in the UN Decade of Education for Sustainable Development (2005–2014) the role of education institutions became clear through the Global Action Program (GAP), in which they established international activities around Education for Sustainable Development (ESD) (Fischer et al., 2015) and in the 2030 Agenda, including for the first time tertiary education or higher education to achieve the objectives (McCowan, 2016).

Education is the key strategy to change the course of our unsustainable dynamics through the 17 United Nations Sustainable Development Goals. Therefore, it is crucial to analyze and reflect on the initiatives adopted and the stakeholders in the initiatives (Jetly & Singh, 2019), precisely the fourth objective of the SDGs, which focuses on achieving “A Quality Education” (The General Assembly, 2015). In this order of ideas, the 2018 United Nations report identifies teachers as a critical factor, since they, in addition to influencing future professionals, also affect institutional dynamics (Amin & Greenwood, 2018).

That is, for education institutions, especially universities, to fulfill the role assigned in the 2030 Agenda, to provide quality education, through the strategies established under the framework of ESD, a structural change and a change in teachers’ vision, built by understanding what the university is and what it is for (McCowan, 2016; Zamora-Polo & Sánchez-Martín, 2019) to overcome the challenges demanded by the integration of the SDGs in the curriculum and institutional strategies (Moon et al., 2018). Therefore, the leadership of the directives is a key factor to positively influence the attitude of teachers and students in promoting ESD (Oyetunji, 2011). But, the world’s universities require different approaches to address sustainability in their contexts to achieve the 2030 SDGs. For example, higher education in the United States has adequate facilities that address goal 7 “affordable and clean energy”, but little impact on the other objectives, especially objective 4 “Quality education” (Smith, 2011), which requires adequate leadership for the integration of the SDGs and to address the lack of clarity of the ESD to incorporate or modify study plans around Sustainable Development, which must contribute notably at the local level and that in parallel respond to global demands for sustainability (Bentham, 2013).

On the other hand, in addition to leadership, teaching and higher education directives require several skills that must go beyond the knowledge of the discipline; it is also necessary to have knowledge and mastery of teaching techniques and methods; in other words, it is essential to promote the professional development of teaching staff (Biasutti
According to Dzelzkaleja & Kapenieks (2018), it is necessary to understand various contradictions that occur in higher education. In other words, it is not only crucial to incorporate ESD, but it is also relevant to implement a systemic approach. The authors have identified seven groups of contradictions (Dzelzkaleja & Kapenieks, 2018, p. 125):

1. Willingness to teach comprehensively versus availability of financial resources;
2. Traditions versus novelties (in the educational process);
3. Willingness to learn versus willingness to survive economically;
4. Student X versus student Y (different backgrounds, personalities, etc.);
5. “Women’s Professions” versus “Men’s Professions”;
6. The mission of a higher education institution;
7. Skills and knowledge of graduates versus the skills and knowledge needed by the employer.

However, Dzelzkaleja and Kapenieks (2018) agree with Ichinose (2017) that the key to integrating the SDGs is focused on placing the human being at the center. In the Latin American context, the task is even more complicated since they must overcome the educational backwardness of the 20th century and face the challenges of the 21st century. This situation is due to the inequalities, social, economic, and educational gaps characteristic of the region (Rodríguez, 2019). In the case of Colombia, the SDGs have been gaining space and importance since the 2012 UN Conference on Sustainable Development in Rio de Janeiro, consequently becoming the first country in the world to align the National Development Plan (PND) with the SDGs. However, few goals are related to Higher Education (Pineda-Escobar, 2019).

Finally, it is important to highlight the contributions generated by the Baltic Sea and Black Sea Circle Consortium (BBCC) in the European community around the EDS, which are presented at the annual conferences and whose participatory action research is strongly linked to the activities of UNESCO Chair programs. As mentioned above, change for sustainability is a complex process that involves all stakeholders, especially universities, with lecturers being the key to transformation; therefore, the UNESCO Chair was founded with the reorientation project “Global Teacher Education towards the Goal of Sustainable Development by 2000”. It should be noted that the BBCC uses participatory action research to find answers that allow for the reorientation of teacher education towards sustainable development (Pipere et al., 2015; Salóte, 2015). Furthermore, the advances of BBCC are evidenced in the remarkable growth of the Journal of Teacher Education for Sustainability in topics such as educational research, research in sustainability education, and sustainability studies in higher education (Pipere et al., 2015).

**Methodology**

There are different methods to analyze the consolidation of a field of study (Bonaccorsi, 2008), with most focusing on a retrospective analysis of intellectual production within a discipline. For Becher and Trowler (2001), the concepts of discipline or field of research are synonymous. While for others such as van den Besselaar and Heimeriks (2006), within a domain, there may be more than one field of study composed of several subfields,
and these divided into smaller parts that represent different research topics. In this sense, when mapping the integration of the Sustainable Development Goals in universities, a subfield of study is investigated within the field of study of higher education.

Research on the integration of the Sustainable Development Goals in universities follows the bibliometric methodology of scientific mapping. In terms of Cobo et al. (2011), this scientific mapping allows us to construct representations of cognitive structures having as source only the scientific production represented in articles published in scientific journals, for this case, indexed in databases with identification of the level of impact, such as Scopus or Web of Science. This type of scientific mapping has limits, i.e., it does not include other types of institutional documents, such as manuals or institutional publications. As it is a recent topic, since the approval of the SDGs, there are no previous studies of similar mappings for this field or subfield of study.

The role of universities in the sustainable development goals is relatively new (McCowan, 2016). Therefore, through the mapping of information, it is important to identify how concepts such as “university” and “higher education” are involved in sustainable development goals. In this study, we compiled publications from indexed journals included in the databases Scopus and Web of Science (WoS) Core Collection, with the following search parameters: “Sustainable Development Goals” AND university* OR higher education* to locate publications that contained these words in the title, the abstract, author keywords and keywords plus until 2019. A starting year was not included because our intention was to identify from when these topics were included and the trend in the research. In addition, there were no restrictions by type of document. Based on the search parameters, 535 documents were published in Scopus and 336 in WoS. In total, 871 documents were recovered and analyzed in Bibliometrix. Analysis of collaboration networks and the concurrence of the keywords of the existing production were also performed.

**Results and Discussion**

The search conducted in the main WoS collection shows that the first document published was in 2013, while in Scopus, it was in 1998. On the other hand, by the type of document, it was identified that the articles in WoS had participation of 88.98 % followed by reviews with participation of 5.35 % and editorials with a percentage of 4.8. In Scopus, the articles have participation of 63.55 %; conference documents with 13.08 % take the second place; and book chapters with participation of 10.5 % take the third place (see Table 1).

Regarding the authors, it was identified that a more significant number of authors were concentrated in WoS; therefore, their collaboration index was higher with respect to Scopus. It is an important fact from the perspective of the amount of scientific production.

The behavior of the percentage increase or decrease of publications in both WoS and Scopus is dynamic year after year, with an increase in 2013, 2015, 2016, and a slight increase in 2018 by WoS; then, a decrease is evident until 2019, as shown in Figure 1.
Table 1

The Main Information of the Search in WoS and Scopus

<table>
<thead>
<tr>
<th>Description</th>
<th>WoS</th>
<th>Scopus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sources (magazines, books, etc.)</td>
<td>197</td>
<td>297</td>
</tr>
<tr>
<td>Documents</td>
<td>336</td>
<td>535</td>
</tr>
<tr>
<td>Average citations by documents</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Average citations per year per document</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>References</td>
<td>15,122</td>
<td>23,236</td>
</tr>
<tr>
<td>Number of articles</td>
<td>299</td>
<td>340</td>
</tr>
<tr>
<td>Number of books</td>
<td>–</td>
<td>9</td>
</tr>
<tr>
<td>Number of book chapters</td>
<td>1</td>
<td>56</td>
</tr>
<tr>
<td>Document of procedures</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>Number of conference documents</td>
<td>–</td>
<td>70</td>
</tr>
<tr>
<td>Number of conference abstracts</td>
<td>–</td>
<td>1</td>
</tr>
<tr>
<td>Editorial</td>
<td>16</td>
<td>7</td>
</tr>
<tr>
<td>Meeting summaries</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>Note</td>
<td>–</td>
<td>17</td>
</tr>
<tr>
<td>Abstracts (Review)</td>
<td>18</td>
<td>34</td>
</tr>
<tr>
<td>Short survey</td>
<td>–</td>
<td>1</td>
</tr>
<tr>
<td>Authors</td>
<td>2,066</td>
<td>1,798</td>
</tr>
<tr>
<td>Authors of documents by a single author</td>
<td>52</td>
<td>128</td>
</tr>
<tr>
<td>Authors of documents by various authors</td>
<td>2,014</td>
<td>1,670</td>
</tr>
<tr>
<td>Documents by a single author</td>
<td>53</td>
<td>131</td>
</tr>
<tr>
<td>Documents by authors</td>
<td>0.163</td>
<td>0.298</td>
</tr>
<tr>
<td>Authors per document</td>
<td>6.15</td>
<td>3.36</td>
</tr>
<tr>
<td>Co-authors per documents</td>
<td>6.59</td>
<td>3.54</td>
</tr>
<tr>
<td>Collaboration index</td>
<td>7.12</td>
<td>4.13</td>
</tr>
</tbody>
</table>

Source: Bibliometrix data processing and own elaboration.

Figure 1. Percentage evolution of publications of Scopus and WoS documents
Source: Bibliometrix data processing, elaboration and own calculations.
On the other hand, the evolution of the number of publications tends to be more homogeneous, but WoS is more dynamic (Figure 2).

In the annual citations per article, WoS stands out with a total average of 13.2 citations, while Scopus has a total average of 7.2 citations. In more detail, the highest level of citations per document in WoS is evidenced in 2016 with a total of 43.6, in 2017 with a total of 10.6 and in 2013 with a total of 9. In Scopus, it is evidenced that in 2009, 13 citations per article were obtained, in 2015 – a total of 11.4 and in 2003 – a total of 11.

Figure 2. Evolution of publication number of Scopus and WoS documents
Source: Bibliometrix data processing, elaboration and own calculations.

It is observed that journals or publication media with an emphasis on higher education have had an important role in academic production. Magazine such as the *International Journal of Sustainability in Higher Education* is in the top 10 of both WoS and Scopus, and the *International Journal of Management Education* ranks ninth in WoS, whose publications began in 2018 and achieved growing importance in the fields of study.

Table 2

<table>
<thead>
<tr>
<th>No.</th>
<th>Scopus</th>
<th>Country</th>
<th>Total citations</th>
<th>WoS</th>
<th>Country</th>
<th>Total citations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>United States</td>
<td>132</td>
<td>United States</td>
<td>1265</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Spain</td>
<td>111</td>
<td>United Kingdom</td>
<td>401</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Australia</td>
<td>105</td>
<td>Australia</td>
<td>296</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>United Kingdom</td>
<td>64</td>
<td>Spain</td>
<td>252</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>South Africa</td>
<td>46</td>
<td>South Africa</td>
<td>216</td>
<td></td>
<td></td>
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<tr>
<td>6</td>
<td>Germany</td>
<td>45</td>
<td>Germany</td>
<td>105</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Brazil</td>
<td>37</td>
<td>Iran</td>
<td>90</td>
<td></td>
<td></td>
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<td>8</td>
<td>Canada</td>
<td>31</td>
<td>Cyprus</td>
<td>73</td>
<td></td>
<td></td>
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<tr>
<td>9</td>
<td>France</td>
<td>28</td>
<td>Canada</td>
<td>70</td>
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<td>10</td>
<td>Japan</td>
<td>28</td>
<td>Japan</td>
<td>42</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Bibliometrix data processing, own elaboration.
The behavior of total citations by country shows that citations are higher in WoS and the behavior of countries varies very little with respect to the positions. However, in the first 10 positions of Scopus, there is a Latin American country, Brazil, while in WoS, the participation of Cyprus, an island located in the Eastern Mediterranean, is observed and Iran takes the seventh position.

When observing the countries by author, the participation of the United States, the United Kingdom, Germany, Spain and Australia in the first five (5) positions predominates in the Scopus database. On the other hand, of the total number of articles by each country, 100 % of the articles of Italy are publications in collaboration with other countries (MCP, Multiple Country Publications); Japan ranks second with 66.7 %, and Canada ranks third with 50 %. In the case of countries with higher production, work in collaboration with other countries is structured as follows: Australia 37.5 %, Germany 33.3 %, the United States 26.1 %, Spain 22.2 % and the United Kingdom 17.6 %, as shown in Figure 3.

![Figure 3. Country of the corresponding author in Scopus](source)
Source: Bibliometrix data processing, own elaboration.

![Figure 4. Country of the corresponding author in WoS](source)
Source: Bibliometrix data processing, own elaboration.
In WoS, it was identified that the United Kingdom had a percentage of collaboration with other countries of 46.7%, the United States – 40%, Spain – 20.6%, Australia – 58.8%, South Africa – 33.3% and Germany – 30.8%. Regarding the country of the corresponding author, the highest percentage of collaboration with other countries was demonstrated by Japan with 66.7%, Bangladesh with 60%, Australia with 58.8%, Canada with 50% and the United Kingdom with 46.7%, as shown in Figure 4.

The collaboration network in Scopus is led by the United States with connections in France, Italy, India, Indonesia, Norway, the Netherlands, especially with the United Kingdom, which in turn has connections with South Africa, Germany, Switzerland, Ghana, Spain, Nigeria, Brazil, Kenya and as a special connection Australia that has a collaboration network with Canada, China, Japan, the United States, France and Austria. In WoS, the collaboration network is more complex; it is led by the United Kingdom, a country that is related to the United States, South Africa, Germany, Mexico, Nigeria, Spain and Brazil with a strong connection to Australia, which displays a broader collaboration network (see Figure 5). It is worth noting that the most notable collaborations have been mentioned; however, the complexity of collaboration is broader, and the interrelationships are greater.
Figure 6. WoS collaboration network by country

Figure 7. Scopus keywords

Source: Bibliometrix data processing, own elaboration.
To date, notable coincidences have been found between Scopus and WoS; however, the analysis of keywords exposes the following aspects. A total of 781 keywords were identified in WoS and 1962 keywords – in Scopus. The keywords with the highest number of occurrences in Scopus are “sustainable development” (9.2%), “humans” (4.7%), “female” (3.4%), “global health” (3.3%), “united nations” (2.8%), “planning” (2.4%), “male” (2.3%), “education” (2.2%), “article” (2.1%), “adult” (1.9%) and “higher education” (1.9%), while the words with the highest number of occurrences in WoS are “education” (4.2%), “health” (4.1%), “higher education” (2.9%), “challenges” (2.2%), “mortality” (2%), “administration” (1.8%), “impact” (1.7%) “science” (1.5%), “framework” (1.4%) and “competences” (1.3%).

Table 3
Trend Topics in Scopus and WoS

<table>
<thead>
<tr>
<th>Item</th>
<th>Scopus Freq.</th>
<th>Year</th>
<th>Item</th>
<th>WoS Freq.</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malnutrition</td>
<td>9</td>
<td>2015</td>
<td>Mortality</td>
<td>16</td>
<td>2017</td>
</tr>
<tr>
<td>Austria</td>
<td>7</td>
<td>2015</td>
<td>Programme</td>
<td>8</td>
<td>2017</td>
</tr>
<tr>
<td>Goals</td>
<td>16</td>
<td>2016</td>
<td>Middle-income countries</td>
<td>5</td>
<td>2017</td>
</tr>
<tr>
<td>Human rights</td>
<td>13</td>
<td>2016</td>
<td>Infant</td>
<td>5</td>
<td>2017</td>
</tr>
<tr>
<td>Health</td>
<td>12</td>
<td>2016</td>
<td>Energy</td>
<td>5</td>
<td>2017</td>
</tr>
<tr>
<td>Politics</td>
<td>11</td>
<td>2016</td>
<td>Health</td>
<td>32</td>
<td>2018</td>
</tr>
<tr>
<td>Language</td>
<td>10</td>
<td>2016</td>
<td>Challenges</td>
<td>16</td>
<td>2018</td>
</tr>
<tr>
<td>Environmental protection</td>
<td>29</td>
<td>2017</td>
<td>Impact</td>
<td>13</td>
<td>2018</td>
</tr>
<tr>
<td>Child</td>
<td>25</td>
<td>2017</td>
<td>Framework</td>
<td>11</td>
<td>2018</td>
</tr>
<tr>
<td>International cooperation</td>
<td>22</td>
<td>2017</td>
<td>Sustainable development goals</td>
<td>10</td>
<td>2018</td>
</tr>
<tr>
<td>Motivation</td>
<td>19</td>
<td>2017</td>
<td>Competences</td>
<td>10</td>
<td>2018</td>
</tr>
<tr>
<td>Developing countries</td>
<td>19</td>
<td>2017</td>
<td>Knowledge</td>
<td>10</td>
<td>2018</td>
</tr>
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</table>

See next page for continuation of table
Continuation of Table 3

<table>
<thead>
<tr>
<th>Sustainable development</th>
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<th>2018</th>
<th>Governance</th>
<th>10</th>
<th>2018</th>
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</thead>
<tbody>
<tr>
<td>Human</td>
<td>93</td>
<td>2018</td>
<td>Education</td>
<td>33</td>
<td>2019</td>
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<tr>
<td>Humans</td>
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<td>Higher-education</td>
<td>23</td>
<td>2019</td>
</tr>
<tr>
<td>Female</td>
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<td>2018</td>
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<td>14</td>
<td>2019</td>
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<td>Global Health</td>
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<td>Science</td>
<td>12</td>
<td>2019</td>
</tr>
<tr>
<td>Higher Education</td>
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<td>2018</td>
<td>Students</td>
<td>10</td>
<td>2019</td>
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<td>Sustainability</td>
<td>35</td>
<td>2019</td>
<td>University</td>
<td>10</td>
<td>2019</td>
</tr>
<tr>
<td>University Sector</td>
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<td>2019</td>
<td>Key Competences</td>
<td>10</td>
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</tr>
<tr>
<td>Teaching</td>
<td>21</td>
<td>2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>20</td>
<td>2019</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Bibliometrix data processing, own elaboration.

The trend topic means a trend topic in a specific period. Table 3 demonstrates that in both Scopus and WoS the keywords related to the search terms of this study are concentrated in 2019.

Figure 9. Co-occurrence of the word “higher education” in Scopus
Source: Bibliometrix data processing, own elaboration.
Co-occurrence occurs when the frequency of x number of concepts is repeated together; consequently, connections are generated between them. Therefore, in Scopus, it was identified that in the co-occurrence of the word “higher education”, it was connected with topics such as sustainable development, sustainability, planning, education and the United Nations; in the background with: humans, global health, article, female, male, health policy, developing countries, organization and administration.

**Figure 10. Co-occurrence of the word “higher education” in WoS**
Source: Bibliometrix data processing, own elaboration.

In WoS, it was identified that the word “higher education” was closely related to science, knowledge, key competences, future and university; in the background with health, education and administration; finally, a connection with challenges was evident.

**Conclusions**

The bibliographic analysis in WoS and Scopus has identified the following. The search window in Scopus is broader, which begins in 1998, while in WoS, it begins in 2003. Additionally, Scopus has a total of 535 documents, while WoS has a total of 336 documents. However, the collaboration index in WoS is 7.12, which is higher than that identified in Scopus, whose collaboration index is 4.13.

Regarding the evolution of publications, there is evidence of a percentage increase in documents published between 2013 and 2018, but their behavior differs between the databases under consideration. In Scopus, there was a significant percentage increase in 2015, and the publication of documents increased 1600%. In 2016, a slight increase of 147 % was observed compared to the previous year. In 2017, 2018 and 2019, a slight increase of 95 %, 98 % and 38 %, respectively, was observed. In WoS, there was a
percentage increase of 250% in 2015, 457% in 2016, 26% in 2017, 88% in 2018 and 60% in 2019. To sum up, the number of publications is very dynamic in both WoS and Scopus year after year.

When observing the publications from the perspective of the number of documents published, the behavior between Scopus and WoS tends to be homogeneous; however, the trend of the evolution of the number of documents published in Scopus is linear, while in WoS, it exhibits a less regular evolution. This behavior can be justified because the United Nations listed 17 main objectives known as Sustainable Development Goals in 2015 and included higher education as an important actor for the achievement of the objectives, especially those associated with sustainable development and sustainable lifestyles (Bell et al., 2017; McCowan, 2016).

The increase in the number of documents in 2015, 2016 and 2017 led to an increase in citations. The total citations by country in Scopus expose a strong participation of the United States, Spain and Australia and include Brazil as a country of Latin America that ranks seventh. In the case of WoS, the United States, the United Kingdom and Australia are identified with an interesting participation of Cyprus that ranks eighth.

On the other hand, the behavior by the corresponding country in Scopus shows a strong participation of North American authors, and collaboration with authors from other countries has also been found. The same happens with the United Kingdom and Germany, but the nationalities of Korea, India, Austria, Iran, Malaysia, the Philippines and the Netherlands do not show collaboration with others. In WoS, a strong participation of authors from the United Kingdom, the United States and Spain is identified; the three countries present an important collaboration with authors of other nationalities; in general, only Ghana presents authors of single nationality. Therefore, it is evident that the collaboration network is broader in WoS and is led by the United Kingdom, while in Scopus, it is led by the United States.

Keywords are the most relevant aspect in the literature search for information retrieval in a specific study area. It also allows for the identification of research trends, relationships between terms used by the authors and study trends (Gonzalez & Mattar, 2012). In this order of ideas, it has been observed in Scopus that sustainable development, humans, female and global health are strong topics for document publication, while in WoS, the publication topics are education, health, higher education and challenges. Thus, WoS exhibits more affinity with the study area of the present investigation. When analyzing the trend topic, in both Scopus and WoS, the keywords related to this study are manifested in 2019. The concurrence of words in Scopus details that the word “higher education” has a strong relationship with sustainable development, sustainability, and planning, while WoS states that the word “higher education” is mainly connected with science, knowledge and competences. It is possible to affirm that Scopus focuses on sustainability and the environment and WoS emphasizes the role of education in sustainability.

Finally, in accordance with the objective of this article, after mapping the relationship between the sustainable development goals in universities, it can be considered that we are facing the configuration of a new field of study still to be explored in the coming years, which is evidenced through the level of scientific production. In Scopus and Web of Science, there is an increase in collaboration networks among researchers and research by countries becomes stronger, as well as the level of citations grows year after year. A greater interest in the field of knowledge is associated with the integration of the Sustainable Development Goals in universities.
References


Mapping the Integration of the Sustainable Development Goals in Universities.


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Foster Parents’ Readiness for the Implementation of Foster Family Pedagogy

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Abstract

It can be observed that changing attitude towards the environment and fellow human beings manifests itself as a socially unsustainable relationship, which in different ways and at different levels manifests itself in social exclusion. Social exclusion is increasingly emerging as a phenomenon that is complex in nature and its solutions must be sought in the wicked problem approach, which is characteristic of complex problems and has significant ontological roots. At present, ontology should consider the much more complicated problem of what types of being are formed by both the natural and the cultural evolutionary processes. It can be argued that evolutionary ontology attempts to create a new image of the world and of humans – a new non-anthropocentric cosmology, i.e., a consistently philosophical culturological cosmology that takes into account reality in its real structure as a conflict between the spontaneous activity of nature and the sociocultural activity of humans (Šmajs, 2008, p. 96). The reasons for social exclusion can be different, and its specific manifestations are various, and the same can be said about the phenomenon of social inclusion, which is the expression of the quality of other relationships and attitudes. Externally observable signs of social exclusion are more closely related to the concept of families at risk. A social risk family can be defined as a family that experiences difficult problems and has limited opportunities to provide favorable living conditions for the comprehensive development of all family members. More and more often it is associated with unsustainable cultural or non-cultural contexts, mainly related to non-ecological culture prosperity in the consumer society. It can be noted that this context in its current form (which includes manufacturing, consumption, material culture, and technology, and both the social, intellectual, and material life of humans) is quite anti-natural oriented in its principle. Unfortunately, the aggressive anti-natural sociocultural strategy permeated also the field of human upbringing and education (Šmajs, 2008, p. 194). At the beginning of the 21st century, it has emerged as the Anthropocene era in a broader sense, in which the geological characterization of the era is
complemented by the characterization of the sustainability of public relations in a broader holistic perspective.

The aim of the article is to consider a number of real cases in a broader perspective from the point of view of foster family pedagogy, identify the choice of foster care approaches and evaluate the results obtained.

From the perspective of foster family pedagogy, foster parents and foster children are participants in the lifelong learning process, where the mutual influence and interaction of foster parents and foster children are studied. The authors evaluated real situations from the perspective of foster family pedagogy and children’s involvement in the family structure. The article also examines the influence of the foster family and its readiness to overcome the effects of Anthropocene unsustainability.

Key words: foster family pedagogy, foster parents’ readiness to implement the foster family’s mission, foster child, life experience, families at risk

Introduction

In the changing world, socio-cultural enrichment, pedagogical research, appearance of new pedagogical realities and the interpretation of pedagogical facts require searching for new methods of studying modern pedagogical phenomena, determining the degree of pedagogical contribution to the researched phenomena and distinguishing the pedagogical component of human social life. The interaction of the family with society is undeniable. The family is important because it creates an individual’s personality. Each individual and family interact in natural/cultural and social contexts. The idea of evolution is the development of the relationship between the world of children and the world of adults. A developmental habitat is introduced into the child’s internal environment, from which the child draws information and the life experience, and for the most part it is unpredictable. The family environment is considered to be a natural, material and social environment for foster parents and children, who by interacting learn new activities, acquire new roles and assign new values. It is an event that is considered to bring the life experience to life between foster parents and children left without parental care.

At the first World Congress of Families in Prague (1997), Tarah Fleming said that the human species could be called not only Homo Sapiens – a sensible, intelligent being – but also Homo Familiaris – family being (Fleming, 1997). It means taking care of one’s children and the individual’s need to belong to the family. The study of the structure and content of Homo sapiens species should look for features that will allow recognizing the relationship between human and nature, and preserving the deepest identity of the prototype values required for self-production processes (Salóte et al., 2020).

The child grows and changes; in this regard it cannot be considered that the child will remain intact. Time, events and life experience have an impact on children’s feelings, experiences, needs, thus creating a unique character and personality (Gorina & Šukste, 2019).

The suppression and distortion of a child’s needs lead to the appearance of negative traits and make the child unhappy. Negative experiences that a child has acquired in childhood hinder developmental abilities. Through the prism of the experience gained, children begin to perceive the information coming to them from the distorted outside world, which prevents them from seeing that the environment has changed when they enter a favorable environment. This indicates the unsustainability of the child’s development.
D. Elkonin admits, “The natural course of life of children and adults in society is a continuous series of situations, which are characterized by varying degrees of difficulty. In difficult situations, a creative effort arises in an attempt to solve new problems and behaviors as a choice of necessary responses. The moment of overcoming natural forms of behavior...” (Эльконин, 2005, 8–10). For children left without parental care, a foster family is one of the greatest values that will form the center of the child’s personality, character, will, love and friendship, as well as the adult support will promote the development of self-confidence in a sustainable manner.

Children become accustomed to the environment in which they grew up. Being beaten and left without food become the norm for a child. The norm does not mean that the child likes it; the norm is the usual environment in which the child lives, which is familiar to the child, and something new scares the child. Therefore, many children, in the most favorable environment for them, do not know how to behave and exist in these conditions. By provoking aggression, they try to return to the environment that is normal for them.

In the context of the Anthropocene era, thinking and action have changed and a lack of succession and interrelationships can be identified there (Fedosejeva et al., 2018). A child left without parental care develops a hostile view of the world, child’s interest in exploring the world is negligible, and it is an obstacle to the child’s active cognitive activity; as a result, the child does not develop a relationship of trust.

The child is significantly more concerned about environmental safety and predictability, so any change in the normal course of events is frightening. Foster parents must be a great “resource” from which a foster child can gain confidence in his or her strength, ability to love and be loved.

Anthropological research by Christiansen et al. (2006) shows that, for example, children and young people in Africa today are often portrayed as innocent and passive victims of poverty and conflict, but many young people still cope with the acquisition of new skills they can later use creatively in other contexts (Christiansen et al., 2006).

Philosophy is based on the belief that in a family environment, regardless of how the concept of family is defined, there is an indiscutable need for any child. Consequently, only knowledgeable and skilled foster parents can provide quality care to a child left without parental care.

The authors accept the theory by Rozov (Розов, 1995) that states that the good must be attractive and modern. The task of foster parents is to educate children who will be able to create their own life trajectory by influencing living conditions through methodological efforts. More specifically, they should help children manifest themselves in shaping their lives. Insufficient development of the above abilities often prevents foster children from succeeding in life.

Foster parents cannot directly influence the development of the child’s personality, but in their power to influence the environment, where the child will be able to freely gain new experiences, to make the environment more dynamic, saturated with possible challenges that will require the comprehensive development of the child. The authors of the study agree with the statement that “a conscious choice about the existence or absence of the Self and We is appropriate to the given situation, thus achieving the highest possible potential for development. By actively participating in the processes of developing the well-being of society and maintaining environmental sustainability, people...
adjust/tune their feelings, the basic values of the education and health care process” (Bogdanova et al., 2017). Thus, foster parents will help gain new experience, teach to analyze the events, feelings and experiences that take place in the child’s life.

Foster parents have to put a lot of effort and wisdom into creating favorable contact with foster children adopted in their family, which means creating living conditions, emphasizing spirituality and human spirituality, which will be revealed in living conditions and realized during life (Salite, 1998). It is a transition to different notions of sustainability. For any transition to sustainability to be successful, knowledge, attitudes and practices (KAP) in relation to sustainability should be understood (Salas-Zapata et al., 2018).

Foster families are one of the forms of out-of-home children, with the help and support of which it is possible to bring the family care model closer and enable the foster child to acquire the necessary skills while living in a family environment. The child receives personal experience from foster parents in shaping his/her life and character. Behavioral experience will be necessary when entering an independent life.

A child who comes from a socially disadvantaged background is different from a child who grew up in a wealthy family. Sustainable development or sustainability is not just an environmental issue. It is a multifaceted interdisciplinary concept that affects our future, encompassing cultural, social, economic, political and environmental aspects. These different aspects of sustainable development are interrelated and cannot contribute to the principles of sustainable development (Hofman-Bergholm, 2018). Raising a foster child should be based on foster parents’ understanding of child psychology, as the child has suffered a psychological trauma by losing his or her biological parents. This behavior of the child is only outwardly similar to the child’s usual reactions. Interdisciplinary action research should use relations with the environment, perception, undifferentiated identity, sustainable and self-generating prototyping in ecological sustainability in relation to personality and nature (Salite et al., 2020). A child brought up in safe conditions is interested in exploring the world, gaining new opportunities, striving for new experiences and searching for communication.

The aim of the research is to find out the experience and opinion of the research participants about the mutual influence and interaction in the implementation of a sustainable life experience for children left without parental care, offering a new approach to identifying the functioning of foster family pedagogy.

Methodology

Both quantitative and qualitative research methods were used to perform the study. Within the framework of the research, the authors will provide a vision of life experience on the problems related to the foster parents’ readiness to support, participate in the improvement of a particular surrounding world (material and relationship world), which will be necessary for foster children when entering the independent life.

The qualitative research methodology was based on a three-part “phenomenological” interview (Seidman, 1998), which provided the context of the experience of the study participants (children left without parental care) to reconstruct the details of their experience in the context, in which this experience was gained. It is therefore important to assess one’s knowledge, skills and experience, which translate into self-experience
and ultimately allow individuals to set more sustainable goals for their education (Kravale-Paulina et al., 2013).

The quantitative research methodology (questionnaire) helped find out the opinion of the research participants (foster families) about the mutual influence and interaction with foster children. Mathematical and statistical data processing methods were used to summarize the results of the research. For clarity reasons, the data were interpreted in graphical form. The research methodology used a targeted sample of research participants, in which there was an interaction among the research, the activity, and the evaluation and comparison of the obtained results (Mārtinsone & Pipere, 2011). The study was initiated in March 2020 and involved 34 foster families and 4 foster children.

The Latvian Foster Family Training Programs on the Basis of Foreign Experience

The Netherlands and some other European countries have a foster care program developed by the Child Welfare League of America in the early 1990s. The development of the program lasted for several years and involved 14 U.S. state children’s rights organizations, several foster care associations, national resource centers, as well as several universities and colleges. In the international environment, the program is known as PRIDE (Parent Resources for Information, Development and Education).

The PRIDE program is based on the specific competencies (knowledge and skills) required for foster parents to be able to successfully care for and raise children. Five categories of knowledge and skills required for foster parents have been formulated within the program. One of the developers of this program said that the initial list of skills compiled by the experts consisted of 28,000 units. To enable foster parents successfully raise and care for children left without parental care according to their special needs, five competence categories have been distinguished (SOS bērnu ciemati Latvijā, 2018):

1. child care and protection;
2. meeting the developmental needs of children and preventing developmental delays;
3. building relationships among children and supporting their families;
4. building a safe and supportive lifelong relationship with the child;
5. cooperation or work in a professional team.

The Model Approach to Partnerships in Parenting (MAPP), developed by Linda Bailey and Heter L. Craig-Oldsen (Institute for Child Welfare, USA), is widely used in the United States.

The “Competent Caregiver of Emotionally Traumatized Children” (KETBA) has been known in Latvia since 2016. This program has been a way for caregivers to understand the effects of trauma, to care for and establish contact with children who have experienced trauma, and to help them find a way to heal. In Latvia, KETBA training is officially approved as training for foster families and adoptive parents in order to obtain foster family and adoptive parent status. The authors of the program are Jayne and David Schooler, who represent Back2Back Ministries. In Latvia, the first training of coaches took place in May 2017. It was organized by New Hope Latvia in cooperation with the Latvian Christian Alliance for Orphans. After completing the program, there is an opportunity to acquire the TBRIÆ program, which is based on the same basic principles. In cooperation with the Karyn Purvis Institute, at the beginning of 2019, this training program was translated into Latvian. The authors of the TBRIÆ training program are Dr. Karyn B.
Purvis and Dr. David R. Cross (Latvijas kristīgā alianse bāreņim, 2020). *It is important to note that in our country it is still not possible to use foreign experience without adapting it to the reality of Latvia, because the standard of living and way of life, values, habits, etc. differ too much.*

**Results**

The statistics give an idea of the care system in just one day of the year. Approximately 30,000 more children are in care in 12 months, and a similar number leave the care system to return home, move to another family member, live with new adoptive families, be subject to special guardianship or residence arrangements, or move into adulthood (The Fostering Network, 2019). Statistics for 2019 provide an overview of the foster care system (see Figure 1).

![Figure 1. The Fostering Network, 2019](image)

The authors of the study were interested in the period (in years) the research participants (foster families) had been performing their duties. This information will give a clear vision of the duration of the experience. The results showed that 3 foster families had been fulfilling their duties for 10 years, 4 foster families – 6 years, 2 foster families – 5 years, 8 foster families – 4 years, and 12 foster families – 3 years. The data are shown in Figure 2.

![Figure 2. Duration of duties performed by foster families](image)

In the context of the study, it was important to find out the readiness of foster family to deal with a number of related consequences when admitting a foster child to their
family. Since Latvia does not have its own training program for obtaining the status of foster family, but the programs are adopted from the USA, it was important for the authors to find out which training program had granted the status of foster family.

The obtained data show that 9 study participants (26% of the respondents) completed the KETBA training program in order to obtain the status of foster family, and 25 study participants (or 74%) participated in the PRIDE training program.

Due to the fact that the foster family is considered to be the most complex socio-pedagogical phenomenon, the society shows great activity in providing help and support to foster children. It should be noted that foster parents do meaningful work, which can also be challenging, as foster parents have a difficult role to play, i.e., they have to continuously learn and develop, establish communication with people that work with children, such as social workers, education specialists and health professionals.

Within the framework of the research, the authors found out the experience and opinion of the research participants about the mutual influence and interaction with foster children in bringing sustainable living experiences to life, offering a new approach to identifying the functioning of foster family pedagogy. Life experience is a special type of activity, the aim of which is to create an individual way of life and which is regulated by a system of dynamic meaning of life.

Based on the context of foster family experience, the opinions and experience of foster parents were explored by asking special questions. The results are shown in Figure 3.

<table>
<thead>
<tr>
<th></th>
<th>PRIDE – Foster family</th>
<th>KETBA – Foster family</th>
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<tbody>
<tr>
<td>1. Ability to accept a child left without parental care as he or she is</td>
<td>22</td>
<td>8</td>
</tr>
<tr>
<td>2. Foster family shall provide a healthy and safe living environment for children left without parental care</td>
<td>25</td>
<td>9</td>
</tr>
<tr>
<td>3. Foster family helps children left without parental care build their self-esteem</td>
<td>18</td>
<td>7</td>
</tr>
<tr>
<td>4. Foster family helps children left without parental care understand the loss of the biological family</td>
<td>7</td>
<td>4</td>
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<tr>
<td>5. Foster family forms a partnership with the children left without parental care and their biological family</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>6. Foster family strengthens the strengths and learns to overcome the weaknesses of children left without parental care</td>
<td>24</td>
<td>9</td>
</tr>
<tr>
<td>7. Foster family determines the strengths and weaknesses of children left without parental care</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td>8. Foster family develops communication skills of children left without parental care with their biological family</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>9. Children left without parental care know their biological family</td>
<td>12</td>
<td>4</td>
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*Figure 3. Foster family experience*
Based on the collected data (see Figure 3), foster parents experience great difficulties in communicating with their children’s biological families and in forming partnerships with children’s biological families, as well as in providing help related to the understanding of the loss of the biological family. It is difficult to require that foster parents establish and maintain contact with the children’s biological relatives. It should be acknowledged that the need for such contact is important for every foster child, as it will allow preserving the past. As the reality shows, there is still a lot of work to be done with public awareness.

The good practice of the world and also of Latvia proves that one of the main tasks of the foster family is not only to provide good care, but to ensure a safe and supportive environment for the foster child. One of the criteria for such an “environment” is that the foster child, while in the foster family, still maintains contact with important people from the past (present), such as biological parents, godparents, grandparents, sisters, brothers, neighbors, other foster families, teachers, classmates, etc., thus providing the child with the opportunity to develop both a sense of belonging and identity (Irish Foster Care Association, 2013).

The authors would like to emphasize that the aim should not be to separate children from biological parents as much as possible, but to help parents and children deal with their fears, anxieties and concerns as much as possible, to help overcome “difficult” areas in parent-child relationships. The stakeholders should work together by observing life experiences in order to achieve positive outcomes and success. Reinstatement of parental rights, return of the child to the biological family, family reunification are rather long, laborious and emotional processes for all the participants (children, parents, foster families and specialists).

Foster Children Experience from the Perspective of Foster Family Pedagogy

M. Gorina’s 12 years of experience show that a foster family means caring for, nurturing, promoting the growth and development of a child left without parental care. Examples from life help connect the acquired knowledge with real life. Foster children may not live with foster parents for a long time, but a foster family may be the only positive example they have ever had. The child’s psychological trauma encourages him or her to distrust the social environment and foster parents are often seen as a source of danger. Being aware of the foster child’s past experience, becoming a role model for someone is a real achievement. The child’s intellect, emotions, soul are saturated with real life, the personality grows in accordance with its inner program, receiving strength and gaining experience, self-confidence and trust in the surrounding world. Foster parents face key questions: “How to teach them to be happy entering the adult life?”, “How to help them find their way to the future?” Obstacles strengthen resilience and increase willpower. In the beginning, the world in which the child develops must be real, lasting, internally consistent, thus facilitating the child’s path to knowledge and love. The development environment is multidimensional and comprehensive. Outside the social environment, it is partly necessary to model the material world.

The study focuses on four foster children who have reached the age of 18 and started independent life. The life experience of foster children has developed in different circumstances and worldviews until they started to live with foster parents. For reasons of confidentiality, the real names of the study participants are not used; instead, they are replaced with fictional names.
Aina – A 14-year-old girl came to the foster family from the orphanage. She was taken away from the biological family when the girl was 6 years old. She was taken by her mother’s sister. Aina had a younger brother, but children were separated. The girl did not stay long, because her mother’s sister could not tolerate Aina’s actions – the girl used to wander and steal. Her mother’s sister gave up Aina and then the girl began changing families. In the first foster family, the girl stayed for six months, then she expressed a wish to return to the orphanage. After living in the orphanage for a year, the girl expressed a wish to live in a foster family. The authorities gave the girl the opportunity to live in a foster family. And such a scenario continued five times until the girl’s adulthood. With this lifestyle, the girl often had to change educational institutions.

During the interview with the girl, the authors intended to find out the reasons of her actions and fluctuations when changing places of residence, expressing a wish to live with foster parents, then in the orphanage. The girl explained that every time she entered a new environment, attention was paid only to her, she was in the center of attention. As soon as less attention was paid to her, she required a new environment. Of course, any child wants to be in the center of attention and is looking for ways to get it, but ways to get it for children left without parental care may not be adequate for the situation.

Richard lived in a biological family – a social risk family – for up to 14 years. The boy did not get the best experience from his parents: he stole to meet his needs (smoking, alcohol), and his lifestyle was to wander. The parents did not take care of the child and showed no interest. He came to the attention of the social service and the police after a theft made with his adult friends. The boy was removed from the biological family and he came to a crisis center, where he stayed for three months. The staff of the center found the foster family that took Richard. While living with the foster parents, Richard was allowed to spend time with his biological parents on weekends. While staying with the foster parents, everything was fine, the boy studied well, helped to do the housework, as well as good communication skills with other children and adults were developed. The mistake of the responsible institutions was that they allowed him to stay with the biological family, where the boy had a bad life experience from an early age. While staying with the biological family, the boy came to the attention of the police about serious thefts and his life experience at the age of 16 continued in a juvenile colony.

The authors found out the reasons behind Richard’s actions. The boy explained that he deliberately committed crimes to be arrested, because his life experience showed that the man was strong in prison. He gained this life experience from his adult friends, who taught him to survive. It was a strange experience that the boy had not experienced himself.

At the age of 2, the biological mother left Emil at the door of the orphanage. The boy spent his first years in the orphanage. The boy remembers from childhood how much he expected his mother to come every day, but it didn’t happen.
At the age of 4, the child was taken by the first foster family, where he lived for 6 years. Due to the fact that the foster mother’s health deteriorated significantly and she died, the foster father alone did not take responsibility for the boy and had to give up on the boy. Thus, at the age of 10 the boy was taken by the second foster family, where he also lived for 6 years. It was a difficult period both for the boy himself and for his foster parents. Emil’s academic achievement was poor, he experienced difficulties in building new relationships of trust with his foster parents, he did not understand the picture of the world and did not want to develop in it. But the years went by and the struggle with the “windmills” continued until a great conflict took place between Emil and the foster parents, where a decision was made by the foster parents to give up the boy. Thus, Emil was taken by the third foster family at the age of 16. The teenager, listening to the advice of the foster parents, enjoyed spending time together, and improved his academic achievements. The foster parents rejoiced in the boy’s determination. Already at the age of 16, he had a goal what to achieve in life and how to live beyond adulthood.

The boy shared his previous life experience. In the second foster family, the boy’s opinion was not heard, his interests were not respected, and, therefore, he started a fight against his foster parents. One could feel that the boy wanted a heartfelt conversation.

Mark was removed from the biological family at the age of 4 and he came to the orphanage. Unfortunately, the boy had to experience a bitter life experience that remained in the boy’s memory for a lifetime. In front of his eyes, his mother killed his little brother. The boy did not succeed in life, he had to gain life experience in one orphanage, then in the second, and then in the third. Shortly before reaching the age of 18, the orphanage where the boy lived was closed and he had to live with a foster family, but it was only for 45 days.

The observation shows that the boy is not ready to live in a family, he has problems communicating with other children in the family, does not understand basic things, and is not prepared for independent living. He is used to live for himself and be provided with board and lodging. There are situations that are so complex that they have robbed an individual of his or her natural ability to act, and he or she must now take into account the views of other peers. The boy is surrounded by a family environment, in which he has never been and has not gained experience. There is a popular perception in society that children raised in orphanages are potential criminals and simply antisocial citizens; this manifests itself as an antisocial lifestyle. They do not develop into a viable citizen. And statistics often confirm this, which is why children today violate laws, moral norms and rules. Behind every child left without parental care there is an individual case and a person.

The study has provided a theoretical analysis, experience and debate on how to help foster children not only obtain education, but also continue their development throughout their lives without losing their family environment, which is considered natural. This is the issue that foster family pedagogy needs to address.
Finding out the experience and opinion of the research participants about the mutual influence and interaction in the implementation of sustainable living experience, the authors of the study offer to get acquainted with the developed model, which reflects the problem, by identifying a number of tasks that can be performed in real life. The model indicates the importance of arranging problems according to the increasing level of complexity. The model uses five principles of effective pedagogical planning, the observance of which will allow achieving the highest results (see Figure 4).

![Figure 4. Five principles of effective pedagogical planning](image)

In the structure of modern scientific knowledge, methodological problems are increasingly growing, gaining the importance of understanding the global changes in the life of children and society. The situation is exacerbated by the fact that the methodological search for social pedagogy coincides with the change in the general methodological paradigm of modern science. Currently, in education and science the essence of pedagogy mission is understood narrowly or even almost lost. Mission-oriented pedagogy science has always, since the emergence of the science, been tended towards a broader understanding of the world (Salite, 2015, p. 27). The essence of the new methodology is that it is believed that the world has lost the usual order – probability with an unpredictable future.

As a result, the child’s relationship with the world becomes irregular. The child develops under pressure, and under unclear circumstances he or she needs to respond to change and instability. In today’s social and educational field, science needs a system of methodological principles that would preserve the pedagogical essence of the social phenomenon in the center of attention.

The theory of foster family pedagogy should include: social education, educational space, environmental pedagogy, personality-oriented education, which would allow specifying the general model of foster family activity. A foster family has a huge advantage if it is set up for short-term help, for a specific situation, under certain conditions, for solving problems, and if it does not destroy the child’s relationship with the biological family.
Discussion and Conclusions

The idea of evolution is mutual developmental relationship: the world of children and the world of adults. Children are indicators of shared values. As Laszlo emphasizes, people need to change their views and vision about their role in the environment and about the role of the environment in their lives (Laszlo, 2008). Like mirrors, children reflect the culture of adults. A foster parent is one who can expand this influence with the help of his or her family, personality, find new approaches and a role for the foster child in society. The mission of foster family pedagogy is crucial for education and education for sustainable development, based on values that will form the basis of moral education and help get to know oneself and others better. It follows that if a child left without parental care is included in the family environment at an early age, then the child has the opportunity to learn wisdom from the life experience of foster parents.

As the foster family is considered to be the most complex socio-pedagogical phenomenon, the main goal of the study has been to understand the experience of foster parents and find out their opinions about the mutual influence and interaction for bringing to life a sustainable life experience. According to the results of the research, nine foster families participating in the study completed the KETBA training program and 25 foster families participated in the PRIDE training program in order to obtain the foster family status. It can be concluded that the PRIDE training program for foster families is being successfully implemented in Latvia.

It follows that the training programs for foster families that are being implemented in Latvia have been developed by social agencies, which provide services in raising the consumer generation; therefore, a problem can be seen in connection with the fact that foster family training programs are not related to pedagogy. At present, the process of globalization and the changeability of environment require the society to ensure sustainability for itself and its lifewide environment (Katane et al., 2015, p. 50). The sustainable development of society depends on the core principles of re-examination that underpin current social and cultural systems, including the principles of a holistic approach, as well as on questioning such principles in relation to individuality (Badjanova & Ilisko, 2015, p. 133). The authors of the present study emphasize that the Latvian society should look for its own new perspectives, methods and directions for the implementation of foster family pedagogy in the society.

Another important factor to address the issue of foster family pedagogy is the readiness of foster parents to carry out the mission of foster care activities. Foster parents need to understand the diversity of different situations. The research has demonstrated that foster parents experience difficulties in communicating with their children’s biological families and in forming partnerships with children’s biological families, as well as in providing help related to the understanding of the loss of the biological family. Social exclusion is another salient example of such alienated frame of reference which effectively dominates and shapes public thinking, and exacerbates unsustainable tendencies in modern society (Gedžūne, 2015, p. 95).

The interaction of foster parents and foster children in bringing life experience to life indicates that everything depends on the child’s previous life experience. It sounds strange, but the child’s future is determined by his or her past. In his/her mind, unconsciously rationalized memories of the past make it impossible to form a future life perspective.
The intellectual and cognitive activity of once rejected children, who are in an emotionally unfavorable situation, decreases. There is little left in their lives that they can change or influence themselves.

The phenomenological approach provides an opportunity to understand the inner world of the foster child and foster parents, by touching on their experience, trusting their independent conclusions and explanations, revealing the deep meanings and values of choice.

The foster family as an innovative and constantly changing social and pedagogical phenomenon is an interesting object of pedagogical research and is awaiting for new scientific conclusions on the improvement of its practical activities. The foster family phenomenon should be understood scientifically and the laws and models of existence should be transferred to the category of the phenomenon.

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Personal Sustainability and Sustainable Employability: Perspective of Vocational Education Students

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Abstract
Sustainability is related to diverse relationships that exist in the world as well as to the attitudes evolving in a person’s diverse life activities, including education and work. In the sustainable employability model, there is a pedagogical idea of experience and self-identity and individual values revealing the level of personal sustainability. The present study explores vocational education students’ personal sustainability as a predictor to sustainable employability in the future. The study involved 151 vocational education students’ self-assessment of valuable (sustainable) personal characteristics, their attitude to being honest, helpful and responsible. The results have shown that the most valuable self-characteristics are being good tempered, helpful and kind. Students’ attitudes to being responsible and honest change during school years — 1st and 2nd year students do not consider them important values but senior students acknowledge them. It means that their lived experiences have promoted personal sustainability development ensuring more sustainable employability in the future.

Key words: employability, sustainability, values, vocational education

Introduction
The issue of employability has become relevant in the 21st century and has both global and local features indicating the current unsustainability of employability. Due to global tendencies, the direction of unsustainable development and education towards the multiplication of unsustainable patterns of behavior was recognized in the January 2011 Document of the United Nations Economic and Social Commission “Learning for the Future: Competences in Education for Sustainable Development”. Education for sustainable development was intensively addressed on a global scale, started in 2000 during the preparatory phase of the Decade of Education for Sustainable Development (2000–2005), continued in the first Decade of Education for Sustainable Development (2005–2015), and Sustainable Goals (SGs) in the achievement phase (2015–2020). The topic of sustainability is still relevant as it is currently being addressed in the next phase of the Global Decade through the implementation of Education 2030 for education for...
sustainable development. Despite transformations during the past 20 years and the start of Anthropocene era, at the beginning of the second decade of sustainable education, there is a conviction that sustainability makes education and economic relations more successful and of better quality (Fedosejeva et al., 2018). Anthropocene is commonly used as a framework for metaphysical and ontological explanation of unsustainability in society, science, and education (Pipere, 2019).

It has become obvious that sustainability can be linked to diverse relationships that exist in the world and to the attitudes evolving in a person’s diverse life activities and experiences. Thus, sustainability competences are related to sustainable employability, which is a complex phenomenon with the nature of wicked problems and can be addressed through action and the interest of participants to improve it and cannot be solved completely and definitively (Salote et al., 2016).

Employment research uses different perspectives based on different approaches to explaining employment and using research perspectives. Often they have the nature of a ‘piecemeal approach’, there may be different aims of the study not addressing the perpetrator’s attitudes or relationships having employers’ goals for competition or different detailed questions. This diversity also exists in the field of education and in the choice of research design, and it also appears in education as differently understood perspectives, which can be seen as unsustainable. Sustainable employability is one of today’s complex problems viewed by the pedagogy from a broader perspective of open participation, assessing the real individual experiences, emotions and attitudes of students and the relationship with a degree of sustainability achieved in society. The previously mentioned ideas are revealed in articles of the Journal of Teacher Education for Sustainability (JTES). The Journal aims at facilitating the open discussion, the evaluation, integration and synthesis of participants’ experiences in recognizing and conceptualizing practical and theoretical concepts (Salite et al., 2020). The content of JTES demonstrates the need of all education-related studies to maintain the context of sustainability and the idea of seeking a more holistic perspective in educational research (Salite et al., 2018).

Today, employers increasingly expect their employees to have general soft skills rather than specific and narrow skills, and this is what enables an individual to successfully adapt to the demands of a changing labor market and implement the idea of sustainable employment. Graduates who after graduation work in their field and are satisfied with their work will make a greater contribution to the country’s economic development. One of the reasons why many drop out of school and are unable to get used to their work environment is related to the individual’s value system and personality characteristics.

Vocational school graduates should gain employment as they have been equipped with skills that urge them towards work independence and readiness; hence, vocational school is seen as a solution to reduce unemployment (Tentama & Abdillah, 2019). However, the reality in the field shows that vocational school graduates are one of the most significant contributors to unemployment in Latvia despite the fact that they are highly demanded in the national labor market. Data from the Central Statistics Agency in 2020 showed that most unemployed people (30.9 %) have secondary vocational or basic vocational education. There are several possible explanations for this fact: students’ professional skills are low and do not correspond to the employers’ requirements, people who graduated from vocational secondary education programs several years ago do
not have up-to-date skills and knowledge that correspond to quickly changing requirements of a definite profession. There are several studies that examined the correlation between different personality characteristics and career success (Stoll et al., 2020). The authors of the paper will study the correlation between sustainability of individual personality characteristics and value system as a predictor of students’ sustainable employability in the future.

The aim of the study is to identify and describe the vocational education students’ personal sustainability as a predictor to sustainable employability in the future.

Theoretical Background

Personal Sustainability

Personal sustainability is concerned with the human being, the personal, intrapersonal, mental and perception patterns, thoughts, emotions, habits, the subjective body and self-conception that are closely related to unsustainable or sustainable development. Personal sustainability explores the ability to live in a way that is sustainable for oneself and surroundings. It includes a qualitative view of inner situation of a person, the inner conditions shaping their lived experiences, their perception and their scope of actions (Parodi & Tamm, 2018).

Similar ideas are described in the study on emotional competence in the ESD system as one of the main factors of development of professional and personal life of a person. The generalized concept of competence encompasses social meanings that appear and function in society, ensure the normal functioning of a man and the interaction of people with each other in such a society (Suleimenova & Ivanova, 2018).

Sustainable Employability

The concept of sustainable employability has been used in the scientific literature before and it has been studied from the point of view of employer, employee, career education, economics, and health sector (Brouwers et al., 2015; Fleuren et al., 2016; Singhal, 2019). Sustainable employability can be defined as an employee’s capability to participate in present and future jobs while preserving good health and well-being as well as the necessary conditions for this to occur (Van der Klink et al., 2016). The proposed study views sustainable employability in the context of pedagogy as an open phenomenon with a dynamic, adaptive evolving nature depending on the relationship between the degree of sustainability achieved in society and the ways in which it is maintained in diverse real individual activities. Sustainable employability will be defined as a complex phenomenon that also manifests itself in economic, social, cultural and environmental activities. At the heart of the sustainable employability model, there will be a pedagogical idea of experience and self-identity, which will be related to the formation of an individual evolving prototype based on one’s own and others’ life experience. Integration or synthesis of experience and self-identity influences changes in development in order to achieve sustainable employability.
Research Design

Instrument

The authors suppose that personal sustainability can be manifested through an individual’s self-assessment of valuable (sustainable) personal characteristics, their attitude to being honest, helpful and responsive as guiding principles to sustainable development, including sustainable employability. Relying on these assumptions, the authors developed a survey consisting of open-ended questions. The self-study of the individual students’ experience and self-evaluation ensure the acquisition of quality data. The data collected were analyzed using a content analysis.

Sample

The study involved students of vocational school, because while studying at a vocational institution the individual makes decisions that greatly affect his or her entire future career. It is important for the student to be able to make informed decisions that are in line with his or her inner nature and are not influenced by the views of other people and society. This will ensure the well-being of students and better integration into society.

The research took place in autumn 2020, in the first semester of 2020/2021 academic year and participation in this research was voluntary. The students (N=151) from a vocational education institution in Latvia participated in the study. The information about the sample is summarized in Table 1.

<table>
<thead>
<tr>
<th>Socio-Demographic Information on the Research Sample of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-demographic information</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Boys</td>
</tr>
<tr>
<td>Girls</td>
</tr>
<tr>
<td>Year of study</td>
</tr>
<tr>
<td>1st year</td>
</tr>
<tr>
<td>2nd year</td>
</tr>
<tr>
<td>3rd year</td>
</tr>
<tr>
<td>4th year</td>
</tr>
<tr>
<td>Part-time student</td>
</tr>
</tbody>
</table>

As Table 1 demonstrates, the number of boys and girls is almost evenly distributed. Most of the students who took part in the research were 1st and 2nd year students (16–17-year olds), and part-time students were mostly adults who already had secondary education. Further in the paper, 4th year students and part-time students will be considered respondents of one group because they are adults and most of them have already some work experience. Vocational secondary education in Latvia (4 years of studies) leads to a diploma of vocational secondary education and professional qualification, and a certificate of general secondary education (EQF level 4). The latter document is awarded for passing four state centralized examinations, and it grants access to higher education. The ratio between theory and practice is 50:50. Most of vocational education institutions in Latvia also offer vocational secondary education to acquire professional skills for labor market (duration of studies from 1.5 to 3 years) to individuals who have general secondary education. Upon completing studies, a diploma of vocational secondary education (EQF level 4) is awarded.
Results

The study participants were asked to name three most valuable personal characteristics in their opinion. The authors divided the characteristics into five categories:

1) Personality traits (e.g., good tempered, kind, calm, patient);
2) Relations to others (e.g., helpful, honest, friendly, responsible, communicative);
3) Appearance/abilities (e.g., sporty, creative, hardworking);
4) Cognitive skills (e.g., clever);
5) General (e.g., good).

The results are summarized in Figure 1.

![Figure 1. Students’ most valuable personal characteristics](image)

The 1st year students’ most valuable personal characteristics were mainly related to personality traits: good tempered (n=7), kind (n=3) and relations with others: helpful (n=4), honest (n=3). Only three students, as their most valuable characteristics, considered being clever. Most of the 2nd year students value characteristics that can help them build good relations with others: honest (n=6), helpful (n=5), understanding (n=4), responsible (n=4). The mentioned valuable personality traits were similar with 1st year students: good tempered (n=8) and kind (n=6). The 3rd year students (only 15 students took part in the study) mentioned characteristics describing their appearance (e.g., sporty), personality trait – being kind and responsive that refer to the category – relations with others. The 4th year students (incl., part-time students) mainly emphasized such characteristics as good-tempered (n=6), honest (n=4), unique (n=4) and clever (n=4). Some students did not answer this question or their answers were not relevant.

The study participants were also asked about keeping their promises; the results are summarized in Table 2.

The results show that 27% of the students who participated in the study did not keep their promises, almost equal number of students (25%) answered that it would depend on a situation and 48% of the students admitted that they kept their promises. It is important to note that most of the students who do not keep their promises are 1st and 2nd year students who mainly associate this question with promises given to their teachers.
about doing homework, writing a test, etc. As an excuse for not keeping the promise they often mentioned that they simply forgot it. 3\textsuperscript{rd} and 4\textsuperscript{th} year students were more responsible and they admitted their liability to other people; some of the students wrote that they did not promise anything if they were not sure they would be able to keep it.

Table 2

\textit{Students’ Answers to the Question: “Do you Always Keep your Promises?”}

<table>
<thead>
<tr>
<th>Study year</th>
<th>Keep promises</th>
<th>Sometimes keep promises</th>
<th>Do not keep promises</th>
</tr>
</thead>
<tbody>
<tr>
<td>1\textsuperscript{st} year</td>
<td>18</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>2\textsuperscript{nd} year</td>
<td>12</td>
<td>17</td>
<td>26</td>
</tr>
<tr>
<td>3\textsuperscript{rd} year</td>
<td>10</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4\textsuperscript{th} year/part-time</td>
<td>29</td>
<td>5</td>
<td>–</td>
</tr>
</tbody>
</table>

Being helpful was one of the characteristics the students mentioned as their best personality traits and answering the question: “Do you help others?”, most of the students (78\%) gave an affirmative answer, while 22\% of the students answered that it would depend on a situation.

Table 3

\textit{Students’ Answers to the Question: “Do you Help Others?”}

<table>
<thead>
<tr>
<th>Study year</th>
<th>Help</th>
<th>Sometimes help/ depends on a situation</th>
<th>Do not help</th>
</tr>
</thead>
<tbody>
<tr>
<td>1\textsuperscript{st} year</td>
<td>34</td>
<td>10</td>
<td>–</td>
</tr>
<tr>
<td>2\textsuperscript{nd} year</td>
<td>43</td>
<td>12</td>
<td>–</td>
</tr>
<tr>
<td>3\textsuperscript{rd} year</td>
<td>11</td>
<td>4</td>
<td>–</td>
</tr>
<tr>
<td>4\textsuperscript{th} year/part-time</td>
<td>31</td>
<td>3</td>
<td>–</td>
</tr>
</tbody>
</table>

Analyzing the answers, we can also identify the difference according to the study year – 1\textsuperscript{st} and 2\textsuperscript{nd} year students as an example of helping others mentioned helping groupmates with homework, helping parents, teachers but senior students mentioned helping unknown people, helping animal shelters and charity organizations.

Honesty is one of the highly valued characteristics in personal relationship and it is also important in the work environment. The students who participated in the study seemed to understand it because most of them answered that they were honest (73\%) and 27\% of the students tried to be honest but it depended on a situation, e.g., they were lying because they did not want to hurt somebody.

Table 4

\textit{Students’ Answers to the Question: “Are you Honest?”}

<table>
<thead>
<tr>
<th>Study year</th>
<th>Honest</th>
<th>Depends on a situation</th>
<th>Not honest</th>
</tr>
</thead>
<tbody>
<tr>
<td>1\textsuperscript{st} year</td>
<td>31</td>
<td>13</td>
<td>–</td>
</tr>
<tr>
<td>2\textsuperscript{nd} year</td>
<td>40</td>
<td>15</td>
<td>–</td>
</tr>
<tr>
<td>3\textsuperscript{rd} year</td>
<td>10</td>
<td>5</td>
<td>–</td>
</tr>
<tr>
<td>4\textsuperscript{th} year/part-time</td>
<td>30</td>
<td>4</td>
<td>–</td>
</tr>
</tbody>
</table>

The analysis of the students’ answers did not reveal significant differences according to the respondents’ study year.
Discussion and Conclusions

The study emphasized the relationship between vocational education students’ personal sustainability and sustainable employability in the future. Personal sustainability was explained on the basis of students’ self-assessment and attitude towards certain values: honesty, responsibility and helpfulness. As we know, values are imposed from our family in childhood and reinforced through culture and life experiences, incl. education. This means that, indirectly, the research also provides an insight into the work of vocational education teachers and others involved.

The results show that the most valuable self-characteristics are being good tempered, helpful and kind. The students involved in the study emphasize personal qualities that help a person be in harmony with themselves and others. Only a few of the participants of the study emphasized some of their external talents, abilities or appearance characteristics, which would allow them to stand out; in general, students’ self-assessments could be assessed as modest.

It is important to emphasize that students’ attitudes to being responsible and honest change during school years – 1st and 2nd year students do not consider them as important values but senior students acknowledge them. This means that the life experience gained (incl., education) has led to the reassessment of several things and the improvement of the internal value system, which is more appropriate for sustainable development. In the process of sustainable development, reflection over personal values is important. The youth needs to clarify their own values in the process in order to challenge the prevailing norms leading to unsustainability. Education has to offer opportunities for value discussions among the students in order to clarify different sets of values, ethics and morals (Hofman-Bergholm, 2018). The students’ self-assessment method used in the study can be integrated in education because it enhances the ability to adequately evaluate oneself and others, build a strong relationship in which, on the one hand, everyone takes on the responsibilities that are most suitable for him/her, on the other hand, others see an individual’s capabilities, entrust him/her with the most appropriate responsibilities (Salite et al., 2016).

Sustainable personal development, based on the values of sustainable development, ensures the individual’s positive relationship with others in the long run, greater satisfaction with his/her life, including work, promoting sustainable employability. We can conclude that promoting a student’s sustainable personal development, we ensure successful integration in the labor market, which is one of the basic tasks of vocational education.

References


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Spaced E-learning for Sustainable Education

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Abstract
The objective of the research is to determine e-learning solutions for the implementation of the spaced learning in university students’ sustainable education. In the spaced e-learning method, the course content includes few-minute pauses between repetitions, during which students let their brain “rest” with different content and then return to the course. Information technology solutions are based on the identification of students’ individual and situational interests and the following promotion of students’ interests for personal development by the content of spaces. Current research is oriented to the search for benefits from synergy of the technological and pedagogical e-learning developments.

The study includes three cycles of education action research. The first and second cycles aim at finding the most effective method to include content for sustainable personality development in the course. At Riga Technical University, a prototype of two blended learning Master level courses was created and apprrobed with Master level students. Outcomes of the research were evaluated by reflection on students’ opinions and analysis of user behavior data in the e-learning environment OpenEdX.

The results obtained in the first and second cycles of the action research and reflection are the basis for the conceptual development of the Living Lab solution in the MOODLE environment with personalized content. Technological solutions for the implementation of personalized content of spaces for personality development are based on the student’s self-assessment of his/her individual interests. The research shows the potential of the spaced e-learning for instructional learning and personality development, thus leading to learning for sustainability in the broadest sense as a perspective of pedagogy with inherently sustainable nature, that we denote as “fostering” in the study.

The spaced e-learning method was seriously influenced by the COVID-19 crisis due to the replacement of blended learning with fully online learning.

Key words: e-learning, fostering, spaced learning, sustainable education

Introduction
Human-induced changes in the global ecosystem require a deeper understanding of humans as part of it. COVID19 crisis shows serious deformities in the comprehension of the interaction of human beings with the other species. Ongoing changes in society give way to the possibility to re-think and develop serious movements for a sustainable
lifestyle in the deepest understanding of it. Human-made deformations currently lead to comprehensive unsustainability. I. Salite et al. (Salite, Fjodorova, Meihami, et al., 2020) emphasize human-nature relationships and human attitudes as reasons for unsustainability and relevance of understanding of transdisciplinary nature of unsustainability and sustainability as well. The authors identify anthropocentrism as a fundamental basis for individual and global behavior that leads to unsustainability in the relationships between humans and nature. On the other hand, anthropocentrism leads to a “decline in interest among researchers concerning adaptive management approaches, deep ecology, egocentrism, and more holistic perspectives on sustainability”. The authors make the assumption that COVID19 should be the last chance for the implementation of the “human education through nature”. The floods of technology that are taking over the world make this solution particularly challenging.

Sustainability consumption strongly correlates with the latest developments in the European Union policies. Several regulations and initiatives are aimed at environment-friendly behavior of the people on all levels – starting from personal attitudes up to the performance of global companies. “Promoting collaboration among higher education institutions, research organizations and companies on climate change, creation of a competence framework to help develop and assess knowledge, skills and attitudes on climate change and sustainable development” and similar measures are determined by the Green Deal Action Plan (European Commission, 2019). It is not visible that understanding of sustainable education is identified as the reason for most of the ecological disturbances. We assume that facing the deep ecosystemic development of individuals is an essential source for changes in our relationship with nature. In our study we use personality fostering concept to distinguish development in the broadest sense as a perspective of pedagogy with inherently sustainable nature.

Changes in the comprehension of relationships between mankind and the environment give way to serious changes in the vision of education. Professor H. Tuman in an interview with E. Veidemane (Veidemane, 2020) emphasizes the riskiness of the presence of false values in the concept of competence education, which leads to unsustainability of education in the broadest sense. Replacement of deep understanding and comprehension with mystic “competencies” ruins the ability to analyze and generalize, see interconnections and thus to think independently. H.Tuman realizes that the goal of European classical education was a comprehensively developed person, a personality, not only a small gear-wheel in the social mechanism (Veidemane, 2020).

To promote the sustainability of education, in addition to teaching and collaboration of the learners’ schools, a vision emerges – the fostering of “active, creative and honest students who need to learn and acquire competencies necessary in a modern changing society, while taking individual needs and abilities into account” (Valackienë & Kairiene, 2019). The authors of the study realize the school’s predisposition to changes determined by self-definition as a cooperating and learning entity. Several studies emphasize the implementation of action research-based instruction not only as a method to improve knowledge acquisition, but also to increase both the teachers’ and learners’ sustainability outcomes (Meesuk, Sramoon, & Wongrugsa, 2020). Action research is identified as an approach to recognition of the unsustainability of humans’ actions, increasing with the changes in lifestyle of humans during the past decades of the 20th century and nowadays as well. Transdisciplinary action research allows deepening the understanding of “the links with the environment, perception, undifferentiated identity, sustainable and self-
generating prototype formation in the ecological sustainability relationship between
the person and nature” (Salite, Fjodorova, Illisko, et al., 2020).

The vision of the contemporary school is based on the attitude to each learner as a
personality, taking into account individual needs, abilities, putting individual interests
at the heart of knowledge acquisition. If we do not see students as passive accumulators
of knowledge, the development of personalities is possible only by the mutual relationship
between an active school and an active student (Valackiene & Kairiene, 2019). The
transition to online learning makes this relationship a particular challenge. In the case
of e-learning, design of the learning management system (LMS) represents the activity
of the school.

The rapid development of information technologies over the past decades gives the
insidious impression of human omnipotence and the possibility to ignore the needs of
the ecosystem. Salite, Fjodorova, Illisko, et al. (2020) emphasize the decrease of the
research beyond anthropocentrism, posing new challenges for ESD research within this
decade. In such conditions, it is highly challenging for e-learning technology researchers
to follow the sustainability requirements of society and nature. Most of the research
deals with technological solutions for the delivery of information by the personalized
solutions in order to adapt the learning process to the needs of the individual. Such an
approach takes into account different aspects of the personality – the learning style
(Truong, 2016; Feldman, Monteserin, & Amandi, 2015), the interests (Walkington,
2013) or the emotional state of the learner (Zagorskis, Kapingieks, & Gorbunovs, 2019).
Such solutions are oriented towards the acquisition of knowledge, skills and competencies,
without paying much attention to the development of the student’s personality
and attitude towards human relations with the environment and nature.

To develop solutions towards sustainable education in an e-learning environment,
it is necessary to create technological and pedagogical solutions for the e-learning environ-
ment that, in parallel with the effective acquisition of knowledge and skills, ensure
formation of attitudes towards nature and understanding of people as a fundamental
unit of the natural world. The current study aims at understanding an increase of the
sustainable education value by the synergy of the pedagogical and technological solutions
compared to pedagogical and technological aspects taken separately.

Spaced E-learning for Sustainable Personality

It is well known that repeating knowledge improves its acquisition and retention in
memory. The first findings about the spacing effect were published in the book “Über
das Gedächtnis: Untersuchungen zur experimentellen Psychologie” (“Memory: A contri-
bution to experimental psychology”) by German psychologist Hermann Ebbinghaus in
1885. The spaced approach included the first repetition after one hour, the second one
after five hours, the third one after one day, the fourth after three days, and so on ... until
finally the tenth repetition after about eight months. The method was compared with
mass repetition – repeating ten times consecutively. It was found that the spaced learning
method was more effective than the mass repetition approach (Ebbinghaus, 1885).

Spaced learning was successfully used to deliver a science course much more efficiently
than using conventional learning. That allowed students to achieve well in high-stakes
testing. Figure 1 shows a comparison of the normal forgetting curve and the forgetting
curve in the case of spaced learning.
Spaced learning is a learning method in which the learning content is repeated several times, with breaks of ten to fifteen minutes during which distractor activities such as physical activities are performed by the learners. Spaced learning is based on a discovery about the brain functionality that was published in 2005 by R. Douglas Fields in Scientific American (Fields, 2005). Fields used a “temporal code” in his experiments, which was developed into a learning method for creating long-term memories by P. Kelley (Kelley, 2007).

The methodology of knowledge retention by the spaced learning method is based on neuroscience findings (Roediger & Karpicke, 2006; Poldrack, 2010; Roffman et al., 2016), but the key question is the efficiency and methodology of the implementation of the spaced learning method in the case of different epistemological pedagogical approaches, cognitive theories and learning theories. According to the Atkinson-Shiffrin model (Atkinson & Shiffrin, 1968), at the beginning of the learning process information is processed by the sensory memory – something is perceived through the senses, such as sight, hearing, sensations. Then, it is transferred to the short-term memory or forgotten, depending on how much attention this information has been given to. From the short-term memory, information is encoded into the long-term memory or forgotten, if encoding is not carried out. Continued rehearsal of information strengthens the memory trace and prevents forgetting.

There are several cases of implementing the spaced approach in e-learning. W. Klemm developed (Klemm, 2012) the short-spaced e-learning method for improvement of the retention of information. W. Klemm’s proposal for the design of the spaced e-learning process is based on the research of Kelley and Whatson (Kelley & Whatson, 2013) (Figure 2).

Experiments by Kelley and Whatson showed that this type of spaced learning was optimal for encoding information and for the activation of genes needed to form long-term memory (Kelley & Whatson, 2013). As shown in Figure 3, spaces between study periods are short. It is essential that the delivered learning content for repetitions would be in different forms: text, graphics, video, interactive objects, examples, educational games.

Figure 1. Comparison of the normal and spaced learning forgetting curves (Quinn, 2011)
Development of the methodology by integration of the spaced learning pedagogical benefits with technological solutions in the e-learning environment creates the opportunity to add value to the educational process in two ways: (1) decreasing the total learning time and (2) students’ involvement in the development of their individual interests, thus facilitating the transition from unsustainable to sustainable education.

**Interests as the Facilitator of Personality Development**

Spaced learning is a powerful method for improving the acquisition and comprehension of knowledge. On the other hand, this approach could be used to motivate learners for sustainability-oriented fostering of the individual. If the content of spaces attracts attention in an exciting way, it leads to deeper interest in the topics oriented to a sustainable worldview. To reach the goal, the content will be closely linked to the learner’s interest and it must motivate deeper studies of the topic. Early scientific inquiry of the role of interest in learning started with Dewey’s thoughts (Dewey, 1966). A. Krapp (Krapp, 1999) assumed that an object of interests could be referred to the content of cognitively represented life-space: concrete things, a topic, a subject matter, an abstract idea, or others. The authors consider interest to specify intrinsic learning motivation. Situational interestingness and motivational effect (long-lasting preference for a certain topic) can be increased by attractive elements. According to Krapp, situational interest can be actualized by the characteristics of a person and the characteristics of the learning context (Krapp, 1999). I. Korsun studied the dynamics of formation of the learners’ interest in physics in the context of sustainability education (Korsun, 2017). His method is based on the following scheme: curiosity — active curiosity — attempts to understand — strong knowledge — scientific research. The first step of development starts from the situational interest in the topic. The individual’s curiosity about the topic will be characterized by his/her self-evaluated interest or situational interest. Interest is based on prior knowledge and the experience of the individual. It could be a source of powerful motivation for the next step — active curiosity, leading to attempts for a deeper understanding of things. This is the way for a holistic understanding of processes in nature, leading to a transdisciplinary understanding of the world as the basis for sustainable education. Strong knowledge “is associated with volitional efforts of learners and application of knowledge in practice” (Korsun, 2017). Figure 3 shows a flowchart for sustainable fostering of the personality by the spaced e-learning method.
Personalization of the spaced e-learning in accordance with the learner’s interest is a starting point for the creation of active curiosity to holistic comprehension and the desire for deeper knowledge. Such considerations are taken into account when we design the spaced e-learning environment.

**Spaced E-learning Action Research**

Educational action research is based on J. Dewey’s philosophy, created at the end of the 19th century (Dewey, 1966). The action research (AR) approach corresponds to the e-learning challenges of today – a motivation of all involved participants, i.e., students, educators, and researchers. Dewey’s philosophy is shown as the prerequisite for designing the contemporary educational tools, emphasizing the development of the personality, personalization and student-centeredness on knowledge acquisition (J. Kapenieks & Salite, 2012).

Research of spaced e-learning is organized as three AR cycles, shown in Figure 4. Two cycles consist of the following steps:

1. **Planning** of the implementation of the spaced e-learning in the course(s).
2. **Implementation** of the method in the e-learning environment design and the e-learning process.
3. **Observing** outcomes of the e-learning process:
   - Collecting data on the students’ opinions on the spaced e-learning;
   - Collecting users’ behavior data in the e-learning environment;
   - Analyzing and evaluating the results of the implementation of the method;
   - Taking into account the opinions of other researchers (networking, mobility).
4. **Reflecting** on the improvements of the method and the improvements in the technological solution.
The second educational AR cycle includes the planning of the implementation of advanced solutions, based on the experience and reflection on the first AR cycle.

In the current study, AR provides an opportunity to experience the transition from an unsustainable to a sustainable learning process. Analysis of the experience from the integration of the pedagogical approach with a technological solution allows taking decision on the most appropriate solutions for personalization of the content of spaces for development of learners’ personality.

The first and second AR cycles include the implementation of the first prototype of the spaced e-learning methodology in the Master level courses in the blended learning in OpenEdX e-learning environment, followed by the observation, collecting learners’ behavior data, gaining experience, and reflecting for improvement of the methodology for the next cycle.

Planning of the third AR cycle is based on the reflection of the outcomes of the first and second cycles. The third cycle includes the creation of an advanced information system for personalization of the content of spaces in the learning management system (LMS) Moodle. The third action research cycle is Living Lab for testing the effectiveness of the method.

**Methodology for Implementation of Sustainable Spaced E-learning**

Blended learning in the first and second action research cycles was implemented as discussion in the classroom on the content and exercises acquired in the e-learning environment OpenEdX. The introduction to each section of the course was performed as face-to-face lessons. Classroom presentations of the tasks and discussions were given in face-to-face lessons as well. In the face-to-face classes, the lecturer assessed the knowledge and skills of the students. During COVID-19 restrictions in the second action research cycle, face-to-face lectures were replaced by online seminars in the ZOOM app.

The spaced e-learning course was embedded in the MOOC (Massive Online Open Courses) type e-learning environment OpenEdX. T. Bates (Bates, 2018) assumes that primarily MOOCs aim at the automation of all interactions between the educator and learners. The teaching model focusses on the high-quality transmission of information and computer-based knowledge assessment for feedback from students. The spaced e-learning method aims at achieving the challenging goal – to design the MOOCs type e-learning environment for the development of the learner’s personality simultaneously with the improvement of instructional acquisition of the course content, leading to the sustainability goals of learning.

The choice of the content of spaces is most challenging for personalization of the course acquisition and information system design. The first prototype of the spaced e-learning for the Master level 1st year students of Riga Technical University was created by the lecturer. There were the following types of content implemented in the OpenEdX LMS:

1. “Space” without offered content;
2. “Space” with YouTube music video;
3. “Space” with YouTube video about attractive adventures and events;
4. “Space” with YouTube beautiful nature video;
5. “Space” with easy-to-understand additional course material video;
6. “Space” with talking head on an easy-to-understand attractive topic;
7. “Space” with optional additional material on the subject of the course.
At the beginning of the course, the students’ interests are identified by means of a poll in the Google form application. Each section (week) of the course consists of the following stages:

1. An introductory face-to-face lesson on the topic, engaging the students and motivating them to implement active spaced learning with regard to the learning of theory;
2. Quiz for identification of the students’ preliminary knowledge of the chapter topic.
3. Unit(s) of theory in different forms of presentation, content of spaces, activation examples, quizzes.
4. Quiz – diagnostic of the acquired knowledge.

Each unit represents some elements of knowledge essential for acquiring the knowledge and skills of the section topic. The conceptual structure of the course unit is shown in Figure 5.

![Figure 5. The conceptual structure of the course unit](image)

Spaces are inclusions of engaging content in the course content in the OpenEdX e-learning environment. The length of the spaces is from 4 to 15 minutes, depending on the content.

After the first action research cycle, students’ opinions and the lecturer’s experience with the design were taken into account. In the second AR cycle, the content of spaces recommended by the lecturer was replaced by the content created or recommended by students. Each student created five to ten minutes of engaging multimedia content, mirroring his/her personal interests on a topic of his/her choice. It is recommended that the theme is related to sustainability. Experience showed that most students were interested in nature and environmental sustainability and preservation issues, which became the topics of their materials. Such topics were “Archives of Latvian Folklore”, “Hillforts in Latvia”, “Interpretation of Folklore Archive Materials”, “Portugal”, “The Latgalian Culture – Between Tradition and Modernity”, “Otters” and others. Some students recommended content on the exciting use of information technologies (“The Brave New World of Artificial Intelligence”) or topics linked to the subject of learning (“Video Editing and Recreating”). YouTube video or Prezi presentations are the most popular forms for delivery of the engaging content.

Outcomes of the Research during the First and Second Cycles

During the first action research cycle, the spaced e-learning method was implemented in two blended learning Master level courses for students of Digital Humanities program in the first and second semesters of 2018/2019 and 2019/2020 academic years. Spaced e-learning was implemented in the MOOC type e-learning environment OpenEdX design of Natural Science Modeling and E-pedagogy courses. The study course “Natural Science Modeling” was acquired by 14 and 20 students, respectively, and the study course
“E-pedagogy” was acquired by 13 and 17 students, respectively. In 2019/2020 academic year, the study course “E-pedagogy” was seriously affected by the COVID-19 crisis, and the course was made fully available online as ZOOM online webinars, conducting theory acquisition in OpenEdX.

There were several essential questions during the implementation of the spaced learning in the e-learning environment:

1. Should the spaces be compulsory or can the student use them voluntarily?
2. What content of spaces do students prefer?

Most students (73%) preferred to exercise voluntarily spaces in between repetitions of the course content units in different forms after the first cycle of AR. They considered such a method to be more effective. Only 28% of the students did not oppose mandatory spaces in the course content.

91% of the students claimed to have “sometimes” taken breaks during the course and only nine percent of them acknowledged that they had not taken any spaces during acquisition of course content in the e-environment.

If the content of the space is exciting and takes a long watch time, there is a risk that students will be distracted from the course content. 67% of the students admitted that sometimes after watching entertaining space content, they did not return to the course. 27% of students said that it never happened.

Students expressed different, sometimes controversial opinions on the effectiveness of the method proposed. Some comments after finishing of the course:

“It’s good to have a space!”

“In my opinion, I think the content of each e-learning course should be split into shorter ones, because too much information can make learners lose patience and become distracted. And repeating the same questions in different quizzes is useful, at least for me, I feel it can help me better remember what I’ve learned before.”

“The most useful for me were pauses without content, because then I could really “disconnect” from training – my problem is often that I sit on the topic for too long, as a result of which I lose efficiency and the ability to concentrate. Very useful for long-term productivity.”

“I think obligatory spaces between materials should be only used at school, kindergarten, not university. At university most of students have already found his/her own pace and optimal learning speed, therefore I think others should not intrude it.”

“I think it is tricky to offer these pauses, because, knowing the human mind, a lot of people might not come back to the course. It is evident that the learning material should be divided in short chunks – the problem (or the solution?) is that edX already divides the information into chunks – therefore the learner can take a break when they need and come back to the course when they feel like it.”

Controversial opinions on the method shows the need to personalize the method and adapt to each student’s learning style and interests.

Students were asked to explain in more detail the rating of the content of spaces. The survey was conducted online two weeks after finishing the course “E-pedagogy”.
Eleven students filled out the Google form in 2019, and only five students answered in 2020 because learning was severely hampered by the COVID-19 crisis. However, the distribution of students provides insight into the students’ opinions on the content of spaces (Table 1).

Table 1
Distribution of Students’ Opinions in the Evaluation of the Space Content

<table>
<thead>
<tr>
<th>Content of space</th>
<th>2019 (11 resp.)</th>
<th>2020 (5 resp.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Space” without offered content</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Space” with YouTube music video</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Space” with YouTube video about attractive adventures and events</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Space” with YouTube beautiful nature video</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Space” with easy-to-understand additional course material video</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Space” with easy-to-understand interactive additional course material</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See next page for continuation of table
A poll on the content of the spaces shows slight differences in the students’ views on the form and content of the spaces. In both cycles, students like spaces without offered content and interactive educational games.

According to the poll, the second-year students prefer entertaining additional course material, entertaining videos or content created by group members in accordance with their interests.

The second-year students highly rated spaces with interesting material on any topic created by their group members. Such content was embedded in the e-environment only
in the second year. These students did not deny the possibility of embedding interesting material on any topic created by their group members, specially adopted to their interests. Such content was not used in the first and second cycles, but it would be implemented in the third action research cycle.

During the second action research cycle, log files from the OpenEdX environment were collected. OpenEdX log files provided rich information on students’ behavior in the e-learning environment.

Log files include information on the date and time, student username, event type, IP address, browser and type of device used, content module identification, and other.

Big data analysis allowed calculating the time spent to watch the videos. For the analysis, three types of videos, recommended as interesting material by students, were chosen:

1) 11-minute engaging YouTube video of general interest “The Brave New World of Artificial Intelligence”;
2) 7-minute video “Hillforts in Latvia” dealing with the history and landscape of Latvia, created by a group member;
3) 4-minute YouTube video with optional additional material on the subject of the course “Simpsons Constructivism”.

Table 2 shows the activity analysis of the students of the course “E-pedagogy” in 2020, watching the above space contents embedded in the course material. Names of students are coded by letters F (female) or M (male). The column “watch time” shows the total time the content was watched. The column “Clicks” indicates the number of times the student has stopped watching, going deeper into the material. This usually shows a deep interest in the topic.

An extreme decrease in the watch time of the 2nd and 3rd video shows the devastating effects of the COVID-19 crisis on the learning process as it occurred during a state of emergency in the country.

Table 2

<table>
<thead>
<tr>
<th>Student</th>
<th>1st video watch time (min)</th>
<th>Clicks</th>
<th>2nd video watch time (min)</th>
<th>Clicks</th>
<th>3rd video watch time (min)</th>
<th>Clicks</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>27</td>
<td>4</td>
<td>3.3</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>F2</td>
<td>12</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>F3</td>
<td>7.2</td>
<td>2</td>
<td>3.3</td>
<td>1</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>F4</td>
<td>12</td>
<td>4</td>
<td>2.8</td>
<td>1</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>F5</td>
<td>10</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>F6</td>
<td>3.0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>F7</td>
<td>13</td>
<td>15</td>
<td>0.3</td>
<td>0</td>
<td>0.2</td>
<td>0</td>
</tr>
<tr>
<td>M1</td>
<td>16</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>M2</td>
<td>9.0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>–</td>
</tr>
<tr>
<td>M3</td>
<td>7.3</td>
<td>2</td>
<td>0</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>F8</td>
<td>1.8</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>F9</td>
<td>10</td>
<td>1</td>
<td>7.0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>F10</td>
<td>0.25</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>F11</td>
<td>5.0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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Reflection on the Outcomes of the First and Second Cycles

Results of the first and second cycles of the action research showed that most Master level students of Digital Humanities enjoyed using the spaced e-learning method implemented in the blended learning courses “Natural Science Modelling” and “E-pedagogy”. When classes were completely transferred online due to the COVID-19 virus social distancing restrictions, some students stopped using the method or did not use it often. This is due to the cognitive overload of the students, as many had to work from home at the same time and to assist their children with online learning.

Implementation of spaces in the e-learning environment between repeating the learning content raised questions on the forms of repeated content and the content of spaces. Varying forms of delivering learning content is a mandatory requirement for the successful implementation of spaced e-learning. The use of textual information, attractive videos, interactivities, and examples make learning attractive. In some cases, watching the content of the space distracted learners from learning. Some students admitted that they also took breaks during acquiring content in regular courses, similar to spaced learning. However, the spaced learning method requires repetition of the course content after the break to strengthen the knowledge in the long-term memory.

In most cases, students support different forms of content of spaces. Some students support a simple reminder to relax for a few minutes. Most, however, find that interesting material makes the break more engaging. In general, students support the delivery of space content in various ways; however, they support entertaining content close to the course material slightly more. Students also support content created by their group members. In this case, each student creates material in the e-environment on a topic of his/her interest in the form of videos, Prezi-presentations, or in other attractive way.

The materials created by students can arouse the students’ interest in an important topic for sustainable personal development. It is essential that the material is personalized according to the interests of the student and serves as a starting point for further development. To implement such an approach, it is necessary to create an information system that would ensure personalization of the content of spaces in accordance with the interests of the student. The input data of such an information system would be a self-assessment of the student’s personal interests.

These data should be compared with the metadata (keywords) of interesting materials created by the group members. The most relevant materials to meet the students’ needs and interests should be included in the content of spaces of the course.

The authors’ experience in the first and second cycle of the action research shows that students’ interests in most cases are related to acquiring deeper knowledge of nature, science, and ecology. Their materials in the form of videos or presentations can serve as a stimulus for a deeper interest in these topics, leading to the sustainable fostering of personality. To promote the achievement of these goals, the instructor can suggest areas for the creation of interesting materials.
Personalization of the content of spaces should be implemented in the third action research cycle embedded in the information system and realized as the LivingLab for testing outcomes of the spaced e-learning outcomes.

Conceptual Design of the Third Cycle of Action Research

In the third AR cycle, spaced learning content is specially adapted to the interests of each student. The technical implementation of the spaced learning idea is based on the custom content generation for each student.

Diagnostic and summative questions at the beginning and end of each unit are added to evaluate the effectiveness of the spaced e-learning using the TELECI method (A. Kapenieks et al., 2020).

From the view of technical implementation, spaced learning functionality is based on adaptive content generation principles. This means that LMS delivers content tailored to the student based on rules defined by the course tutor. Moodle LMS has some in-built functionality providing access control to certain content items. Unfortunately, this functionality did not fit our needs, and the setup of fully functional spaced learning functionality would require a significant amount of manual work. This is why a custom solution was created, integrating Moodle LMS and Google sheets to generate delivery of the spaced learning content through Moodle LMS.

A technological solution was implemented on Moodle 3.9 LMS using internal tools and extra code for better content delivery. The goal of the system was to create a tool capable of injecting custom content in the students’ learning content.

It was achieved through a content generator script providing custom content in the form of embedded elements to Moodle LMS on demand. Placeholders for spaced learning elements were inserted among study content elements. These placeholders display spaced learning content generated by the above-mentioned content generator script. To generate content for a student, the script requests data such as the content title and the URL of the embedded element from the Google Sheets API. Currently, student-specific data are stored in Google Sheets, providing a flexible environment for testing different algorithms. The content item is assigned to a student using a set of Google Sheet functions. The system can be adapted to use a database instead of Google Sheets for complete integration in Moodle LMS.

Further work in the third AR cycle is the complete integration of spaced learning in Moodle LMS. This would include further development, providing

1) Moodle feedback module for collecting student data;
2) Custom Moodle LMS plugin for spaced learning content setup and management;
3) Extra tables in the Moodle LMS database for data storage and custom content generation.

The key concept is requirements for the implementation of spaced learning functionality in Moodle LMS for custom content generation for students. This means that Moodle LMS delivers content based on predefined rules.
Conclusions

E-learning is a powerful tool for the acquisition of knowledge and skills. Previous experience during the COVID-19 crisis has shown that it is an indispensable set of competency education tools. However, the introduction of competence education has created new risks in pedagogy. A superficial understanding of the concept of competencies may give the impression that the task of education is only to educate and train competent personalities for the labor market. This has already led to the dominance of anthropocentrism and related mercantilism in many sectors of society. The consequences are an unsustainable economy and a way of life that have led to catastrophic changes in the natural environment. The widespread implementation of e-learning methods further increases these risks, as learning environments are designed to deliver information and test knowledge. This opens up a wide field of research on the possibilities of applying the e-learning environment for the implementation of sustainable education, thus developing the individual’s personality.

The current research has demonstrated an opportunity to apply the e-learning environment for personal development based on the interests of the student.

The research methods used in the study allow following students’ attitudes to spaced e-learning and their activities during the acquisition of the course content. The big data approach allows making a detailed analysis of the students’ behavior in the e-learning environment.

Spaced e-learning method requires repeating the same information in different forms using different authoring tools. It allows learning theoretical knowledge, training practical skills and identifying how the knowledge can be used in the real world. Online learners prefer active engagement with the e-learning content rather than passive reading of the theory.

It is important that the content of the spaces is interconnected with the individual interests of students. Encouraging the student within the topic covered by the content of the space can promote deeper understanding of the topic, leading to the fostering – development of personality for the sustainable perception of the world in the broadest sense.

The students positively evaluated the use of the method in the course; however, it would not be effective if there was not enough time to learn the subject. During the COVID-19 crisis, students rarely took the opportunity to stop learning a subject before repeating it in another form. Lack of time resulted in the loss of students’ interest in the spaced e-learning method.

It is useful to link the engaging content of spaces to the student’s individual interests in the third cycle of the action research. Engaging content of spaces can be the source for developing student’s individual interests, creating a desire to learn more about the topics of sustainable development, thus leading to personality fostering. Content can be directly or indirectly related to the course objectives. It may also be unrelated to the course objectives.

Personalization of learning is essential in the developed spaced e-learning environment prototype, leading to the collaborative learning prototype based on the students’ experience. On the other hand, incorporating a personal interest component into the learning process poses a wide range of challenges to the development of sustainable education and topics for further transdisciplinary research in the fields of pedagogy and information technologies.
Acknowledgements

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A Study on the Status of Sustainability Education among Iranian EFL Instructors: Developing a Glocalized Model

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Shiraz University, Shiraz, Iran

Abstract

In the Iranian education context where the concept of Sustainability Education is to a certain extent novel and fresh, one must first determine the state of Sustainability Education in education systems and specifically TEFL departments to discover EFL instructors’ needs. This way, EFL instructors can be equipped with Sustainability Education competencies needed for transforming EFL education systems. Sustainability Education can be best implemented through language learning and specifically English learning compared with other subjects because language classes are the best sights for discussing sustainability issues. Additionally, the actualization of Sustainability Education in language classes can facilitate CLT and global citizenship operationalization. Having these in mind, the present study attempts to depict a clear picture of Sustainability Education among EFL instructors and provide education systems and policymakers with the necessary Sustainability Education competencies to equip teachers and help learners to feel and identify the relationship among sustainability issues such as culture, ecology, economy, power structures, and even their own families. The study was conducted using a Sustainability Education questionnaire developed by the researchers. The questionnaire was distributed among 150 EFL instructors. The findings of the study reveal that EFL instructors experience an apparent lack of sustainability literacy. On the other hand, their level of implementation is better than literacy but still not much satisfactory. The important findings can bring about the transformation and modification of EFL teacher education and curriculum and will be highly advantageous regarding professional and ethical dimensions of education system.

Key words: sustainability, sustainability literacy, sustainability implementation, sustainability education

Introduction

The comprehensive construct of sustainability concerns intergenerational, evenhandedness, the interconnectedness of environment, economy, and social justice. It is a promising paradigm with a holistic view of human and non-human systems and involves transformative policies. On the other hand, education and sustainability are considered inextricable since sustainability will not come true in the absence of education (Onwueme &
As a result, the term “Sustainability Education (SE)” has emerged and been discussed under the labels of Education for Sustainability (EFS) and Education for Sustainable Development (ESD).

Sustainability Education (SE) or Education for Sustainable Development aims at incorporating the philosophies, ethics, and practices of Sustainable Development (SD) into all education facets (Redman, 2013; Heasly et al., 2020). It is a movement in all subject areas such as English, which tries to make people, societies, and governments gain a great understanding of environmental, economic, and social situations and integrate it into their contemplation of humanity (Vincent, Bunn, & Stevens, 2013). Implementation of sustainability is not imaginable without education since education has a major role in enhancing learners’ cognitive and affective dimensions, which can then bring about knowledgeable, skillful, and healthy residents who are mindful and inspired to live more sustainably and safeguard future generations (Biasutti, De Baz, & Alshawa, 2016; Carban & Fisher, 2017). Sustainability Education is, in fact, an attempt towards behavior transformation and re-orientation. Sustainability Education is a socio-psychological multidisciplinary approach that seeks effective ways to achieve individual and social well-being. It will not be achieved without the two main factors of literacy and implementation (Kabadayi, 2016). In the area of Sustainability Education, environmental, social, and economic phases of sustainable development need to be unified to develop learners’ sustainability consciousness and literacy, which encompasses their knowingness, attitudes, and behavior and leads to behavioral change through sustainability implementation (Carban & Fisher, 2017).

Sustainability Education is applicable to all subjects such as physics, mathematics, and English. This way, different SE versions, for instance, EFL SE and psychology SE, will be presented. The main burden in Sustainability Education is on teachers’ shoulders since they are believed to be the receptacles of education. As learners are the mirrors of their teachers, these are teachers who should help learners cultivate the special knowledge and skills required for sustainable development, which is a multifaceted issue and needs a great deal of training. Wals (2011) believed that for learners to develop sustainably, they should be able to make decisions sustainably connected with teachers’ literacy and teaching methods (Abdulwali, Alshmrani, & Almufti, 2017; Besong & Holland, 2015).

Teachers as the main agents of sustainability development in education should be not only teachers but also constant learners and researchers. This highlights the interwoven relationship between professional development and sustainability literacy. Since sustainability is not an exclusively environmental or economic issue, it can be best implemented in English classes through teachers teaching not only language but also culture and lifestyle (Zeeshan, 2017). Therefore, English classes can be the best site for SE execution in Iran because the humanities and culture, in particular, are identified as core drivers of sustainability (Fry & Wei, 2015). Cultural approaches to sustainability are directly related to lifestyle, and the discussion and debate sessions in English classes provide teachers with the best opportunity to discuss sustainability issues with learners. Concerning Zeeshan’s findings, EFL SE can be considered one of the most important versions of SE in Iran, which can lead to worthwhile outcomes since language and communicative and cross-cultural competence are treated as the main factors of sustainability actualization (Human Resources Development, 2012; Committee for Global Human Resources Development, 2012).

From another point of view, Sustainability Education is believed to be interwoven with the two concepts of Global Citizenship and Identity (Committee for Global Human
Moreover, English language teaching is considered a key to fostering global citizenship, identity achievement and an attitude towards sustainable development (Basarir, 2017; Commission on the Development of Foreign Language Proficiency, 2011). The introduction of these concepts into the EFL context can trigger the whole context, including teachers and learners, in a way to help learners identify as global citizens who have an achieved sense of identity and can ensure future development (Tsukamoto, 2014). In fact, Tsukamoto stated that implementation of Sustainability Education in English language teaching could facilitate the implementation of Communicative Language Teaching (CLT) in EFL settings.

A comprehensive view of SE is believed to be the main part of a healthy, high-quality education (Fry & Wei, 2015). Up until now, the components of SE have not been introduced as a whole to provide a foundation for further research. As a result, the researchers in the present study made an attempt to gather the main components through a careful review of the related literature (Andic & Vorkapic, 2017; Brundiers & Wiek, 2017; Demirci & Teksoz, 2017; Frisk & Larson, 2011; Nolet, 2009; Rashidi & Meihami, 2017; Reunamo & Suomela, 2013; Uitto & Saloranta, 2017; Wen & Wu, 2017; Zeeshan, 2017) and UNESCO Sustainability development elements, which led to the development of a comprehensive model of SE (Figure 1).

![Figure 1. The comprehensive model of Sustainability Education developed based on literature and UNESCO sustainability development elements](image)
Background

Reviewing the literature reveals that sustainability and sustainable development are used interchangeably in numerous studies, yet some investigators believe these two complex concepts have to be clearly cut. Sustainability Education or Education for Sustainability was for the first time officially stated by UNESCO in 1997 as a movement toward a better future. UNESCO report was an attempt to introduce SE as the main weapon against environmental, social, and economic issues. Subsequently, the importance of sustainability implementation in education was emphasized time after time in numerous studies (Brundiers & Wiek, 2017; Corcoran, Osano, Weakland, & Hollingshead, 2009; Demirci & Teksoz, 2017; Frisk, 2011; Redman, 2013; Reunamo & Suomela, 2013; Samari, 2012; Stewart, 2010; Uitto & Saloranta, 2017). Some of these researchers (Corcoran, Osano, Weakland, & Hollingshead, 2009; Reunamo & Suomela, 2013) mainly focused on SE implementation in children’s education and some others (Brundiers & Wiek, 2017; Stewart, 2010) focused on higher education. Afterward, some researchers, though not many, went beyond sustainability implementation in education and dealt with SE actualization in different areas such as foreign language teaching (Wen & Wu, 2017; Zeeshan, 2017).

Anyolo, Karkkainen, and Keinonen (2018) investigated teachers’ perceptions and practices regarding sustainability literacy and implementation through a qualitative-explorative study design. The following results were obtained: 1) The teachers were familiar with the concept of sustainability without undergoing training; 2) All the teachers incorporated SE into their subjects and curriculum without prior preparation; 3) The teachers were able to respond to sustainability challenges without familiarity with sustainability components; 4) The teachers confessed to the universal need for literate, knowledgeable teachers in sustainability; 5) There was a connection between teachers’ field of study and their preferences and power points.

Some teachers’ experiences of practices in SE were probed into by Sund in 2016. The teachers in Sund’s study strongly looked with favor on political aspects of sustainability since they believed that power structures and relations were of considerable importance in sustainability development. They also pointed to the seriousness of the ethical dimensions and coined the term “ethico-political” to show the integration of these two areas to develop learners’ empowerment. Sund concluded that some aspects of sustainability such as political, historical, and epistemological were field-specific. The ethical and affective dimensions, on the other hand, were not. This means that how a teacher weighs a dimension depends on the teacher’s field of study.

Zeeshan (2017) emphasized the importance of ESD promotion through English language teaching. His ideas were in line with those of UNESCO (2005) regarding the vital role of universities in the expansion of sustainability modus operandi. The good fortune of the society is resultant from sustainability literacy and implementation, which will not come true in the absence of well-informed, educated English teachers. The researcher further maintained that SE and ELT seemed alien at first glance since English language teachers felt that they were supposed to teach merely a language, i.e., vocabulary, grammar, and communication skills. This can be why English language teachers’ central role has been neglected so far, although some researchers have depicted a clear picture of the close connection between SE and EFL (Jacobs & Cates, 1999). Most English teachers participating in the study believed that the insufficiency of teacher training,
quality of curriculum materials, and support from the administration were the first three noticed obstacles to sustainability development followed by lack of infrastructure and equipment and access to teaching resources. The study also indicated literacy as a pre-requisite for implementation. The English teachers did not know what information should be included in lectures, videos, presentations, and discussions.

Andic and Vorkapic (2017) used Juarez-Najera’s socio-psychological model of sustainable behavior (2010) to depict a clear picture of teacher students’ awareness of environmental problems and how to attribute responsibility for environmental/sustainability problems. Furthermore, the authors claimed that systemic education as opposed to linear education was a must for change towards sustainable behavior. The values of the systemic and linear models are totally different and lead to two different education systems. At the heart of a systemic model, there are awareness, collaboration, participation, care and quality, which bring about an all-round education system that draws a circular but not a hierarchical structure that reforms the pattern of society based on collective growth, personalization, transdisciplinary approach, network, responsibility, and collaboration and finally develops sustainability (Dominici & Peruccio, 2016).

Gholami and Qurbanzada (2016) studied TEFL key stakeholders’ attitudes towards teacher education programs. They maintained the importance of sustainable development in education and teacher education since sustainability in education was the gate to behavior change. The stakeholders believed that sustainability awareness acted as a facilitator of sustainability implementation and both were the necessary characteristics of efficient teaching in this era.

The effectiveness of EFL SE lies in its multi-dimensional platform. EFL SE is a means to accomplish not only sustainability goals but also linguistic ones. Regarding sustainability goals, EFL SE has enormous potential to raise sustainability consciousness and command of language (Zeeshan, 2017). EFL SE lends itself to Education for Global Citizenship (EGC) and can be the driving force behind personality and linguistic development (Ban, 2012). As a matter of fact, EFL SE can be discussed under the umbrella term “EGC” since EGC covers the core principles of both EFL and SE. It considers local and global issues, cultural and cross-cultural differences, acquiring a working knowledge of English as a lingua franca and developing communicative language proficiency (Ishimori, 2010).

**Research Methods**

The present study has mainly investigated if Iranian instructors have the knowledge, skills and tenets that enlighten the learners’ mental models and day-to-day behaviors and help them engage in critical thinking, problem-solving, and decision making. In fact, depicting the overall status of SE in the Iranian EFL context and investigating the existence of a certain pattern among SE components have been the ultimate goal of the present study. As each phase of the study has its own goals and sub-goals and all are channels towards the final goal of the research, i.e., development of a relatively comprehensive glocalized model of EFL SE, the following research questions have been raised:

1. How competent are EFL instructors regarding their SE literacy?
2. In which dimensions of Sustainability Literacy are the instructors more competent?
3. How often is SE implemented in EFL classes?
4. Which dimensions are implemented more often in EFL classes?
5. What is the overall status of SE in the Iranian EFL context?
6. What are the components of the glocalized SE model?

Participants

The participants in the study were 150 EFL instructors at Shiraz University, Shiraz Islamic Azad University, Zand University, Apadana University, Pasargad University, Persian Gulf University, Tehran University, and Yazd University. They were selected via convenience and snowball sampling. The instructors, chosen for accessibility reasons, were from the same education level, but different age, gender and educational and experiential background.

Instrument

The main instrument of the study was an SE questionnaire developed by the researchers. For the development of the questionnaire, the researchers first prepared a list of global features and elements of Sustainability Development recommended by UNESCO and also extracted from attainable literature. For the global features to be locally practical, the researchers asked the officials at relevant organizations, such as Department of Environmental Protection, Planning and Budget Organization, Agricultural Jihad Organization, Department of Culture and Islamic Guidance, to check the locally associated features. The questionnaire items were then developed based on these features. The list of the items was checked and rechecked by SE expertise for the content validity. In the next step, the rating scales and instructions were designed and the items were first analysed and then based on the results of the analysis they were revised. The final version of the questionnaire was administered to a group of 200 EFL instructors for its reliability and validity, which were estimated through Cronbach’s Alpha (CA) and Confirmatory Factor Analysis (CFA), respectively.

Reliability

For the confirmation of reliability, CA of each item was estimated separately to find the items which were supposed to be eliminated. CA for all the items in the first part of the questionnaire and the total CA for sustainability literacy were estimated (see the results in Table 1). The total alpha reliability coefficient for sustainability literacy was equal to 0.943, which confirmed the reliability of the first part of the questionnaire since it was above 0.7.
Table 1

Reliability of Sustainability Literacy Questionnaire

<table>
<thead>
<tr>
<th>Item number</th>
<th>Cronbach’s Alpha if Item Deleted</th>
<th>Item number</th>
<th>Cronbach’s Alpha if Item Deleted</th>
<th>Total Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
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<td>.941</td>
<td>.943</td>
</tr>
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<td>s15</td>
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<tr>
<td></td>
<td></td>
<td>s27</td>
<td>.943</td>
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</tbody>
</table>

CA for all the items in the second part of the questionnaire and the total CA for sustainability implementation were estimated (see the results in Table 2). As shown in Table 2, the total alpha reliability coefficient for sustainability implementation was equal to 0.947, which confirmed the reliability of the second part of the questionnaire since it was above 0.7.

Table 2

Reliability of Sustainability Implementation Questionnaire

<table>
<thead>
<tr>
<th>Item number</th>
<th>Cronbach’s Alpha if Item Deleted</th>
<th>Item number</th>
<th>Cronbach’s Alpha if Item Deleted</th>
<th>Total Cronbach’s Alpha</th>
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</thead>
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<td>s30</td>
<td>.974</td>
<td>s49</td>
<td>.973</td>
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<tr>
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<td>s32</td>
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<td>s41</td>
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<td>s42</td>
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<td>s45</td>
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<tr>
<td>s46</td>
<td>.973</td>
<td>s65</td>
<td>.973</td>
<td></td>
</tr>
</tbody>
</table>
Validity

To confirm the construct validity of the questionnaire, CFA, which is a quantitative data analysis method that belongs to the family of structural equation modeling (SEM) techniques, was used. CFA allowed for the assessment of fit between the observed data and an a priori conceptualized, theoretically grounded model that specifies the hypothesized causal relations between latent factors and their observed indicator variables. The CFA results for sustainability literacy are shown in Table 3 and the relationship between factors is depicted in Figure 2. As shown in Table 3, p-value for all the items is below .005 which proves the validity of the items in the first part of the questionnaire.

Table 3
CFA of Sustainability Literacy Variables

<table>
<thead>
<tr>
<th>Item number</th>
<th>Item type</th>
<th>Estimate</th>
<th>C.R.</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>q1</td>
<td>environmental</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>q2</td>
<td>environmental</td>
<td>1.329</td>
<td>3.614</td>
<td>***</td>
</tr>
<tr>
<td>q3</td>
<td>environmental</td>
<td>1.355</td>
<td>3.240</td>
<td>.001</td>
</tr>
<tr>
<td>q4</td>
<td>environmental</td>
<td>1.130</td>
<td>3.655</td>
<td>***</td>
</tr>
<tr>
<td>q9</td>
<td>economic</td>
<td>1.000</td>
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<td></td>
</tr>
<tr>
<td>q10</td>
<td>economic</td>
<td>1.402</td>
<td>2.606</td>
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<td>q11</td>
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<td>1.268</td>
<td>2.392</td>
<td>.017</td>
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<td>q12</td>
<td>economic</td>
<td>1.434</td>
<td>2.519</td>
<td>.012</td>
</tr>
<tr>
<td>q24</td>
<td>Cultural</td>
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<td></td>
<td></td>
</tr>
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<td>q25</td>
<td>Cultural</td>
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<td>1.982</td>
<td>.042</td>
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<td>q26</td>
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<td>1.961</td>
<td>.045</td>
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<tr>
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<td>Cultural</td>
<td>2.007</td>
<td>2.608</td>
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<tr>
<td>q18</td>
<td>sociopolitical</td>
<td>.767</td>
<td>3.636</td>
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</tr>
<tr>
<td>q19</td>
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<td>.496</td>
<td>2.030</td>
<td>.042</td>
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<tr>
<td>q5</td>
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<td>.965</td>
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<td>.005</td>
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<td>s6</td>
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<td>1.250</td>
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<tr>
<td>q7</td>
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<td>1.337</td>
<td>3.595</td>
<td>***</td>
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<td>q8</td>
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<td>2.595</td>
<td>.009</td>
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<td>q13</td>
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<td>.007</td>
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<tr>
<td>q14</td>
<td>economic</td>
<td>1.240</td>
<td>2.360</td>
<td>.018</td>
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<td>q15</td>
<td>economic</td>
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<tr>
<td>q23</td>
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<td>.777</td>
<td>3.492</td>
<td>***</td>
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</table>
Figure 2. The relationship between sustainability literacy variables

The results of CFA for sustainability implementation are shown in Table 4 and the relationship between factors is depicted in Figure 3. As shown in Table 4, p-value for all the items is below .005, which proves the validity of the items in the second part of the questionnaire.

<table>
<thead>
<tr>
<th>Item number</th>
<th>Item type</th>
<th>Estimate</th>
<th>C.R.</th>
<th>P</th>
</tr>
</thead>
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<tr>
<td>q28</td>
<td>Curricular</td>
<td>1.017</td>
<td>7.045</td>
<td>***</td>
</tr>
<tr>
<td>q49</td>
<td>professional</td>
<td>1.000</td>
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<td></td>
</tr>
<tr>
<td>q48</td>
<td>professional</td>
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<td>4.911</td>
<td>***</td>
</tr>
<tr>
<td>q47</td>
<td>professional</td>
<td>.790</td>
<td>4.241</td>
<td>***</td>
</tr>
<tr>
<td>q46</td>
<td>professional</td>
<td>.990</td>
<td>4.969</td>
<td>***</td>
</tr>
</tbody>
</table>

See next page for continuation of table
Continuation of Table 4

| q45  | professional | 1.085 | 4.892 | *** |
| q44  | professional | 1.021 | 4.904 | *** |
| q43  | professional | 1.091 | 5.328 | *** |
| q42  | professional | .924  | 4.667 | *** |
| q41  | professional | .846  | 4.569 | *** |
| q40  | professional | 1.270 | 5.569 | *** |
| q39  | professional | 1.202 | 5.474 | *** |
| q38  | professional | .723  | 4.081 | *** |
| q37  | professional | .709  | 4.059 | *** |
| q36  | professional | .868  | 4.641 | *** |
| q35  | professional | .592  | 3.546 | *** |
| q34  | professional | 1.106 | 5.202 | *** |
| q33  | professional | .817  | 4.484 | *** |
| q32  | professional | .986  | 4.778 | *** |
| q31  | professional | 1.002 | 4.730 | *** |
| q58  | Ethical      | 1.000 |       |     |
| q57  | Ethical      | 1.145 | 6.074 | *** |
| q56  | Ethical      | 1.364 | 6.596 | *** |
| q55  | Ethical      | 1.109 | 6.036 | *** |
| q54  | Ethical      | 1.360 | 6.542 | *** |
| q53  | Ethical      | .859  | 5.056 | *** |
| q52  | Ethical      | .824  | 4.904 | *** |
| q51  | Ethical      | .936  | 5.499 | *** |
| q50  | Ethical      | 1.080 | 5.866 | *** |
| q59  | Affective    | 1.000 |       |     |
| q60  | Affective    | .692  | 5.355 | *** |
| q61  | Affective    | 1.284 | 10.132| *** |
| q62  | Affective    | 1.302 | 10.097| *** |
| q63  | Affective    | .566  | 4.418 | *** |
| q64  | Affective    | 1.056 | 8.172 | *** |
| q65  | Affective    | 1.008 | 7.146 | *** |
According to Nolet (2009), in order to check if Iranian EFL instructors are literate in sustainability or not, they were asked if they “knew things associated with sustainability, if they were disposed to think or solve problems in ways associated with sustainability, and if they behaved in ways consistent with sustainability” regarding the four different sustainability dimensions (ecological, economic, social and cultural) (p. 429). Then, they were asked how often they implemented SE in their classes. The frequency of different activities was rated according to a five-point Likert scale: 5 = very often, 4 = rather often, 3 = sometimes, 2 = rather seldom, 1 = very seldom. The teachers’ perceptions
of their competence in SE were assessed using five items with which the teachers could rate their responses according to a five-point Likert scale: 1 = very poor, 2 = rather poor, 3 = satisfactory, 4 = rather good, 5 = very good. The questionnaire also provided us with information about different dimensions of SE separately.

Data Collection Procedure

The data related to instructors were gathered using the SE questionnaire. The questionnaire was administered both in person and online to let the target participants have a choice over the completion process. Before the distribution of the questionnaire, the researchers contacted the instructors at each university and got permission for the process. The instructors were also asked to distribute the questionnaire to as many EFL instructors as possible.

Data Analysis Procedure

For data analysis, different tests and analysis procedures were used. First of all, descriptive statistics and means comparison graphs were used to discover the overall status of sustainability literacy, sustainability implementation, and sub-divisions. Then, to check the normality of distribution, the Kolmogorov-Smirnov test was used to decide whether the sample came from the population with a specific distribution. Since normality was accepted, a one-sample t-test was used as a tool to compare the sample mean with the hypothesized mean to determine whether the two means were significantly different or not. These tests were used to gain insights into EFL instructors’ level of competence and implementation.

Results

Descriptive Statistics

Using descriptive statistics, the sustainability literacy and implementation level of EFL instructors were revealed. The descriptive statistics results demonstrated that EFL instructors’ sustainability implementation was in a better condition compared to their sustainability literacy. Figure 4 shows that EFL instructors’ sustainability literacy is less than 3 (2.40), while their sustainability implementation is over 3 (3.28). Although the sustainability implementation of EFL instructors is above the mean score, there is not a large gap between sustainability literacy and implementation. The mean scores of both sustainability literacy and implementation confirm that EFL instructors are not in a satisfactory position in terms of sustainability education with the mean score of 2.83 as shown in Figure 5.
Mean and standard deviation estimates for sustainability literacy sub-divisions revealed worthwhile information regarding its four main dimensions, i.e., environmental, economic, socio-political, and cultural. The results showed that EFL instructors were the least literate in terms of environmental and economic sustainability and the most literate in terms of cultural and socio-political sustainability compared with the total medium score, which was 3. In fact, EFL instructors confirmed that they were culturally literate but not environmentally literate. More details about sustainability literacy descriptive statistics can be seen in Table 1. As shown in Table 5, the mean scores for the environmental and economic dimensions are below the medium (1.66 and 1.89) and the mean scores for the socio-political and cultural dimensions are above the medium (3.14 and 3.29). The bar graphs also confirm this revelation (Figure 6). The attained scores imply that the instructors’ socio-political and cultural literacy is in a better condition compared to their environmental and economic literacy.

Table 5

<table>
<thead>
<tr>
<th></th>
<th>environmental</th>
<th>economic</th>
<th>sociopolitical</th>
<th>cultural</th>
<th>s. literacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>1.6624</td>
<td>1.8907</td>
<td>3.1485</td>
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<tr>
<td>Std. Deviation</td>
<td>.37779</td>
<td>.40430</td>
<td>.34531</td>
<td>.44251</td>
<td>.26900</td>
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<tr>
<td>Minimum</td>
<td>1.38</td>
<td>1.14</td>
<td>1.88</td>
<td>1.75</td>
<td>1.96</td>
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<td>3.13</td>
<td>3.00</td>
<td>4.13</td>
<td>4.50</td>
<td>3.44</td>
</tr>
</tbody>
</table>

Figure 6. Means comparison of sustainability literacy dimensions
Looking at the results of the descriptive statistics for sustainability implementation and its sub-divisions shown in Table 6 and Figure 7, certain differences between sustainability implementation dimensions can be found. Out of the four dimensions of sustainability implementation, the professional dimension is the first frequent one with the mean score of 3.42 and the curricular dimension is the last frequent one with the mean score of 2.82 among EFL instructors. The affective and ethical dimensions are the second (3.34) and third (3.09) frequent ones, respectively.

Table 6

<table>
<thead>
<tr>
<th></th>
<th>curricular</th>
<th>professional</th>
<th>ethical</th>
<th>affective</th>
<th>s. implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>2.8200</td>
<td>3.4218</td>
<td>3.0978</td>
<td>3.3438</td>
<td>3.2832</td>
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<tr>
<td>Std. Deviation</td>
<td>.36765</td>
<td>.15474</td>
<td>.25452</td>
<td>.24777</td>
<td>.11382</td>
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<tr>
<td>Minimum</td>
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<td>2.89</td>
<td>2.56</td>
<td>2.71</td>
<td>2.89</td>
</tr>
<tr>
<td>Maximum</td>
<td>3.67</td>
<td>3.79</td>
<td>3.67</td>
<td>4.00</td>
<td>3.55</td>
</tr>
</tbody>
</table>

Figure 7. Means comparison of sustainability implementation dimensions

Table 7 shows the results of the status of sustainability education. The mean score (2.83) demonstrates that EFL instructors are not in a satisfactory position in terms of SE.

Table 7

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Mean</td>
<td>2.8385</td>
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<tr>
<td>Std. Deviation</td>
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</tr>
<tr>
<td>Minimum</td>
<td>2.05</td>
</tr>
<tr>
<td>Maximum</td>
<td>3.66</td>
</tr>
</tbody>
</table>

One-Sample Kolmogorov-Smirnov Test

To check the normality of the distribution, one-sample Kolmogorov-Smirnov test was used for sustainability literacy and implementation separately. The results are shown in Tables 8 and 9.
As shown in Table 8, Asymp. sig for all the four dimensions and finally for sustainability literacy is over 0.05, confirming the normality of the variables and allowing for the use of parametric tests for data analysis.

<table>
<thead>
<tr>
<th>Table 8</th>
<th>One-Sample Kolmogorov-Smirnov Test for Sustainability Literacy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>environmental</td>
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<tr>
<td>Test Statistic</td>
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</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.062</td>
</tr>
</tbody>
</table>

As shown in Table 9, Asymp. sig for all the four dimensions and finally for sustainability implementation is above 0.05, affirming the normality of the variables and allowing for the use of parametric tests for data analysis.

<table>
<thead>
<tr>
<th>Table 9</th>
<th>One-Sample Kolmogorov-Smirnov Test for Sustainability Implementation</th>
</tr>
</thead>
<tbody>
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<tr>
<td>Test Statistic</td>
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<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.052</td>
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</tbody>
</table>

The results of Kolmogorov-Smirnov test for SE are presented in Table 10 and the Asymp.sig value (0.60) affirms that the variables are normal and subsequently one-sample t-test can be used.

<table>
<thead>
<tr>
<th>Table 10</th>
<th>One-Sample Kolmogorov-Smirnov Test for Sustainability Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Statistic</td>
<td>.197</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.602</td>
</tr>
</tbody>
</table>

**One-Sample t-Test**

As the normality of the variables was affirmed in the previous section, a one-sample t-test was used to check if the mean differences noticed were significant. For this purpose, the t-test was run for sustainability literacy, sustainability implementation, and sustainability education.

According to Table 11, the hypothesis of the equality of the mean scores was rejected for all four dimensions. Considering the mean differences, the environmental and economic dimensions are proved to be below the medium (-0.34 and -0.10), and sociopolitical and cultural dimensions are proved to be above the medium (0.14 and 0.29). The highest amount of the mean difference belongs to the cultural dimension and the lowest one belongs to the environmental dimension.
Table 11
One-Sample t-Test for Sustainability Literacy Dimensions

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95 % Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>environmental</td>
<td>-43.364</td>
<td>149</td>
<td>.000</td>
<td>-1.33760</td>
<td>-1.3986 to -1.2766</td>
</tr>
<tr>
<td>economic</td>
<td>-33.603</td>
<td>149</td>
<td>.000</td>
<td>-1.10927</td>
<td>-1.1745 to -1.0440</td>
</tr>
<tr>
<td>sociopolitical</td>
<td>5.268</td>
<td>149</td>
<td>.000</td>
<td>.14853</td>
<td>.0928 to .2042</td>
</tr>
<tr>
<td>cultural</td>
<td>8.072</td>
<td>149</td>
<td>.000</td>
<td>.29167</td>
<td>.2203 to .3631</td>
</tr>
</tbody>
</table>

The results of the one-sample t-test for sustainability implementation dimension, indicated in Table 12, show that the null hypothesis of the equality of the mean scores has been rejected for all the four dimensions. On the basis of the mean differences, it can be concluded that the curricular dimension has been the only dimension below the mean score (-0.18) and the other dimensions are proved to be above the mean score (0.42, 0.09, and 0.34). The highest mean difference belongs to the professional dimension and the lowest one belongs to the curricular dimension.

Table 12
One-Sample t-Test for Sustainability Implementation Dimensions

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95 % Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>curricular</td>
<td>-5.996</td>
<td>149</td>
<td>.000</td>
<td>-0.18000</td>
<td>-0.2393 to -0.1207</td>
</tr>
<tr>
<td>professional</td>
<td>33.381</td>
<td>149</td>
<td>.000</td>
<td>0.42175</td>
<td>0.3968 to 0.4467</td>
</tr>
<tr>
<td>ethical</td>
<td>4.705</td>
<td>149</td>
<td>.000</td>
<td>0.09778</td>
<td>0.0567 to 0.1388</td>
</tr>
<tr>
<td>affective</td>
<td>16.995</td>
<td>149</td>
<td>.000</td>
<td>0.34381</td>
<td>0.3038 to 0.3838</td>
</tr>
</tbody>
</table>

The results of the one-sample t-test for sustainability literacy and implementation, shown in Table 13, confirm that sustainability literacy mean score is below the medium since the mean difference is equal to -0.59 and sustainability implementation mean score is above the medium since the mean difference is equal to 0.28. The mean differences between the attained scores and medium (3) are significantly effective at 0.05 level.

Table 13
One-Sample t-Test for Sustainability Literacy and Implementation

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95 % Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>s.literacy</td>
<td>-27.233</td>
<td>149</td>
<td>.000</td>
<td>-0.59813</td>
<td>-0.6415 to -0.5547</td>
</tr>
<tr>
<td>s.implementation</td>
<td>30.469</td>
<td>149</td>
<td>.000</td>
<td>0.28316</td>
<td>0.2648 to 0.3015</td>
</tr>
</tbody>
</table>

As shown in Table 14, the results confirm that EFL instructors’ SE level is significantly below the medium since the mean difference between the attained score and medium (3) is equal to -0.16.
Table 14
One-Sample t-Test for Sustainability Education

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95 % Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>dataall</td>
<td>-11.198</td>
<td>161</td>
<td>.000</td>
<td>-.16154</td>
<td>-.1900/.1331</td>
</tr>
</tbody>
</table>

EFL SE Glocalized Model

![EFL SE Glocalized Model Diagram](image)

Figure 8. EFL SE glocalized model

A comparison of the EFL SE glocalized model (Figure 8) with the comprehensive model developed based on the literature reveals that the components of the glocalized model are not complete. This model reveals the EFL instructors’ deficiencies in the realm of sustainability literacy and implementation. It shows that neither sustainability literacy nor sustainability implementation is complete among the Iranian EFL instructors. It also shows that the relation between the two phases of literacy and implementation
has not been circular as opposed to the comprehensive model. The two phases have a linear relation since they have worked separately but not inter-connectedly.

Discussion

The aim of the present study has been to gain an insight into EFL instructors’ sustainability literacy and implementation needs, and on that basis to suggest training courses for teacher education programs to turn EFL instructors into powerful SE agents who can help EFL learners become not only communicatively competent but also literate and conscious in sustainability. The following recommendations are proposed and discussed according to the results.

EFL instructors recorded below medium literacy in sustainability specifically in the environmental and economic dimensions: Preparing more sustainability literacy training for EFL instructors

Regarding the first and second research questions which were around EFL instructors’ sustainability literacy, the findings of the study revealed that EFL instructors lacked Sustainability Literacy specifically in the environmental and economic dimensions. This lack of literacy can be at the first stage due to the instructors’ unfamiliarity with technical terms and issues and, broadly speaking, a result of unfamiliarity with the whole idea of sustainability. In spite of the instructors’ low scores in the environmental, economic and socio-political areas, they scored the highest in the cultural dimension, which affirmed the fact that EFL instructors were more conscious of cultural and cross-cultural issues. Additionally, the instructors’ below the medium score is an indicator of the relationship between teachers’ field of study and weaknesses as confirmed by Sund (2016). Environmental and economic issues are not dealt with in the field of TEFL. The mean score of instructors’ sustainability literacy was 2.9, indicating that most EFL instructors were not literate in sustainability. As stated in some other studies, EFL teachers suffer from lack of confidence in teaching and preparing learners for the future since they do not have enough knowledge of SE (Summers, Childs, & Corney, 2005; Uitto & Saloranta, 2017). The finding of the study regarding EFL instructors’ sustainability literacy is in contrast with that of Anyolo et al. (2018) which shows that it will be easy and feasible for instructors to become literate in sustainability since sustainability literacy has mainly to do with environmental and economic issues and these issues are spontaneously absorbed into the mainstream of teaching systems. The absorption of sustainability into teaching does have to do with the teachers’ field of study. Yet, the first finding of the present study is in line with Dominici and Peruccio’s eco-literacy shortage (2016). As stated previously, the need for the incorporation of eco-literacy into all levels of education, including higher education, was foregrounded by Dominici and Peruccio.

EFL instructors recorded a little above medium implementation in sustainability, specifically in the professional and affective dimensions: Preparing more curricular sustainability implementation training for EFL instructors

With regard to the third and fourth research questions which sought the frequency of sustainability implementation, EFL instructors recorded better results in comparison
with sustainability literacy, which showed that they tried to actualize sustainability in their classes although they were not technically familiar with the whole idea. The instructors’ above the mean scores in professional, affective and ethical dimensions affirmed their sensitivity towards professional core skills, attitudes and moral principles, which was in line with the judgment claiming that TEFL and SE were both holistic approaches regarding different aspects of implementation (Yavetz, Goldman, & Pe’er, 2014). The instructors in Sund’s study also paid attention to affective and professional dimensions. The only dimension about which EFL instructors did not seem willing to actualize was the curricular dimension. This shows that curriculum is not a priority from instructors’ point of view. As pointed out previously, the instructors in Sund’s and Anyolo’s studies took careful account of curriculum development and modification as opposed to the instructors in the present study, which could be an indicator of the effect of the instructors’ major. In other words, instructors may take power over specific aspects of sustainability based on their field of study. Another manifestation of this contrast is the relationship between sustainability literacy and curriculum planning as stated by Sund (2016). As a matter of fact, Iranian EFL instructors’ neglect of curriculum can be akin to their sustainability literacy deprivation.

EFL instructors recorded below medium in Sustainability Education: Preparing more Sustainability Education training for EFL instructors

With respect to the fifth research question which was an attempt to unfold the state of SE among EFL instructors, EFL instructors’ total score revealed that in spite of their strengths, they needed to be technically and academically trained in terms of Sustainability Education since the structural change, which was desired for the incorporation of SE into TEFL, would be not exclusively but primarily in the hands of instructors. In fact, universities, researchers and teacher educators should increase their sensitivity and awareness to help EFL instructors win over their shortcomings. This is exactly what was propounded by Frisk in 2011 and Stewart in 2010. This deficiency in TEFL departments is mainly due to insufficiency of teacher training and curriculum materials as stated in previous studies (Redman, 2013; Zeeshan, 2017). The finding rejects what was stated in Anyolo et al. (2018). In their study, it was claimed that teachers could reach the level of literacy and implementation without any training, preparation and familiarity with SE components which was not really the case in the present study. The EFL instructors’ deficiencies can also be akin to their field of study as mentioned in previous studies (Andic & Vorkapic, 2017; Anyolo et al., 2018; Sund, 2016).

EFL SE model in Iran is not comprehensive: Some aspects of SE are neither known nor actualized

Considering the last research question, the components of the EFL SE model in Iran are extracted based on the statistical results. The model confirms that the Iranian EFL instructors are far from ideal regarding SE. This represents that they need to undergo training in every aspect of SE, otherwise they will not be able to expand the learners’ views toward sustainability issues and teach them how to take action or make changes against them. This model is in direct response to Zeeshan’s study who was in search of the true type of information that should be incorporated into English classes through discussions, lectures, presentations, and videos.
Conclusions

Regarding the history of EFL SE and the insufficiency of information in this area, this study shed light on different aspects of SE among EFL instructors, which could be crucial in EFL teacher education. The present study was an attempt to answer different questions in the area of SE and TEFL. In response to the first and second research questions, one can come to the point that EFL instructors are not competent regarding their sustainability literacy specifically in the environmental and economic dimensions. In response to the third and fourth questions, it is concluded that EFL instructors try to implement SE practices in their classes specifically the professional and affective dimensions; however, they have not been fully successful. And as a final point, all the evidence leads to the inescapable conclusion that EFL instructors are not educated in sustainability in spite of their merits. A close and detailed inspection of the results of the study reveals that teacher education programs and teacher educators must equip EFL instructors with SE proficiencies regarding both the literacy and implementation aspects. The training can move forward and capitalize on the instructors’ strengths. EFL instructors have the potential to go from strength to strength provided that they become acutely aware of their weaknesses and know how to alter them. The results also will lead to the consideration of wider implications:

1) Sustainability and EFL are not unrelated: SE can be incorporated into TEFL; EFL instructors have not been totally unfamiliar with sustainability issues. The instructors’ satisfactory level of socio-political and cultural literacy and professional, ethical, and effective implementation confirm that EFL and SE can be interwoven, as stated by Zeeshan (2017).

2) SE cannot come true without the instructors’ both literacy and implementation; consciousness can lead to implementation and implementation can lead to consciousness.

3) Literacy and implementation should operate circularly: one should not be a prerequisite for the other, but they should positively affect each other. The results indicated that satisfactory performance in one phase, i.e., implementation, could not save the other phase, i.e., literacy, because EFL instructors viewed them as two separate phases operating linearly. Yet, SE needs a holistic view that considers the relation between the two phases as circular. This way, the weaknesses in one phase can turn to strengths with the help of the strengths in the other phase. The advantages of the instructors in some specific areas cannot turn them into successful SE agents.

4) Reaching a satisfactory level in all the dimensions of literacy and implementation is necessary for instructors.

On condition that teacher education programs do not provide EFL instructors with the necessary SE training courses, not only the quality of EFL classes but also the whole society will be affected since the implementation of SE in all subject areas of education including TEFL is considered to be a must (Uitto & Solarants, 2017). As Burns stated in his Sustainability Model, Constructivism (Ernest, 1991; Philips, 1995; Vygotsky, 1962), Transformative Learning (Baumgartner, 2019; Mezirow, 1991), Critical Theory (Freire, 1970; Hooks, 2010), Place Based Learning (Orr, 2004; Sobel, 2005), Situated Experiential Learning (Fenwick), and Experiential Learning (Dewey, 1938; Kolb, 1984) are the building blocks of sustainability pedagogy and learning theories.
Implementation of SE in language classes prompts critical thinking and critical thinking provokes better use of language strategies (Atkinson, 1997).

The positive effect of EFL SE implementation is two-folded: educational and social. From the point of view of learning quality, the results regarding the state of EFL SE in Iran can provide worthwhile information about the status of CLT in Iran since the competencies, perspectives, processes and strategies of EFL SE overlap, to a large extent, with those of CLT (Tsukamoto, 2014). A close look at the state of EFL SE in Iran can reveal the instructors’ weaknesses, and the revelation of the weaknesses can tell teacher educators what should be incorporated into teacher education programs. When EFL instructors’ weaknesses are turned into strengths, they can decide on the best topics which should be covered in English classes. This helps learners broaden their knowledge of communication and globalization and feeds into CLT actualization. From the point of view of teaching quality, EFL SE can affect teachers’ professional development, professional responsibility, mindfulness, awareness of context and autonomy (Nolet, 2009). Getting familiar with SE paradigms in teacher education courses, university teachers will develop adaptive expertise (Bransford, Brown, & Cocking, 2000). Moreover, from the point of view of life quality, being equipped with the knowledge of SE, EFL teachers can move toward a better professional future and can help learners live a better life in the future since TEFL is highly engaged with sustainability issues such as human rights, environmental defense, religious multiplicity, gender impartiality, sustainable worldwide economic growth, poverty alleviation, inhibition of conflicts between countries, eradication of weapons of mass destruction, charitable assistance, and preservation of cultural diversity. Teaching English helps learners find personal fulfillment and mutual understanding and a sense of global citizenship. It is remarkable that the sense of fulfillment, global citizenship and shared understanding are at the heart of SE. This represents that learning English, as the world’s language, can deepen the learners’ consideration of the world and, accordingly, their real understanding of national and international identities. These representations confirm how TEFL and SE are tied up.

References


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Learnings from the #IndigenousESD Global Research: Twenty-First Century Competencies for All Learners

Katrin Kohl and Charles A. Hopkins
York University, Toronto, Canada

Abstract

The 2030 Agenda for Sustainable Development promotes with the Sustainable Development Goal 4 a quality education for all and aims to ensure equal access to all levels of education and vocational training for vulnerable groups, such as Indigenous Peoples. However, most education systems are not yet in a position to embrace a culturally appropriate way of teaching children and youth of their Indigenous communities. The #IndigenousESD research creates a voice for relevant education stakeholder groups, including Indigenous Elders/leaders, ministry officials, parents, students, and teachers from communities with Indigenous students on their perceptions of quality education.

Based on a participatory research approach developed together with Indigenous communities and researchers from around the world, dialogues held in 54 research settings in 26 countries show a focus on the acquisition of twenty-first century competencies for learners amongst the most important aspects of a quality education.

For this article, the authors focused on knowledge, attitudes and skills, providing recommendations for policy makers in education to better address the needs and priorities of Indigenous communities. Findings from the research indicate that teaching twenty-first century competencies are at the center of concern in all stakeholder groups, yet want these competencies taught in a context to which Indigenous students can readily relate.

Adjusting the pedagogy of delivering these common competencies in the classroom could be an important step towards a feasible and affordable path within existing education systems to better serve Indigenous students and all learners.

Key words: Indigenous ESD Global Research, competencies, twenty-first century learners

Introduction

The global research project Reorienting Education and Training Systems to Improve the Lives of Indigenous Youth aims to improve the lives of Indigenous youth, in or from traditional communities by enhancing the quality of their education. The research follows a community-based participatory research approach. The unique approach of this research on how education outcomes for Indigenous youth can be improved is by engaging education for sustainable development (ESD), i.e., addressing local social, economic and environmental issues and designing appropriate pedagogy. York University in Toronto,
Canada leads and coordinates the project by involving more than 120 (research) institutions and communities having schools with Indigenous students in approximately 40 countries/Indigenous peoples’ territories.

The research was designed to serve the 2030 Agenda with the Sustainable Development Goals (SDGs) (United Nations, 2015), in particular UNESCO’s SDG 4 mandate with the Global Education 2030 Agenda (UNESCO, 2015a). By establishing this project for one of the least served groups (May & Aikman, 2010) after successful research in high-scoring PISA countries (Laurie et al., 2016), the first international research on SDG Target 4.5 was launched with the possibility for research institutions to collaborate beyond this initial research project.

Interested research institutions were required to fulfil certain criteria to be considered for participation. The criteria for institutional membership included:

- Eligible research institutions were (accredited) teacher education institutions or institutions of higher education as they collected the data and oversaw the actual research and its reporting.
- If the coordinating research institution was not an institution of higher education, it was expected to work in close collaboration with such an institution, e.g., by signing an underlying Memorandum of Understanding or other form of agreement.
- The research was expected to be conducted in cooperation with a coordinating Indigenous organization or other suitable institution.
- Principal and coordinating researchers were expected to hold a minimum of a Bachelor’s degree, to have a basic knowledge and understanding of the SDGs and ESD as well as communication skills in English.
- Access to necessary (human and fiscal) resources to carry out the research plan.

The criteria for eligibility of an Indigenous partner site included:

- The school had the support of the school leaders and staff.
- The school had the permission and ability to modify the curriculum.
- Where possible, the school/community had the approval of the ministry of education or the local tribal council or overall education authority and had to work in close collaboration with those authorities.
- Access should exist to necessary (human and fiscal) resources to support carrying out the research plan.

The research project, under patronage by UNESCO-UNEVOC and the Canadian Commission for UNESCO, was financed through private donations. While researchers work directly under the respective and appropriate cultural and ethical regulations with schools and community leaders, their research covers three research initiatives:

1. Quality Education Dialogue: Exploring the various perspectives on quality education and its desired outcomes as seen by ministries of education, Indigenous community leaders, principals and teaching staff, parents, students and other stakeholders;
2. Best practices: Collecting examples of “Good Practice using ESD” in delivering quality education for Indigenous youth; and
3. Action research: Performing action research in exploring ESD approaches to improve the overall quality of education for Indigenous youth based on how quality education is perceived by stakeholders as found in research initiative 1.
An initial global research report covered an extensive data analysis from the first research initiative covering 29 countries in all UN regions (Kohl & Hopkins, 2020) with concrete policy recommendations to assist UNESCO, education and community leaders worldwide to reorient existing education systems towards sustainability regarding the following aspects: program coordination and curriculum; information sharing and learning; resource mobilization, networks; as well as planning, monitoring and reporting mechanisms and suggestions to enhance the implementation of SDG 4.

This in-depth analysis focuses on twenty-first century learning competencies as the issue with the highest priority based on the findings of the research.

Education for Sustainable Development and the 2030 Agenda

*Education for Sustainable Development* as a concept does have a long history in the sustainability movement going back to the Agenda 21 when sustainable development in its three dimensions (economic, environmental and social) was first recognized as a concept and education was seen as a central means of implementing a sustainable future (United Nations, 1987; United Nations, 1992). Ever since, there have been tremendous efforts to reorient the world towards sustainability with the focus on ESD (McKeown & Hopkins, 2006; McKeown & Hopkins, 2010; Heasly et al., 2020).

The 2030 Agenda for Sustainable Development (United Nations, 2015) with its 17 SDGs addressing the most pressing world challenges, adapted in content and pedagogy to a local context and addressed within its education system, is one of the key thrusts of ESD (Hopkins & McKeown, 2001; UNESCO, 2012). A crucial intent of the reorienting is to address the understandings and worldviews inherent within sustainable development to make the curriculum relevant and culturally appropriate (UNESCO, 2017a).

SDG 4 and Education 2030 (UNESCO, 2015a) define the Global Education 2030 Agenda Goal: *Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all* (United Nations, 2015, p. 14) with a target – SDG 4.5 – addressing opportunities for vulnerable groups, amongst them Indigenous Peoples, who are still excluded from access to education in many cases (United Nations, 2015, p. 17).

Aiming at embedding ESD at all levels of education as a purpose of education (UNESCO, 2014), the United Nations General Assembly reiterated in 2019 (after the first call in 2017) ESD *... as a vital means of implementation for sustainable development (...) and as an integral element of the Sustainable Development Goal on quality education and a key enabler of all the other Sustainable Development Goals* (United Nations, 2017, p. 3; United Nations, 2019, p. 4).

Indigenous Peoples in the 2030 Agenda

This research recognizes the lack of a definition of Indigenous Peoples in the United Nations system (UNDESA, 2008) as using a universal normative definition of this particular often marginalized group facing considerable limitations (Bowen, 2000; Kenrick & Lewis, 2004; May & Aikman, 2010). The project addressed Indigenous youth, including those who continue to live in, or have recently left traditional cultures. In the spirit of the 2030 Agenda, the Principal Researchers have used the term in a respectful and appropriate attempt of engaging and learning both with and from Indigenous Peoples.
Although Indigenous Peoples have been granted full human rights (United Nations, 2007) helping them to get many Indigenous issues recognized although not all solved (Champagne, 2013), still today and with few exceptions, youth, in or from traditional cultures, remain amongst the least-well served by their respective public education and training systems with some of the lowest graduation rates from elementary, secondary or tertiary education. Indigenous girls are more likely to be affected (UNESCO, 2016).

There is a significant lack of understanding of why Indigenous students often do not function well in most education systems (e.g., Gray & Hunter, 2000; Song et al., 2014). The social and economic disparities that arise from an inequitable education system are considerable (UNESCO, 2017b). Yet, little research-based knowledge is available to effectively address the situation.

Quality Education Dialogue: Overall Methodology and Data Collection

**Phase 1: Creating the report template for research initiative 1**

As a joint basis to carry out the dialogue for this research, a model to structure and document the conversation in each community was needed. It was meant to generate comparable findings from around the world on the research initiative *What are desirable education outcomes as perceived by relevant stakeholders that define the quality of education for Indigenous youth?*

The overall research methodology (Kohl & Hopkins, 2020) was based on models used to describe UNESCO’s humanistic approach to learning: *The Faure Report* (1972), *the Delors Report* (1996) and *Rethinking Education* (2015), added by the three dimensions of sustainable development (economic, environmental and social). Scholars emphasize Delors’ relevance widely to date and even identify five pillars in the same model to highlight its potential for transformation adding “learning to transform oneself and society” (Power et al., 2007; Biasutti et al., 2016).

Researchers were invited to use the provided model to facilitate the dialogue. Yet, – building on the experience from action research for sustainability (Salóte et al., 2009) – researchers were free to decide how to carry out the actual dialogue in their community with the involvement of the Indigenous communities themselves engaged in all steps along the way.

While this approach allowed for participation of diverse groups from several countries, various approaches and different ways of conducting the conversation, language translation barriers and the inability to control the community conversation resulted in a lack of in-depth reporting aligned with the template, collectively posed limitations to this research.

**Phase 2: Carrying out the quality education dialogue and documenting the results**

Researchers facilitated the #IndigenousESD quality education dialogue accordingly and with local adaptation to match legal and cultural appropriateness (Kohl & Hopkins, 2020).
Phase 3: Categorizing and understanding the results, creating the global research overview

The results from all research settings were systematically examined (Kohl/Hopkins, 2020) based on the framework of the UNESCO Policy on engaging with Indigenous Peoples (UNESCO, 2018) and in accordance with the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) 2007 (United Nations, 2007) in the following dimensions of the UNESCO Policy:

1. Human rights and fundamental freedoms, health;
2. Equality and non-discrimination;
3. Self-determination, participation, leadership;
4. Cultural heritage, knowledge, traditional cultural expressions and languages;
5. Development with culture and identity;
6. Conservation and protection of environment; and
7. Gender equality.

Since 2019 was declared the International Year of Indigenous Languages (United Nations, 2016), a special priority was given to Indigenous languages and qualified as a subcategory of cultural heritage according to Article 11 UNDRIP. Also, health and leadership were expected from the discussions in planning meetings to be important subcategories of their respective UNDRIP category. Items were categorized in several rounds of individual and collective examinations; an item could be applied to several categories when appropriate.

64 research institutions were actively involved with the research network and report data for this global initiative were received from 54 institutions:

- Asia-Pacific region: 24 institutions from 9 countries/territories (Australia, China, India, Malaysia, Maldives, New Zealand, Philippines, Austronesian Taiwanese);
- Central Asian region: 4 institutions from 3 countries (Kazakhstan, Russia, Tajikistan);
- Central/North American region: 9 institutions from 3 countries (Canada, Nicaragua, USA);
- Europe: 1 institution (Finland);
- South American region: 5 institutions from 5 countries (Bolivia, Brazil, Chile, Peru, Venezuela);
- Southern African region: 3 institutions from 3 countries (Botswana, Lesotho, South Africa);
- Sub-Saharan Africa: 8 institutions from 2 countries (Ethiopia, Nigeria).

Overall Research Findings from the Application of the Delors-based Model

The findings from all UN regions allowed for the examination of 578 items that had been applied to the Delors-based model. Categorizing the items led to the following regional distribution with 1,011 matches within the ten categories (Figure 1).

Participating stakeholders could be identified from the following groups: Community, Indigenous Peoples (including Elders), ministry officials, parents, students, and teachers. The groupings of 41 % of all respondents who participated in the discussions were not further defined by the research teams (Figure 2).
The 578 ESD items were also classified according to dimensions of sustainable development (environmental, social and economic) in the data collection process at each research setting when possible.
Figure 4. Total average results per UNDRIP-based category from all regions

All regions demonstrated a particular composition of responses matching the UNDRIP-based categories. The following charts demonstrate the percentage of responses targeting competencies (in % from 100 overall regional responses) for each of the regions in the research.

Figure 5. Distribution of regional responses for the UNDRIP-based category ‘Human rights, fundamental freedoms with a specific focus on twenty-first century competencies’

Findings on Human Rights, Fundamental Freedoms with a Specific Focus on Twenty-First Century Competencies

Responses to the category of human rights occurred not only quantitatively often but also qualitatively in most regions where the quality education dialogue was held with education stakeholders (23 % of overall responses). While the category covered a broader context, most respondents mentioned the acquisition and understanding of
various mainstream competencies (knowledge, skills and attitudes) common globally to students in schools (Bell, 2016). This access to excellent education was seen as a human right for (Indigenous) students. Each region put a different emphasis on this category. The access and retention in education providing the opportunity to acquire what is commonly called twenty-first century knowledge and skills was of utmost importance in the Sub-Saharan African region (49% of regional responses), followed by Finland (27%) and Central Asia (27%). It was also seen relevant in the Asia-Pacific Region (21%) and the Central and North American regions (18%). The results from the South American region (11%) and South African Region (9%) showed less importance for this category.

Stakeholder groups in all regions seem to be extremely concerned about Indigenous children often not succeeding within existing education systems. All stakeholder groups acknowledged the need for access to education and acquiring competencies. The dialogue results also showed that stakeholders were not against mainstream education but rather worried about children’s success within the system. No stakeholder group advocated for a separation of Indigenous students from other student groups but rather inclusion with respect for Indigenous culture and heritage.

Analyzing each stakeholder group, participants gave different importance to the human rights category. Most groups emphasized the importance of knowledge, skills and attitudes in a quality education as one of the highest priorities. Especially the overall communities (47% of responses), ministry officials (28%) followed by teachers, students and parents particularly appreciated elements of twenty-first century competencies.

Another aspect was the concern for appropriateness of teachers to teach Indigenous youth and the need for in-service training. To meet expectations, teachers need to update their knowledge and skills regularly (e.g., acquiring the language skills to be able to teach subjects, such as history, science and maths, in the English language).

Competencies suggested by various stakeholders in the regions were broad and often not further prioritized. Fortunate for education systems, what stakeholder groups wish students to gain is overlapping with mainstream twenty-first century competencies, such as suggested by UNESCO named key competencies for sustainability (UNESCO, 2017; Rieckmann, 2012; Scott, 2015c) or OECD’s Learning Framework 2030 (OECD, 2018).

The following examples show broad responses from various regions and research settings:

- Asia-Pacific – Malaysia: Introduce 21st century learning techniques to realize benefits from modern knowledge and preservation of traditional knowledge, and to also use appropriate learning approaches that Orang Asli (Indigenous Peoples) best respond to (stakeholder not defined);
- Asia-Pacific – Malaysia: Graduates should know both traditional and contemporary (formal) knowledge (parent);
- Asia-Pacific – Philippines: Training of teachers in Indigenous Peoples Education (Indigenous Peoples);
- Asia-Pacific – New Zealand: Students shall be skilled to understand the world, also an inconsistent world (teacher);
- Asia-Pacific – Maldives: Know how to use computer technology, using media and technology, students should be aware of the latest technology (stakeholder not defined);
• Central Asia – Kazakhstan: *Schools are introducing a new education system. Many subjects at senior courses must be in English. But there are no educators who will teach subjects in English in rural schools. Teachers who know English go to work in the city (teacher and ministry);*

• South America – Peru: *Acquiring literacy skill* (stakeholder not defined);

• Southern Africa – Botswana: *Learn about their history and stories of their community* (stakeholder not defined);

• Sub-Saharan Africa – Nigeria: *Any education that makes me better than my parent is quality. I am more excited when I am using my hand and my head to do something. So quality education should be the one that uses what I like to teach me what I need* (students);

• North America – Canada: *To ensure that these learners have the tools to gain academic and economic success and remain in their community if they choose, with the understanding that Anishinaabe and Western knowledge imparts not only understanding but also responsibility to work for the greater good* (student);

• Sub-Saharan Africa – Nigeria: *The school is trying but they should do more by getting quality teachers not adhoc teachers like Youth corpsers that do not have the needed commitment most of the times. They should get seasoned and experienced teachers* (Community).

**Recognizing the Relevance of Twenty-First Century Competencies for All Learners**

**Context for Policy Recommendations**

The research is designed and carried out to serve UN/UNESCO, education leaders and Indigenous communities globally with evidence-based policy recommendation. Therefore, the following recommendations focus on existing education systems and highlight the need for structural changes for both Indigenous youth and possibly all other learners.

**Overview of Policy Recommendations from this Research**

Based on the evidence from the quality education dialogue, the following 10 policy recommendations for education systems that serve students in and from traditional communities were developed (for detail on the overall recommendations from this research: Kohl & Hopkins, 2020):

• Teach twenty-first century competencies in locally relevant and culturally aligned contexts;

• Systematically strengthen technical and vocational training on all levels of education;

• Include Indigenous Elders and the local community in the learning process;

• Intensify engagement of Indigenous students in youth-appropriate settings;

• Communicate on online platforms with other students, schools and communities that will develop media literacy and provide joint learning for all learners;

• Engage teacher education institutions to work closely with local Indigenous communities in addressing locally relevant sustainability issues;
• Address teaching certification to allow Indigenous knowledge keepers to teach Indigenous perspectives;
• Provide information on and foster access to (inter)national school networks and other education networks;
• Strengthen cooperation of ministries of education with Indigenous Elders and with other key stakeholders; and
• Ensure participation of stakeholders in education management.

Focus on Twenty-First Century Learners’ Competencies

Teaching twenty-first century competencies is not the only but the first and at the heart of all of these recommendations. The full text of the first recommendation reads as follows:

*Teaching twenty-first century competencies in locally relevant and culturally aligned contexts means to prepare all learners for a changing world dealing with major challenges in climate and environment, digitalization and artificial intelligence, globalization, migration and urbanization that will allow all Indigenous children to thrive in the mainstream school system and to succeed in both worlds.*

All stakeholders in all regions acknowledge the need for and are concerned about access to and retention in quality education for Indigenous youth. Living in “two worlds” and needing knowledge, skills and attitudes to manage the requirements of thriving in both – often fundamentally different – environments and cultures are inherent across all stakeholder responses from all regions. The general perception is that Indigenous students have to manage greater amounts and various dimensions of knowledge and skills to be able to succeed.

Therefore, Indigenous knowledge and perspectives should not only be part of their education to ensure success in later life in that world but also to make education relevant for the Indigenous students while they are in schooling. It was inferred that the respectful inclusion of Indigenous knowledge and perspectives will support them in developing their future identities as Indigenous. If education builds on Indigenous students’ informal knowledge from their upbringing in Indigenous communities, new innovative pedagogy in connecting those dots should be possible. This would ensure a more seamless and comprehensive education rather than parallel learning in and about two different worlds. Consequently, students could become viable, responsible citizens, proud of their heritage, connected spiritually to the land, and yet attain well-being, meaningfulness, and manage the requirements of the workplace in whatever setting they choose to live in, including modern urban societies.

Many of the worldviews that Indigenous Peoples wish to protect and nurture, are closely aligned with the mainstream education approaches to sustainable development through both *Education for Sustainable Development* and *Global Citizenship Education (GCED)*. With the hope for all learners to strive for sustainable development, a concept that reflects much commonly found in Indigenous worldviews, all learners could benefit by acquiring twenty-first century knowledge, skills and perspectives from traditional worldviews in a societal pursuit of a sustainable future.
As sustainable development is an overarching goal to be pursued by all of humanity as evidenced by the global adoption of the 2030 Agenda for Sustainable Development and the Global Education 2030 Agenda, it is most appropriate to reciprocally share perspectives, insights into ecological knowledge and worldviews. The proposed perspective of seeing the quest for sustainability as an inherent purpose of quality education by mainstream education systems should prove to be a significant facilitator of addressing the current misalignment of education outcomes for Indigenous students. Reinforcing and acknowledging abilities to see value in Indigenous cultures’ traditional knowledge, skills and worldviews while acquiring twenty-first century competencies would strengthen Indigenous students’ learning. Respectfully combining Indigenous knowledge, skills, values, perspectives and worldviews while investigating current and future environmental, social and economic issues as a curricular vehicle to address twenty-first century competencies would be of benefit to all learners.

To successfully adapt, alterations of both content and pedagogy will have to be made. Adaptations to current teacher competencies should not be overlooked. Nor should assessment tools and expected outcomes. It is helpful that the demand for twenty-first century competencies for all learners allows building on what is currently being implemented in most education systems (UNESCO, 2017a). Many education systems and international comparative tools (e.g., PISA) have moved from a focus on content knowledge towards competence-oriented curricula and student assessment.

Changes made to correct the current inequities would likely benefit all students and societies in general as profound changes are deemed necessary to address the issues delineated in the 2030 Agenda. Teaching for future well-being, both individual and societal, could include how previous cultures dealt with uncertainty, including their treatment of the planet and all life forms. While considerable adaptation would be needed, curricular and pedagogical issues are currently expected, regularly reviewed and modified as a systemic ongoing part of education processes. This is not a reversal of current thrusts but rather the simple inclusion of a major need within current strategic endeavors that would be of benefit of all.

Conclusion

The #IndigenousESD research demonstrates that there is interest by stakeholders and an opportunity in the movement towards the 2030 Agenda to significantly improve education outcomes for Indigenous students. This research has also been a unique opportunity to create a dialogue on equal footing among various stakeholder groups and anecdotal evidence shows that the conversation supported relationship building in various communities, such as in the Philippines, where researchers went beyond the quality education dialogue and developed an ongoing support system for an Indigenous community in health, farming and education. It once more shows that it is of relevance to build the relationship among officials, communities, teachers, parents and students to listen to one another and consider each other’s perspectives to determine and create a path towards the best possible outcomes for Indigenous students. Implementing changes based on the policy recommendations informed by this research into perceptions of education quality, especially teaching twenty-first century competencies in a context to which Indigenous students can relate, would create a feasible and affordable path within existing education systems to better serve Indigenous students. When properly acknowledging and serving
the aspects of a quality education as perceived by Indigenous students and their community, including traditional knowledge, and respectfully seeking Indigenous perspectives in classroom discussions, student engagement could be enhanced enabling all learners to better achieve academically. Thus, societal inclusivity could be strengthened, alternative sustainable futures explored and hopefully created.

References


Learnings from the ‘#IndigenousESD’ Global Research


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The Impact of Spaced and Massed Instruction on Foreign Language Reading Motivation and Reading Attitude among Pre-intermediate EFL Learners

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Abstract

This study investigated the impact of spaced and massed instruction on foreign language reading motivation and reading attitude among Iranian pre-intermediate EFL learners. To fulfil this objective, 60 Iranian participants were chosen among 120 students based on the results of Oxford Quick Placement Test (OQPT). The selected pre-intermediate participants were then divided into two equal experimental groups: spaced group and massed group. Afterwards, the researcher measured the participants’ reading motivation and reading attitude by administering a reading motivation questionnaire and a reading attitude survey as a pre-test. Then, both groups received the treatment. During the treatment phase of the study, the massed group was taught the reading comprehension in an intensive 60-minute session, while the spaced group was taught in three short sessions (twenty-minute session). After the instruction, a reading motivation questionnaire and a reading attitude survey as a post-test were carried out to both groups and finally the data were analyzed by running paired and independent sample t-tests. The outcomes demonstrated that there was a significant difference between the post-tests of spaced and massed groups. The findings indicated that the spaced group significantly out performed the massed group ($p < .05$) on the reading motivation and reading attitude post-test. The implications of this study make teachers know that teaching through spaced periods can produce better outcomes than teaching through one massed session.

Key words: massed instruction, spaced instruction, vocabulary learning, foreign language reading motivation, reading attitude, pre-intermediate EFL learners
Introduction

Undoubtedly, no one can deny that reading is one of the most valuable skills, particularly in foreign language environments where accessibility to a foreign language is mainly restricted to a written language. Reading is the easiest and most effective way to get information. Through reading, the reader can expand their understanding, widen their points of view and help them learn and understand more things about the universe (Penjak & Karninčić, 2017). It is one of the most essential goals of learning. For children and adults, reading skills can open up a wide variety of possibilities and viewpoints on the new world. It helps them learn new skills, keep them up-to-date with information and technologies, enjoy literature and do their everyday jobs, which are important aspects of modern life (Okuniewski, 2014).

In formal language learning classroom, reading is the most important activity. It is not only a source of knowledge and pleasant practice, but also a medium for leveraging and expanding knowledge of the language. In other words, reading exercises will provide learners with many advantages, such as knowledge, enjoyment and information. Through this way, learners are not only able to read, but are also able to understand the written text of reading materials from books, journals, newspapers, and science and technology (Penjak & Karninčić, 2017).

In the language learning process, particularly for learners of English as a Foreign Language, reading plays a fundamental role. According to Bánhegyi and Nagy (2019), reading is the most significant element for learners to improve their L2 competence. It has also become the main platform and the largest L2 input source. In addition, through reading, students can expand their understanding of the language in terms of syntax, discourse structure and vocabulary. These days, reading is perceived as an unpleasant and inappropriate practice for learners. Some scholars believe that students do not read their textbook even if they are aware of its effectiveness (Kwedlju as cited in Masduqi, 2014). Some others report that the loss of participation among learners in reading classes is due to the absence of understanding of the subject and the interpretation of the texts (Rukmini as cited in Masduqi, 2014).

Evidence that reading skills are essential to all educational stages and can result in good job chances (Esfandiari & Hesani, 2019) has contributed to our curiosity in finding out the factors that contribute to the enthusiasm of reading and, in particular, L2 reading among learners.

Since reading is an essential language ability in the language learning process, it is crucial to enhance the reading activity of L2 learners. Motivation is a way to assist students to promote their understanding and desire to take part in reading courses. Komiyama (2013) mentions that reading is highly related to motivation because it inspires readers to learn and achieve their language learning goals. Motivation is a mixture of commitments to meet the goals of language learning (Meihami & Saadat, 2019; Namaziandost, Sawalmeh, & Izadpanah Soltanabadi, 2020).

Studies show that motivation is a fundamental element in the enthusiasm of readers. Baker and Wigfield (1999), for instance, examined the aspects of children’s reading motivation and its relation to critical reading and success. The findings revealed that high reading motivation is related to the reading activity in terms of self-efficacy and difficulty, and the two inherent motivational aspects are linked to enthusiasm and participation. In addition, enthusiasm for reading is often reported as having an impact
on reading development (Rigg & van der Wal-Maris, 2020; Wang & Guthrie, 2004). Apart from reading inspiration, reading attitude is another aspect that leads to learner’s willingness to read as well as their ability to read (McKenna, Kear, & Ellsworth, 1995; Jeon & Yamashita, 2014).

Therefore, to increase the learner’s foreign language reading motivation and reading attitude, the authors of the present study carried out spaced and massed instruction in Iranian EFL classrooms. Massed activity alludes to the circumstances under which learners continue to perform a task without rest. Spaced exercise refers to the circumstances under which learners are granted rest periods during practice sessions. Although information replicated in a scattered fashion or spaced over time is obtained more slowly, it is stored for much longer periods of time. The idea of the spacing effect, first explored by Ebbinghaus (Ebbinghaus, 1885) in 1885, is that, given the overall continuous study time, knowledge is better learned and stored when reviewed in staggered intervals rather than in one continuous study session. In order to recall knowledge, the spacing impact has been validated in a wide variety of learning realms, such as mathematics (e.g., Rohrer & Taylor, 2006), children’s development of L1 vocabulary (Childers & Tomasello, 2002), the recollection of physical facts (Franzenburg, 2020) and the memorization of images (e.g., Toppino, 1993). The spacing impact has also been shown in the tasks of text processing (e.g., Seabrook, Brown, & Solity, 2005).

To enhance intricate skills beyond simple memorization, the spacing effect is definitely efficient. In 1978, Baddeley and Longman discovered that the spacing effect was beneficial in participants’ learning to touch type. Moreover, Rohrer and Taylor (2006) explored a major benefit in the use of spacing impact in intricate mathematical skills development. Moulton et al. (2006) observed that training a particular surgery procedure through spaced intervals (spaced distribution) created greater practice outcomes than training through one massed distribution practice session, as shown by a delayed post-test. Shebilske et al. (1999) noticed that learners better mastered the complicated challenge of computer simulation instruction by spaced delivery of practice sessions relative to mass distribution conditions. These results demonstrate that the Technique of Spacing Effects goes beyond mere rote memorization of information, and may lead to more nuanced learning efforts involving the incorporation of a variety of acquired skills.

According to cognitive psychology research, extensive practice is a situation in which the whole piece of teaching is presented in a continual period (Marco, Martinsone, & Tali, 2020). As none of the language programs pursues completely extensive practice, the relation of cognitive psychology research concerning time allocation to language syllabus has been examined (Alipour, 2020; Serrano, 2011; William, Opoku, Saloviita, & Tracey, 2020). According to Rohrer (2015), each language program is a distributed action. Nevertheless, frequent calls have been made to expand studies on the spacing effect from a laboratory setting to more real language learning conditions (Bird, 2010; Miles, 2014; Namaziandost, Saberi Dehkordi, & Shafiee, 2019). Actually, when learning a language, one can imagine a wide range of time programs involving the length of different study periods, intermittent intervals, test delays and general training courses. Thus, the words “massed” and “distributed practice” are derived from cognitive psychology and used to explain situations in which training time is concentrated or distributed over a period of time. For instance, in Collins, Halter, Lightbown, and Spada’s (1999) study, extensive training was used to refer to an intensive program in which the training time was focused on a 5-month versus a 10-month period. This definition of massed
practice contradicts a study by Miles (2014), which refers to a situation in which 65 minutes of uninterrupted training is given. Consequently, due to the comparative nature of these terms, care should be taken when comparing the results of different studies on the distribution of training time.

The great benefits of using the spacing effect for complex numerical skill movement have been declared by Rohrer and Taylor (2006). Moulton et al. (2006) confirmed that training a particular medical procedure strategy through spaced intervals outperformed the results of training through an extensive circulatory training session, as shown in a month delayed post-test (Miles, 2014). According to Shebilske et al. (1999), learners learned an unpredictable PC recreation-preparing task better by divided allocation of training sessions in contrast to the extensive circulation periods. These results suggest that the method of separating effect goes beyond maintaining simple repetition of facts, and can aid in more confusing exercises, which need a combination of different scientific abilities.

The impacts of spaced training on reading comprehension have not been examined. Researchers, for example, Brantmeier (2003) and Namaziandost et al. (2020) have described reading cognition as an essential part of various exchanges of characteristic L2-related reading systems. Reading comprehension may vary among language learners. In this regard, Brantmeier (2003) acknowledged that processing similar or unexpected writings, learners could have unrecognizable translations. It means that learners may process the content accordingly; however, understand unexpectedly, or process the writings contrastingly, but comprehend in a similar way.

Numerous studies (Namaziandost, Nasri, Rahimi Esfahani, & Keshmirshekan, 2019; Namaziandost, Rahimi Esfahani, & Hashemifardnia, 2018; Mashhadi, Farvardin, & Mozaffari, 2017; Schuetze, 2015; Miles, 2014; Xu, Padilla, & Silva, 2012; Serrano, 2011) have investigated spaced and massed instruction. These studies lack straight-forward and unmistakable findings. Language students in Serrano’s (2011) study did not make greater growth in mass practice than did their intermediate equivalents. In a survey conducted by Xu et al. (2012) in the context of Mandarin intermediate level, 80+ hours of training were offered over a 22-week semester and a 4-week intensive course. Unlike Serrano, this research found no disparity in improvements in oral understanding, vocabulary, pronunciation and grammar as a consequence of massed versus dispersed instruction. Despite these obstacles, the common agreement of all scholars studying language learning programs is that intensive programs are more efficient in promoting overall English proficiency. Thus, it is controversial how studies on the spaced effect in cognitive psychology will support planning decisions in foreign language study programs.

Meanwhile, a majority of studies have demonstrated the beneficial impacts of spaced instruction over massed instruction in grammar learning (Miles, 2014), vocabulary learning (Nakata, 2015), and reading skills (Seabrook, Brown, & Solity, 2005). There is recent evidence that spaced distribution instruction is better than massed distribution instruction in the retention of target language structures, i.e., when learning is measured after administering a delayed post-test (Miles, 2014).

Investigating the great impacts of spacing on learning has been one of the significant fields of studies in psychological sciences pertinent to the spaced effect. The spaced effect refers to the advantage of memory, which increases memory when learning segments are extended for a long period of time rather than in a single session (Cepeda, Pashler,
Vul, Wixted, & Rohrer, 2006). Generally, it is essential to identify two kinds of repetitions: rehearsal and retrieval practice (Goossens, Camp, Verkoeijen, & Tabbers, 2014; Namaziandost, Hafezian, & Shafiee, 2018). Cognitive psychology studies have indicated that the use of retrieval practice results in better memory than restudy in the learning process (Roediger & Karpicke, 2006). This situation is called the retrieval practice impact or testing effect. It refers to a memory phenomenon by which testing has a greater impact on memory than restudying.

However, the impact of spaced and massed instruction on reading motivation and attitude received little attention. In an effort to complete part of the existing gap, this study aimed to investigate if using spaced and massed instruction had any significant impact on foreign language reading motivation and reading attitude among Iranian pre-intermediate EFL learners.

A suitable level of education is regarded as one of the basic principles of sustainability that covers all skills and subskills of the language. On the other side, quality of education is based on the theory that educational goals are served and objectives achieved. For years, educating workforce had been the objective of education in Iran and in other countries as well. After that, the objective of the education changed within the economic domain to international economic competitiveness. Even though an economic situation has a significant effect on countries, communities, families and people, the focus appears to be moving from economic competitiveness towards global citizenship, social justice and sustainability.

In addition, a lasting enhancement is not achievable unless teachers and learners change their teaching and learning methods. In this respect, education has a crucial part in attaining sustainability. Based on Hofman-Bergholm (2018), sustainable education is inherently “value-dependent” (p. 25). Teachers and learners must be cognizant that their actions can influence the procedure of educational enhancement completely. If sustainable enhancement is understood as motivating sustainable shift in students, the duty of teacher must necessarily go beyond supplying the knowledge and the art of teaching to pre-service teachers since in this regard, teachers are regarded as agents of change rather than propagators of knowledge (Williams & Burden, 1998). That is how the methods of educating obtain priority. Therefore, applying the suitable ways in educating by teachers may be useful for teacher-learner process of teaching since it provides teachers the chance to utilize their best ways to reach the best purposes (Kostoulas-Makrakis, 2010).

More significantly, education for sustainable enhancement assists learners in learning and constant comprehending of the educational facets, social sustainable enhancement and working accordingly (Anyolo, Karkkainen, & Keinonen, 2018). Education for sustainable enhancement requires some learner-oriented strategies and interactive teaching practices such as spaced and massed instruction methods (Ichinose, 2017). Recently, some research studies have been performed on sustainable education and education for sustainable enhancement (Fedosejeva et al., 2018). Certainly, the education system plays a key role in teaching students and enhancing the effective teaching process.

Up to now, a large number of empirical studies related to memory analysis have revealed that spaced practice exceeds mass practice in learning. These studies have shown the advantageous impact of spacing in learning words (e.g., Gerbier, Toppino, & Koenig, 2014; Goossens, Camp, Verkoeijen, Tabbers, & Zwaan, 2014; Küpper-Tetzel, Erdfelder, & Dickhäuser, 2014; Nakata, 2015; Namaziandost & Çakmak, 2020),
learning passages (e.g., Wang & Guthrie, 2004), and learning L2 constructions (e.g., Matusevych, Alishahi, & Backus, 2016). Despite the importance of spaced and massed instructions, they have not yet received the attention they deserve. In fact, only a few studies have examined the effectiveness of utilizing spaced and massed instructions in Iranian EFL context. Therefore, this study investigated the impacts of spaced and massed instructions on Iranian EFL learners’ foreign language reading motivation and reading attitude.

Regarding the above-mentioned points, this study aimed to address the following questions:

**RQ 1.** Does spaced and massed instruction have any significant effect on the Iranian pre-intermediate EFL learners’ foreign language reading motivation?

**RQ 2.** Does spaced and massed instruction have any significant effect on the Iranian pre-intermediate EFL learners’ foreign language reading attitude?

### Methodology

#### Participants

Based on the results of Oxford Quick Placement Test (OQPT), 60 pre-intermediate EFL learners were chosen among 120 Iranian learners from a private English language institute at the age from 16 to 18 years. Non-random convenience sampling was actually used. This study only included male learners with Persian as their native language. The selected learners were randomly divided into two equal experimental groups: spaced instruction and massed instruction.

#### Instruments

**Oxford Quick Placement Test (OQPT)**

OQPT was administered as the first instrument in the current study to homogenize the participants. In this study, 50 intermediate students were considered the target participants because based on the standards of OQPT those learners who got 30 to 39 points (out of 60) had a pre-intermediate level.

**The Motivation for Reading Questionnaire Used as Pre-test and Post-test**

A modified version of Motivation for Reading Questionnaire (MRQ) was the main instruments applied in the current study. In 1997, Dr. Allan Wigfield and Dr. John Guthrie from the University of Maryland developed the MRQ. During implementation of the Concept-Oriented Reading teaching, Wigfield and Guthrie applied the MRQ to a group of learners at one mid-Atlantic state school. Wigfield and Guthrie run factor analyses to verify the construct validity of 53 items in MRQ. The positive relevance of the maximum motivating reading fragments was low-to high-level. In addition, they reported that their questionnaire had a reliability ranging from .63 to .96. In this study, 30 of the 53 elements in the questionnaire were chosen by the researchers since only eight facets of the total eleven components of the motivation for reading were selected for measurement. They included: reading effectiveness, reading difficulty, reading curiosity, reading participation, reading value, reading a word-avoidance, social motives for reading, and grade reading. MRQ was a five-point Likert scale questionnaire made
up of five choices: 1 for ‘strongly agree’, 2 for ‘agree’, 3 for ‘do not know’, 4 for ‘disagree’, and 5 for ‘strongly disagree’. The MRQ administered two times, once prior the treatment and once after the treatment.

**Reading Attitude Survey**

To assess the participants’ attitude toward reading, a reading attitude survey (RAS) adapted from “Survey of Adolescent Reading Attitude (SARA)” by Conradi et al. (2013, p. 569) was used. Each of the items started with the expression “How do you feel” and learners were requested to score each item according to a 4-point Likert scale from ‘very good’ to ‘very bad.’ The reliability coefficient (Cronbach’s α) of the attitude toward recreational reading items was 0.989. The survey was translated into Persian, the learners’ L1, and given to the researchers’ advisors and EFL teachers for validation (content and face validity), and some revisions were made based on the comments. The reliability of the reading attitude survey of the Persian version was checked using Cronbach’s alpha. Internal consistency coefficients of 0.982 were reliable. Like the MRQ, the RAS was given to learners two times, once prior the treatment and once after the treatment.

**Data Collection Procedure**

First of all, 120 Iranian EFL learners received the OQPT. Then, regarding their performance in the OQPT, 60 pre-intermediate learners were selected as the target participants of the study. After that, the researchers randomly divided the selected participants into two equal groups: spaced instruction group (SIG) and massed instruction group (MIG). Afterwards, the groups’ foreign language reading motivation and reading attitude were measured by an MRQ and RAS as a pre-test. Next, participants in experimental groups obtained the same treatment, but in various ways. The reading comprehension was taught to the SIG and MIG through spaced instruction and massed instruction, respectively. The reading skills were taught to the learners during 60 minutes in a massed class. In fact, 60 minutes were dedicated to each session. In the spaced class, there were three sessions, and each session lasted 20 minutes. The spaced class took place three times a week, but the massed class took place once a week.

During the treatment, the MIG was taught reading comprehension in an intensive 60-minute session, while the SIG was taught in three short sessions (a total of 60 minutes). The first session lasted 20 minutes; while the second occurred two days after the initial session (lasted 20 minutes); and the third session lasted 20 minutes and was held two days after the second session.

The duration of the instruction was 15 sessions. The OQPT, MRQ and RAS were carried out in the first two sessions; the treatment was given to the students in the next eleven sessions, and finally the MRQ and RAS were administered as a post-test in the fourteenth and fifteenth sessions to the participants of both SIG and MIG to check their foreign language reading motivation and reading attitude after receiving the treatment. It means that after the intervention, the both groups were asked to fill out the motivation and attitude questionnaires. The MRQ and RAS contained 30 items and 5 items, respectively, designed to investigate the participants’ motivation and attitude toward using the spaced and massed instruction after the intervention.
Data Analysis

In this study, Statistical Package for Social Science (SPSS) software version 25 was used to analyze the data. First of all, the normality of the data was checked through running the Kolmogorov-Smirnov (K-S) test. Secondly, means and standard deviation as descriptive statistics were calculated. Ultimately, a paired sample t-test and an independent sample t-test were run to check the effects of the treatment on the learners’ foreign language reading motivation and reading attitude.

Results

Results of Normality Test

Checking the normality of distributions is totally needed prior carrying out any analysis on a pre-test and post-test. Therefore, Kolmogorov-Smirnov test of normality was run (Table 1).

Table 1
One-Sample Kolmogorov-Smirnov Test (Groups’ MRQ and RAS before and after the Treatment)

<table>
<thead>
<tr>
<th>Kolmogorov-Smirnova</th>
<th>Statistic</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIG. MRQ. Pre</td>
<td>.18</td>
<td>30</td>
<td>.08</td>
</tr>
<tr>
<td>SIG. MRQ. Post</td>
<td>.24</td>
<td>30</td>
<td>.09</td>
</tr>
<tr>
<td>SIG. RAS. Pre</td>
<td>.17</td>
<td>30</td>
<td>.11</td>
</tr>
<tr>
<td>SIG. RAS. Post</td>
<td>.31</td>
<td>30</td>
<td>.08</td>
</tr>
<tr>
<td>MIG. MRQ. Pre</td>
<td>.25</td>
<td>30</td>
<td>.22</td>
</tr>
<tr>
<td>MIG. MRQ. Post</td>
<td>.22</td>
<td>30</td>
<td>.11</td>
</tr>
<tr>
<td>MIG. RAS. Pre</td>
<td>.15</td>
<td>30</td>
<td>.09</td>
</tr>
<tr>
<td>MIG. RAS. Post</td>
<td>.16</td>
<td>30</td>
<td>.07</td>
</tr>
</tbody>
</table>

Note. SIG: Spaced Instruction Group; MRQ: Motivation for Reading Questionnaire; Pre: Pre-test; Post: Post-test; RAS: Reading Attitude Survey; MIG: Massed Instruction Group.

According to Table 1, all the p values were higher than .05; thus, it could be inferred that the distributions of scores for the MRQ pre-test, MRQ post-test, RAS pre-test, and RAS post-test of both groups were normal. Thus, parametric tests (i.e., paired and independent sample t-tests in this case) were safe to use for comparing the groups.

Results of Both Groups on MRQ as a Pre-test

To compare the MRQ scores of the SIG and MIG learners prior the treatment, it was necessary to run an independent sample t-test (Tables 2 and 3).

Table 2
Descriptive Statistics Results Comparing SIG and MIG on MRQ Pre-test

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRQ. Pre</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIG</td>
<td>30</td>
<td>38.80</td>
<td>5.32</td>
<td>.97</td>
</tr>
<tr>
<td>MIG</td>
<td>30</td>
<td>37.63</td>
<td>5.99</td>
<td>1.09</td>
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</tbody>
</table>
The pretest mean scores of the SIG and MIG for MRQ are illustrated in Table 2. In foreign language reading motivation questionnaire, minimal differences can be seen between the mean scores of the two groups. An independent sample t-test was run to ascertain if there were any statistically significant differences (Table 3).

Table 3
**Independent Sample t-Test Results Comparing SIG and MIG on MRQ Pre-test**

<table>
<thead>
<tr>
<th>Levene’s Test for Equality of Variances</th>
<th>t-Test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>MRQ. Pre</td>
<td></td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>.23</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>.79</td>
</tr>
</tbody>
</table>

The data demonstrated in Table 3 clearly indicate that no statistically significant difference can be found between the SIG and MIG on MRQ pre-test because the p value (.42) was higher than the significance level (p > .05). Accordingly, the researchers concluded that both groups were at the same level of MRQ prior the treatment.

Results of Both Groups on RAS as a Pre-test

Before implementing treatment, it was necessary to compare the RAS pre-test scores of SIG and MIG through an independent sample t-test to properly assess the homogeneity of both groups regarding their reading attitude.

Table 4
**Descriptive Statistics Results Comparing SIG and MIG on RAS Pre-test**

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAS. Pre</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIG</td>
<td>30</td>
<td>21.66</td>
<td>7.20</td>
<td>1.31</td>
</tr>
<tr>
<td>MIG</td>
<td>30</td>
<td>22.60</td>
<td>6.10</td>
<td>1.11</td>
</tr>
</tbody>
</table>

Table 4 demonstrates the SIG and MIG learners’ mean score on the RAS pre-test. An independent sample t-test was run to reveal if the difference between mean scores of both groups on RAS pre-test was statistically significant.

Table 5
**Independent Sample t-Test Results Comparing SIG and MIG on RAS Pre-test**

<table>
<thead>
<tr>
<th>Levene’s Test for Equality of Variances</th>
<th>t-Test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>RAS. Pre</td>
<td></td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>1.75</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td></td>
</tr>
</tbody>
</table>

Table 5
Table 5 shows that no statistically significant difference exists in the mean scores of the SIG and MIG on RAS pre-test because the \( p \) value was larger than 0.05 (\( p > .05 \)). Thus, it could be concluded that before the treatment both groups were at the same level of reading attitude.

**Results of Both Groups on MRQ as a Post-test**

Figuring out whether spaced and massed instruction had any significant effect on Iranian pre-intermediate EFL learners’ foreign language reading motivation was the first research question in the current study. To reach a reasonable answer to this question, the SIG and MIG learners’ MRQ posttest scores had to be contrasted through running an independent-sample t-test.

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRQ. Post</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIG</td>
<td>30</td>
<td>49.93</td>
<td>5.53</td>
<td>1.01</td>
</tr>
<tr>
<td>MIG</td>
<td>30</td>
<td>38.33</td>
<td>5.19</td>
<td>.94</td>
</tr>
</tbody>
</table>

Regarding both groups’ performance on MRQ post-test (see Table 6), it is obvious that the mean score of the SIG learners (\( M = 49.93 \)) was higher than the mean score of the MIG learners (\( M = 38.33 \)). An independent sample t-test was necessary to indicate if this difference was statistically significant.

<table>
<thead>
<tr>
<th>MRQ. Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levene’s Test for Equality of Variances</td>
</tr>
<tr>
<td>F</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Equal variances assumed</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
</tr>
</tbody>
</table>

Table 7 demonstrates that the difference between SIG (\( M = 49.93 \)) and MIG (\( M = 38.33 \)) on the MRQ post-test was statistically significant because the \( p \) value was lower than 0.05 (.00 < .05). This reveals that utilizing the spaced instruction could enhance the SIG learners’ reading motivation significantly.

**Results of Both Groups on RAS as a Post-test**

Regarding the second research question of this study which aimed to investigate if spaced and massed instruction had any significant effect on the Iranian pre-intermediate EFL learners’ foreign language reading attitude, the reading attitude post-test of both SIG and MIG was compared using an independent sample t-test.
Table 8  
Descriptive Statistics Results Comparing SIG and MIG on RAS Post-test

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAS. Post SIG</td>
<td>30</td>
<td>34.26</td>
<td>2.62</td>
<td>.47</td>
</tr>
<tr>
<td>MIG</td>
<td>30</td>
<td>23.06</td>
<td>6.06</td>
<td>1.10</td>
</tr>
</tbody>
</table>

Table 8 shows the descriptive statistics of both SIG and MIG on the RAS post-test. It is clearly seen that the means of the groups are different. The SIG had better performance than MIG. An independent sample t-test was run to indicate whether this difference was significant (Table 9).

Table 9  
Independent Samples t-Test Results Comparing SIG and MIG on RAS Post-test

<table>
<thead>
<tr>
<th>Groups</th>
<th>Levene’s Test for Equality of Variances</th>
<th>t-Test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>RAS. Post</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>37.07</td>
<td>.00</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>9.27</td>
<td>39.48</td>
</tr>
</tbody>
</table>

Table 9 demonstrates the RAS post-test scores of SIG and MIG. As the score of SIG (0.00) is smaller than .05, significant difference between the groups is seen ($p < 0.05$). The SIG got better grades on the RAS post-test. It can be deduced that the implementing the treatment (using spaced instruction) affected the performance of the SIG on the reading attitude post-test more positively.

To find out whether the difference between the foreign language reading motivation and reading attitude pre-test and post-test scores of the SIG and MIG learners was statistically significant, a paired-sample t-test was run (Table 10).

Table 10  
Results of Paired-Sample t-Test Comparing the Reading Motivation and Reading Attitude Pre-test and Post-test Scores of the SIG and MIG Learners

<table>
<thead>
<tr>
<th>Pair</th>
<th>SIG. MRQ. Post – SIG. MRQ. Pre</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SIG. MRQ. Post – SIG. MRQ. Pre</td>
<td>11.13</td>
<td>7.98</td>
<td>1.45</td>
<td>7.64</td>
<td>29</td>
<td>.00</td>
</tr>
<tr>
<td>2</td>
<td>SIG. RAS. Post – SIG. RAS. Pre</td>
<td>12.60</td>
<td>8.38</td>
<td>1.53</td>
<td>8.23</td>
<td>29</td>
<td>.00</td>
</tr>
<tr>
<td>3</td>
<td>MIG. MRQ. Post – MIG. MRQ. Pre</td>
<td>.70</td>
<td>1.60</td>
<td>.29</td>
<td>2.39</td>
<td>29</td>
<td>.07</td>
</tr>
<tr>
<td>4</td>
<td>MIG. RAS. Post – MIG. RAS. Pre</td>
<td>.46</td>
<td>.86</td>
<td>.15</td>
<td>2.97</td>
<td>29</td>
<td>.06</td>
</tr>
</tbody>
</table>
The Impact of Spaced and Massed Instruction on Foreign Language Reading.

Based on the data illustrated in Table 10, a significant difference can be seen between the MRQ pre-test \((M = 38.80)\) and MRQ post-test \((M = 49.93)\) of the SIG learners because the \(p\) value was smaller than the significance level (.00 < .05). In addition, the difference between the RAS pre-test \((M = 21.66)\) and RAS post-test \((M = 34.26)\) of the SIG learners was of statistical significance since the \(p\) value was smaller than the significance level (.00 < .05). Regarding the MIG group’s performance on MRQ pre-test and MRQ post-test and RAS pre-test and RAS post-test, no significant difference can be found as the \(p\) values were higher than 0.05 (.07 and .06 > .05). Thus, the researchers concluded that applying spaced instruction in the SIG classroom affected both reading motivation and reading attitude positively.

In brief, the required data were analyzed via means of independent and paired t-test samples. The findings revealed that the spaced group progressed on their MRQ and RAS post-test relative to their MRQ and RAS pre-test. Their post-test results were much higher than their pre-test grades. This enhancement may be the product of the spaced instruction. The outcomes of this survey are consistent with Year (2009) who explored the crucial role of the spaced effect in learning grammar. The findings showed that the spaced group greatly surpassed the massed group in the productivity and acceptability decision tests.

Spaced training helped the Iranian EFL students boost their reading enthusiasm and reading attitude. In spaced training, participants had more time to relax, more time to reflect, and more time to learn; this could relate to learners’ desire to learn and their attitude to reading.

The findings of this research are confirmed by Bird (2010) who studied the impact of direct L2 grammar training through spaced method of teaching. This research demonstrated that the spaced group had better performance than the massed group.

In addition, after evaluating the results, the consequences revealed that the massed group did not increase their MRQ and RAS post-test as opposed to their pre-test. Their grades for the MRQ and RAS pre-test and post-test were approximately equal.

The findings of this research are consistent with Sobel et al. (2011) who had 39 middle-school children and learned eight new English words over two sessions with a one-week break among study sessions. Children also learned the vocabulary under two separate working circumstances (massed vs. spaced). The findings found that the recall of spaced items was considerably stronger than the recall of massed items.

The results of this research were confirmed by Lotfolahi and Salehi (2017), who applied a novel approach to classify various timeframes for space in young EFL students. To this end, young EFL participants were taught English–Farsi words utilizing various spacing plans (massed vs. spaced). The results found that spaced training provided greater long-term retention than massed one.

Learning content over two or three sessions that are divided (i.e., staggered or dispersed) in time also results in greater positive effects than devoting the same period of time learning the subject in one session.

The more spaced two objects are, the more probably they would be interpreted separately in the respondent’s memory, as per the encoding heterogeneity hypothesis (Anderson & Bower, 1972). This inconsistency in retrieval cues and encoding, which is promoted by the various ways in which the spaced elements occur, offers additional retrieval clues. As a result, recalling is preferred in the spaced distribution instruction. In addition, as per the defective processing model, in the spaced periods, the first demons-
tration is not widely available at the time of the second demonstration, and the complete processing of the second presentation is therefore required (Fernbach, 2020). As a consequence, this method, in essence, encourages learning and knowledge retention. In essence, it is considered that when respondents are presented to two objects at the same time or within a brief period of time, they do not pay as much attention to these objects as when they are faced with ample spacing.

The findings of this study are in line with those of Mashhadi and Farvardin (2017) who examined effects of spaced and massed distribution instruction on EFL learners’ recall and retention of grammatical structures. The findings of their study showed that on the delayed post-test the spaced group performed better than the other two groups. However, on the immediate posttest, no statistically significant difference was found between the spaced group and massed one.

Conclusion

The finding of this research demonstrated that spacing training contributed to stronger learning than massed training. The results showed that the spaced group performed better on reading motivation and reading attitude post-test since they received the spaced training. According to the results obtained, it can be inferred that learning via spaced delivery training allows students to maintain an adequate amount of information acquired from training before the next chance for review occurs, either inadvertently via input, deliberately through extra education, or through the necessity to utilize a particular item in speaking, reading, etc. (Miles, 2014, p. 421).

There are several advantages to the academic field of foreign language learning, particularly reading comprehension, from the incorporation of spaced teaching. Using the spaced training definitely increases the students’ self-confidence in learning reading comprehension. The results of this study demonstrated that the English language learners should actively utilize spaced training to control their development and enhance their learning.

The outcomes of this survey would enable educators to educate their learners via spaced teaching, since this method of teaching is more efficient than the massed one. The outcomes will help English teachers utilize spaced instruction or massed instruction. With the insights obtained from this research, L2 instructors, analysts and curricula developers will be able to obtain information on how to promote the instruction of the English language via reading motivation and reading attitude through implementing spaced instruction and massed instruction.

Last but not least, sustainability is a problematic for every educational program. However, the literature directs us to a variety of main considerations that make it intuitive and feasible. First, sustainability is considered the main element of the process of implementation – a level at which the currently popular reading instruction program, which was specifically created, continues to evolve and increase students’ achievement. Second, the appropriate instructional approaches should be developed to promote the purpose of high reading success and be faithful to the key components of evidence-based reading activities. Finally, it is necessary to make an immediate effort to schedule and assess sustainability.

During the time of this study, the researchers faced some limitations. Due to time limitation, only 60 learners took part in this study. This study was conducted on male
students and the female students were overlooked. The other limitation referred to the treatment duration which was short. This study was restricted to the Iranian EFL respondents; it could be executed in other settings of the EFL and the ESL. The current research was performed on the Iranian pre-intermediate EFL students, so the outcomes should be very cautiously extrapolated to all language participants. The other constraint was that the research involved only students aged 16 to 18 years. The findings cannot, however, be extended to the other age groups.

References


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Interdisciplinary Inquiry-based Teaching and Learning of Sustainability in Saudi Arabia

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Wai Si El-Hassan
Guildford College for Higher and Further Education, Surrey, United Kingdom

Abstract

Saudi Arabian citizens, including university students, are in an interesting and precarious situation—they care for sustainability, but their economy thrives because of oil production. This study used an author-developed instrument to briefly explore 135 Saudi university students’ (nine disciplines) knowledge, awareness, evaluation and convictions of how to facilitate the nation to achieve sustainable development goals (SDGs) per Vision 2030 despite living in an oil-based economy. Within this context, the paper then reports 31 female Saudi pre-service teachers’ (also university students) experience with and reaction to using inquiry-based learning (IBL) to teach sustainability. Their feedback as emergent educators is invaluable for Saudi initiatives concerned with Education for Sustainability (EfS). Study participants were from Saudi’s Eastern Province (convenience and snowball sampling) with data collected in fall 2019. Recommendations include integrating IBL into teacher education, supporting IBL with Saudi cultural and religious practices, and communicating anthropogenic impact to Saudi citizens.

Key words: inquiry-based learning (IBL), sustainability and climate change, pre-service teachers, Saudi Arabia, education for sustainability (EfS)

Introduction

At the time of writing, the COVID-19 (a novel coronavirus) pandemic had brought more than 300,000 global deaths in six months (Picheta, 2020). Many economies have ground to a halt, but we now have cleaner air because of the decline in carbon (CO₂) emissions caused by fossil fuel combustion. When humanity resumes their normal lives after the pandemic, greener lifestyle and long-term sustainable, functional systems will be needed to curb a resurgence in massive carbon emissions that devastatingly affect humanity, wildlife and nature (Rasmussen, 2020). (By mid-January 2021, the number of the global COVID-19 deaths has reached 2.00 million (World Health Organization, 2021)).

There are five top oil-producing countries in the world. Pre-pandemic data from the Energy Information Administration (EIA) (2018) showed that the Kingdom of Saudi
Arabia (KSA) ranked second in the top five, contributing 12% of the world’s total oil production. From a closer-to-home perspective, the Saudi Arabian (SA) petroleum sector accounts for roughly 42% (nearly half) of its gross domestic product (GDP). However, while sustaining Saudi’s economy, oil production is also contributing to global air pollution (The World Factbook, 2020).

There is a link between the production and burning of fossil fuels, such as petroleum and natural gas, and extreme weather conditions, such as flash floods and environmental degradation, including deforestation and desertification. This link ties into the imbalance in the carbon cycle, which contributes to global warming and climate change. Saudi citizens, including university students, are in an awkward and precarious situation—they care for sustainability (Alghamdi & El-Hassan, 2019a), but their economy thrives because of oil production (Alyousef & Varnham, 2010; Kingdom of Saudi Arabia, 2016, 2018).

Instead of the conventional Education for Sustainable Development (ESD) approach (UNESCO, 2006), the education most needed to restore earth’s health is Education for Sustainability (EfS) (Selby, 2006). The former focuses on development (which can include oil production), and the latter concerns sustainability, which would critically challenge development and oil production. EfS depends on inquiry-based learning (IBL) and teaching (Ireland, 2007; McGregor, 2020; Selby, 2006) (to be discussed), which educators must learn so they can offer EfS.

To that end, this investigation was two-fold. First, it examined Saudi university students’ evaluation, knowledge, awareness, convictions and suggestions of how to facilitate their nation’s achievement of its sustainable development goals (SDGs) advocated in its new national development plan – Vision 2030 (Kingdom of Saudi Arabia, 2016, 2018). Second, the investigation sought contributions from prospective teachers who had to be able to employ innovative sustainability pedagogies. Appreciating that pre-service teachers’ (PSTs) insights should not be overlooked, several agreed to employ the inquiry-based approach and then share their experiences with the researchers. The key focus of this paper is the findings from prospective teachers with a brief, contextual nod to other university students’ ideas.

Literature Review

An imbalance in ecosystems is proof of anthropogenic (human generated) causes of loss of wildlife and reduction in the habitability of the earth (directly or indirectly). Examples include rising sea levels, collapsing coastal ecosystems (due to historical overfishing) (Duarte, Dennison, Orth, & Carruthers, 2008), large-scale deforestation, detrimental wildfires and floods, and continuous desertification (Gibbens, 2019; World Wildlife Fund, 2019). The fate of humanity and the health of the world are interconnected and deeply influenced by the anthropocene ethos (Trenberth, 2018). Alberro (2019) also points out the widespread and deep-rooted attitude of the separation of humans from nature in Western culture must change in order to mitigate environmental crises. The literature review profiled the scope and depth of damage caused by unsustainable development in concert with any messages of hope. It served to reinforce what Saudi university students must learn, come to terms with and respect (and what teachers need to teach) if they intend to support sustainable development (SD) while living in an oil-
producing nation (per the vision of Saudi’s new national development plan). Then, EfS is explained as is the IBL approach.

**Threats to Sustainability and Restoration of Earth’s Health**

In the long history of human food systems, both environmental and human health issues are mounting. The use of pesticides and synthetic fertilizers is contaminating air, water and soil. The use of hormones in animal husbandry is a major concern. Furthermore, poor practices in meat production is an issue. For example, the use of preventive antibiotics in animal husbandry contributes to antibiotic resistance in humans. The unregulated consumption of bushmeat and wild animals also poses human risks (Lindgren et al., 2018; Milner et al., 2017).

Coupled with the growing world population, human premature death is on the rise along with related issues, including malnutrition, which is now being addressed (Lindgren et al., 2018). Many people are undernourished and stunted and conversely many are overweight and obese (FAO et al., 2017). The world needs sustainable food systems such as those employed in India. They are adopting healthy dietary foods that could reduce dietary water footprints to meet future constraints “whilst minimising changes to cost and simultaneously cutting GHG emissions” (Lindgren et al., 2018, p. 1508; see also Milner et al., 2017). GHGs are greenhouse gases (e.g., CO\textsubscript{2} and methane) that contribute to global warming or *global heating* as Selby (2007) has reframed it. Excessive carbon emissions are causing adverse health effects, even loss of life (Public Health England, 2018).

About one-third (31 %) of the land area on the earth is covered with forests; trees are the lifeline of our planet (World Wildlife Fund [WWF], 2019). Sustainable forest management (SFM) is essential to restore the health of the earth. MacDicken et al. (2015) investigated the progress of SFM, explaining that *if* it were full strength, it would be possible for ecosystems to renew themselves to ensure their long-term productivity and health. They concluded that “the evidence shows a trend favorable to SFM globally” (p. 55). An enabling environment for SFM is mostly in place, and progress at the operational level is evident in support from governments, industry and communities. That said, some forestlands are yet to be sustainably managed (MacDicken et al., 2015).

Another negative development is the loss of the Amazon rainforest, called the lungs of the earth. Gibbens (2019) poignantly described the sight of the intensely burning Amazon rainforest due to wildfires. This phenomenon is destroying a significant portion of the rainforest and habitats, made worse because these fires were deliberately set in the cause of deforestation to make way for business activities. According to WWF (2019), around 17 % of the rainforest was lost in the last 50 years due to deforestation. This crime against nature and humanity was committed by heads of transnational corporations who wanted land for their own economic activities, such as cattle ranching and soy growing. As a result, “we’re losing 18.7 million acres of forests annually, equivalent to 27 soccer fields every minute” (WWF, 2019, para. 2). Without trees and vegetation (both on land and in water), wildlife loses food sources and habitats, and the carbon in the atmosphere cannot be absorbed at its usual rate. Failure to absorb CO\textsubscript{2} emissions, which have already reached an alarming rate, is causing severe impacts on the health of both humans and all living creatures.
Consequences of Global Warming and Possible Deterrents

It is now commonly known that the consequences of global warming can be calamitous as evident in the extreme and frequent changes in climate patterns resulting in the paradoxical, simultaneous rising of sea levels and shortages of potable (drinkable) water. These consequences lead to the displacement of climate refugees, people who are forced to leave their region due to climate change-induced alterations to their natural environment (Boano, Zetter, & Morris, 2008). Unprecedented results of global warming include melting glaciers in the Tibetan plateau and flash floods in Saudi Arabia (United Nations High Commissioner for Refugees [UNHCR] (UK), 2019).

Although the environment has become cleaner amidst the global COVID-19 pandemic lockdowns (Rasmussen, 2020), the improvement is only temporary. A long-term solution requires intervention to deter the resurgence of devastating CO\textsubscript{2} emissions. Continued reliance on fossil fuels is not sustainable. It is time to reconfigure the relations between humans and nature; wildlife and the environment (Roberts, 2020). This will require a different kind of education, more than education for sustainable development (ESD).

Education for Sustainability (EfS)

The dramatically improved clarity of air and water during the global coronavirus lockdown in spring 2020 is visible from space as is its resurgence once economies started to reopen (Rasmussen, 2020). The positive outcome is the result of the contraction and reduction of pre-pandemic economic development and consumption. For example, virtually all fossil-fueled planes were grounded around the world. Selby (2006) advocated that sustainability education should focus on the conservation of nature instead of the conservation of development and progress. He recommended Education for Sustainability (EfS). Explaining Selby’s approach, McGregor (2020) clarified that “people need to pull back from aggressive production and consumption and live modestly by moderating their actions [with] sustainable moderation... that is the ultimate focus of education” (p. 5).

Instead of focusing on the sustainability of development as ESD does, EfS concerns teaching students to “respond to the complex sustainability issues they encounter in their personal and working lives” (Commonwealth of Australia, 2009, p. 10). Done properly, this pedagogy helps reorient the way people live by building capacity “to tackle the underlying causes of unsustainable trends and [strive for] systemic change” (Commonwealth of Australia, 2009, p. 10).

Using a collection of principles, educators strive to instill “the values and the motivation to take action for sustainability” (Australia Department of Education and Training, 2015, para. 2). This involves building knowledge and awareness of sustainability divorced from development, developing worldviews beyond mechanistic to ecological, polishing critical and creative thinking skills, instilling a reflective mindset, and valuing justice, participation, a future orientation and systems thinking (Australian Curriculum, Assessment and Reporting Authority, 2015; Commonwealth of Australia, 2009; Ireland, 2007).

Among many advocates of adopting effective pedagogies in educating students of (tech-savvy) Generation Z in the 21\textsuperscript{st} century, Cédere and Keviša (2018) embraced the
transdisciplinary approach to teaching and learning of natural science. The teaching and learning of EfS can adopt similar approach as well. Salite et al. (2016) saw transdisciplinary approach as a solution that “can open a new perspective for understanding and interpretation of the complex phenomenon of sustainability” making it possible to integrate research and a myriad of learning activities. Transdisciplinary approach (as opposed to traditional approaches) forges “a link between science, real life, [students’] personal interests and participation in the process of learning” (Cêdere & Keviša, 2018, p. 8).

Inquiry-Based Teaching and Learning

The inquiry-based approach to teaching and learning is a powerful instrument for EfS. IBL can be an effective way for students to learn about and address interdisciplinary issues such as unsustainability, climate crisis, global warming and heating, and gray carbon emissions (Ontario Ministry of Education, 2013). “When used effectively, it increases student agency in learning and can strengthen authentic connections to the world around them” (Science Learning Hub, 2017, para. 4). Furthermore, employing IBL enhances diverse learning outcomes including “the development of students’ [a] active thinking skills and conceptual understanding…, [b] abilities to formulate hypothesis [sic] and questions … and [c] [academic] performance levels (Effendi-Hasibuan, Ngatijo, & Sulistiyono, 2019, pp. 538–539).

The IBL approach is ideal when exploring interdisciplinary knowledge or cross-curricular subject matter. Inquiry requires more than “simply answering questions and getting a right answer. … It is enhanced by involvement with an Inquiry Community in social interaction in which each can learn from the other” (Kuklthau, Maniotes, & Caspari, 2007, p. 133). IBL espouses investigation, exploration, search, quest, research, pursuit, and study (Baraquia, 2018). The application of inquiry learning thus helps cultivate a culture of inquiry, which encourages students to learn collaboratively (Kuklthau et al., 2007).

Banchi and Bell (2008) identified four levels of IBL: confirmation inquiry, structured inquiry, guided inquiry and open inquiry. IBL “requires a degree of scaffolding tailored to the level and experience of the students” (Science Learning Hub, 2017, para. 4), so they are motivated by intrinsic interests and equipped with the skills to conduct their own research and investigation.

Interdisciplinary Nature of Sustainability Inquiries

The study of (un)sustainability is interdisciplinary in nature and involves knowledge of many disciplines (Cairns, Hielschere, & Light, 2020; Walshe, 2016), including but not limited to: social, natural and physical sciences; geography and urban studies; formal sciences (computer, mathematics, statistics), applied sciences (technology, business, medicine); and the arts and humanities (law, history, philosophy, ethics). Interdisciplinarity seeks intersections, connections, synergies and tradeoffs among disparate and divergent ideas. The intent is to create a new integrated whole that can be used to address (un)sustainability (Cairns et al., 2020).
Baraquia (2018) added the notion of “interdisciplinary contextualization” wherein educators contextualize the lesson by embedding it in the “cultural, historical, ideological fabric” (p. 54) of learners’ lives. This way, they remember what they learned, because it was meaningful. Authentic learning is further assured if interdisciplinary contextualization is combined with IBL. The latter ensures that learners are provided opportunities to “make connections, draw conclusions or generalizations, explore and work cooperatively, discuss and debate, express knowledge in a variety of ways, and use multiple intelligences” (Baraquia, 2018, p. 54).

Method

This study unfolded in fall 2019 in the Eastern Province of Saudi Arabia. The research design comprised two parts. Part one involved administering an author-developed questionnaire (both English and Arabic) to 135 university students enrolled at a university to which the lead author had ready access. Respondents (who participated voluntarily) were recruited through university colleagues and the lead author also reached out via email and text to previous students. The entire process was facilitated by convenience and snowball sampling augmented with WhatsApp. Most (≈ 60 %) of the instruments were delivered and returned by email to the researchers with the remaining (≈ 40 %) hand delivered and picked up then returned to the researchers. Respondents were assured anonymity and advised that their answers would be used for research.

Section A of this instrument collected demographic information (area of study, type of degree, age and sex). Section B comprised 10 questions intended to measure their knowledge, awareness, evaluation and convictions of how to facilitate SA achieving its SDGs per Vision 2030 despite living in a fossil fuel producing country. Five questions (#1–4, 9) were either matching, yes/no or had a Likert scale. Five questions (#5–8, 10) were open ended and dealt with their inclination to support SD in Saudi Arabia, possible actions to protect their community’s environmental well-being, any responsibilities to future generations, and how their culture and religion affected their views on SD. Data were analyzed using descriptive statistics (frequency counts and percentages), and open-ended questions were analyzed separately to glean collective responses and positions.

For part two of the investigation, 31 female teacher trainees (PSTs) enrolled in a public university in the Eastern Region of SA (lead author access) voluntarily agreed to participate. They tendered their responses via email during a semester break. Anonymity was assured, and they were aware that their contribution would be used for research. An instrument was developed to facilitate a two-step process: use the IBL approach and then assess their experience. Regarding the former, four questions/tasks lead them through the process of using IBL to research flash floods in Saudi Arabia and its neighboring regions.

After completing the IBL assignment, seven questions queried them about their actual experience (e.g., was it motivating, were they left with too many questions, were they satisfied with sources found). Three open-ended questions wrapped things up and focused on how they would improve the IBL activity. Data were analyzed using descriptive statistics (frequency counts and percentages), and all questions were analyzed separately to glean collective responses and positions.
Part One: University Student Results

Demographics

There was a good mix of respondents studying in a wide range of disciplines (24 % did not answer this question). In descending order, these included education, health sciences, humanities, science, computer science, engineering, math, business and finance, and languages. Most (67 %) respondents were aged >25. Slightly more than half (56 %) were female (41 % male). A small percentage (3 %, n = 4) did not specify their sex. Most (75 %) were enrolled in an undergraduate degree. Detailed results of this part of the investigation are available on request with a brief summary shared herein to provide context for part two of the study, which is PSTs’ (also university students) trial usage of IBL. In the following sections, nominal dialogue is integrated only when doing so reinforced the poignancy or implication of a result.

Evaluation, Knowledge, Awareness, Convictions of Achieving Vision 2030

While Section A of the instrument gathered demographics, Section B sought insights into Saudi university students’ evaluation, knowledge, awareness, convictions and suggestions of how to facilitate the country to achieve its SDGs per Vision 2030. First, a telling result emerged when asked if they had ever heard of social movements or global events such as Global Climate Strike, Earth Day, or Extinction Rebellion. Nearly all (83 %) said “no”. This result implies a deep lack of awareness among Saudi university students of worldwide youth movements that bring millions of people together to stand up for humanity and the earth.

Supported Sustainable Development

Most respondents correctly answered questions that assessed their knowledge and understanding of fossil carbon (gray carbon) and green carbon (deriving carbon from renewable resources). The majority (87 %) supported sustainable development (SD), including fossil carbon reduction, despite being citizens of a fossil fuel producing country. Seven reasons were tendered for supporting SD (see Figure 1, frequencies) with the most common reasons being reduction of negative impact of unsustainable development (29 %, n = >40) and protect the environment (22 %, n = >30). Fewer respondents (7 %) said they supported SD because it involved seeking energy alternatives or preserving human health and lives (mentioned <10 each).

In another telling result (see Figure 1), virtually no one (n = <5 %, 3.7 %) said they supported SD because they thought it would help sustain the future or raise awareness of the anthropogenic impact on all life. Respondents seemed to lack an appreciation for or realization that anthropogenic damages were happening now (not in the future). While very few said SD would sustain the future, they still said they supported SD (87 %, n = 118) despite living in an oil-producing country. Ironically, changing Saudi’s economic model so it shifts away from unsustainable oil production would also impact their future (Alyousef & Varnham, 2010).
Figure 1. University students’ reasons for supporting sustainable development in Saudi Arabia

**Plausible Actions**

The majority (90 %) of respondents offered multiple suggestions for what they could do to protect the environment as members of the community (see Figure 2, frequencies). This high response level reflects an apparent belief that they can become active members of the community to protect the environment. The four most common actions (mentioned 25–35 times each) were sustainable waste disposal, resource conservation, awareness raising, and green carbon and afforestation (tree planting). A noteworthy result was mentioning less (<15 times) the preventative measures like education and knowledge or punitive measures such as law enforcement.

Figure 2. University students’ proposed actions as community members to protect the environment
Securing Future for Next Generation

As a member of society, the respondents expressed their responsibilities toward ensuring that the younger generation has a secure future (see Figure 3, frequencies). Mostly, they felt it was their responsibility to cultivate a culture of awareness, ensure education and research on sustainability, and conserve the environment and resources for the next generation (mentioned ≈ 30 times each). Very few university students felt it was their responsibility to give advice and guidance, get involved with community service, or provide a good upbringing to prepare younger citizens to be sustainable (mentioned <5 times each). Perhaps this is because respondents were adults but not yet parents who might have increased environmental concerns (Milfont, Poortinga, & Sibley, 2020).

Responsibilities to take because of the younger generations

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cultivate a culture of awareness</td>
<td></td>
</tr>
<tr>
<td>2. Education &amp; Research</td>
<td></td>
</tr>
<tr>
<td>3. Conservation of natural resources and the environment</td>
<td></td>
</tr>
<tr>
<td>4. Be a role model</td>
<td></td>
</tr>
<tr>
<td>5. Reduce the use of fossil fuels and use renewable or alternative energy sources</td>
<td></td>
</tr>
<tr>
<td>6. Derive benefits from the economy</td>
<td></td>
</tr>
<tr>
<td>7. Keep the environment clean &amp; free from pollution</td>
<td></td>
</tr>
<tr>
<td>8. Provide good upbringing of the youth to prepare next generations</td>
<td></td>
</tr>
<tr>
<td>9. Involve with community service</td>
<td></td>
</tr>
<tr>
<td>10. Give advice and guidance</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3. Major responsibilities for ensuring next generations’ future

Culture, Religion and Sustainability

The majority (91%, n = 123) of respondents answered the question about how their religion and culture affected their views on restoring the health of the earth, but some (7%) did not, and 2% said they did not know the answer. Those who answered tendered affirmation of how their culture or religion informed their views of healing the earth with highlights presented in Table 1. Two other selected statements exemplify their collective answers: “The religion of Islam instilled in us many values and urged the conservation of the land and the environment; that is a religious duty” and “The land and what is from it is a blessing of God that a Muslim must thank God for so that the blessings will be increased.”
Table 1

Respondents’ Thoughts on How Culture and Religion Affect Views on Restoring the Earth

1. God created us on the earth to build and preserve it, not to destroy it. From this logic, we must preserve the environment, rebuild the earth, and reduce corruption.

2. God created man from the earth (clay) and made provision for humans (Qur’an, 23: 12–15 & 18–21), appointed man (Adam) as a vicegerent on the earth (Qur’an, 2: 30–33) and warned us “to make no mischief on the earth (including: cause no corruption in the land)” (Qur’an, 2: 11).

3. As Muslims, we are obligated to protect the environment and conserve natural resources, thereby avoiding overconsumption.

4. Self-censorship and self-monitoring of own behavior and manner to earn God’s grace and to show fear of God.

5. The Prophet (pbuh) was reported to say: “If a Muslim plants a tree or sows seeds, and then a bird, person or animal eats from it, it is regarded as a charitable gift (sadaqah) for him.”

To wrap up, Alghamdi and El-Hassan (2019b) painted a grim picture of Saudi university students’ knowledge of sustainability, but students had a good attitude toward green living. Compared to their results, we found that Saudi university students seemed to have a better grasp of what constitutes environmental sustainability and a more positive attitude toward and greater awareness of CO₂ emission reduction and their impact on sustainable living. These results affirm Alghamdi and El-Hassan’s (2019a) finding that Saudi university faculty members (specifically ESL instructors) thought sustainability and Saudi energy issues should be included in higher education curricula.

Part Two: Pre-service Teachers’ Findings

In the second part of the investigation (more qualitative in nature), PSTs completed an IBL assignment and then answered questions about the experience offering recommendations for improving it. Nominal dialogue is integrated into this section when doing so reinforced the poignancy or significance of a finding.

PSTs’ Reactions to the IBL Experience

The PSTs completed the assignment virtually, not at the university site or in person. Twenty-eight (n = 28) completed IBL assignments were returned electronically with duplicates because group work was excluded. Their task was to complete an inquiry about the causes, frequency, and consequences of flash floods in desert regions (a symptom of climate change). They were asked to comment on (a) the sources they used and their perceived worth in completing the assignment (e.g., newspapers, research journals, the internet and social media); (b) why they chose to work alone or in a group and the value of this mode; and (c) whether they found the IBL experience motivational and if it left them wanting – if they still had questions.

The majority (90 %, n = 25) of participants found the IBL activity very motivating with three PSTs (10 %) saying the opposite, one because the topic was too narrow. They felt it was motivational, because the tasks helped them understand and learn that climate change was happening in Saudi Arabia manifested in flash floods in a desert (an
oxymoron). They discovered previously unknown-to-them information about flash floods and their impact on local Saudi citizens. The IBL activity not only raised awareness of individual actions that might cause climate change but also how to prevent flash floods. Some PSTs said that it was an “eye-opener” to understand the types of conflict happening right around them and in the world. They also learned the importance of staying alert, preparing for what would be coming and, above all, finding solutions to flash floods and other aspects of climate change.

Participants saw value in being able to choose between Arabic (mother tongue) and English to complete the assignment. From iterative readings of their answers, we sensed that Saudi-speaking PSTs had their own way of framing questions intimating that writers of teaching/learning materials could benefit from better communication with their targeted audience (i.e., Arabic-speaking educators).

PSTs also appreciated having different types of questions to answer, thus enabling them to carry out the investigation in more depth. The PSTs also said that more questions could have been provided to make the IBL activity more interesting. Of the 31 questions, the PSTs tendered for consideration, 71% pertained to climate change and not flash floods, the actual focus of the assignment. Targeting flash floods, PSTs thought the inquiry should have queried why and when most flash floods happened in general and why in a desert? Regarding climate change, they wanted a chance to inquire about (a) how to raise awareness of climate change, (b) how dangerous is climate change and how easy is it to combat, (c) and what is the Saudi government doing about climate change?

The majority (71%) of PSTs preferred working alone with slightly more than one quarter (29%) choosing group work to complete the IBL activity. They worked alone mainly because they felt that group work was too slow (and took too much time), distracting, acrimonious, and it was too challenging to communicate. Working individually would help them learn and gain deeper understanding, which would make them self-reliant and more confident. Group work was preferred, because they can learn from each other’s backgrounds, perspectives and points of view. Several said that group work was more efficient leading to more detailed and better information about the issue. Others appreciated the help within a group, because they found the tasks to be difficult, especially figuring out what the questions meant.

Most university students are keen to use social media. But only one-fifth (19%) of the PSTs (also university students) used these platforms to collect data to inform their inquiry about flash floods in SA. They benefited from the (a) images and pictures of flash floods and (b) archived information and threaded discussions. They also used social media to communicate with fellow students to help them understand the learning tasks, and some contacted family members or others to seek help with their inquiry. The 81% who did not use these platforms said that they distrusted using social media for IBL activities, because multiple opinions were distracting, and these media did not give reliable information.

PSTs’ Suggestions for Improving the IBL Experience

Participants’ ideas on how to improve the IBL experience were likely shaped by the fact that virtually (99%) none of them had ever researched climate change, let alone flash floods in their home country. A related finding is that 83% of university student
respondents had never heard of the global climate change youth movement. That said, the PSTs offered feedback on how the IBL experience about climate change impact (e.g., flash floods) could be improved: (a) to provide key words in order to facilitate the search process, (b) to break the tasks down into even smaller steps to lead learners to the answer and (c) to give some directions on how to write a conclusion.

Two issues arise from this finding. First, the researchers assumed the PSTs (who already have an undergraduate degree) had previous knowledge of and experience with conducting a simple research project, including writing conclusions to complete their inquiry. However, it was noticeable that their dexterity with using sources, knowledge about data collection, and conclusion writing skills were lacking. Second, and very likely related, the nature of the participants’ suggestions for improving the IBL experience suggest that they could have benefited from better scaffolding so the activity matched their level and experience (Science Learning Hub, 2017) rather than assuming pre-existing levels of expertise.

Nevertheless, their inputs will be essential in modifying the IBL assignment for future use. We anticipate that the final product can become a model for any climate change or sustainability related IBL investigation. Participants shared many ideas about other tasks that could be completed by students engaged with IBL activities aside from writing a report with conclusions (something not all felt comfortable with, per above). They recommended the creation of PowerPoints, digital posters, videos, brochures, visual representations and graphics, an online quiz using Kahoot, even a plenary session—anything it seems except formal report writing. The key reasons given for these recommendations were to make learning fun, vibrant and interesting and help learners grasp the gravity and seriousness of the issue.

Open-ended Comments

The researchers categorized the participants’ open-ended comments about how to keep learners motivated when engaging with interdisciplinary issues using IBL into two themes: education and community efforts.

Education. PSTs said that people could not rectify climate change unless they acquired knowledge about it. Secondary and university students need to learn that the environment is their home and that of their future family. They said this could be reinforced with a connection to religion and culture. They believed that because Islam urged humankind to preserve the environment and every living organism, it could be linked to environmental protection. This can effectively draw students’ attention to the issues of (un)sustainability and the harmful consequences of climate change that impact Saudi society.

PSTs felt that learners needed help in making the connection between human activities and behaviors (anthropogenic) and their impact on the environment. It is important to show students what is really happening in the world leading to and because of climate change. They must learn how important it is to be educated, so they know what they are talking about and advocating for. They said that public school activities to raise such awareness and build knowledge might include integrating climate change research into art projects, engaging students in a pollution experiment, or creating an online social media forum to spread climate change awareness. They believed that these efforts
could make students verify sources and ensure their reliability to avoid sharing false and misleading information. One student said, “Trump and his administration are claiming that climate change is a fake story. Discuss this.”

Community efforts. Although fewer comments fell within this category, the PSTs did offer insightful ideas. They felt IBL experiences should teach students to respect and uphold Saudi laws about environmental protection. People need advice and guidance about sustainable consumption of natural resources. The current Saudi lifestyle needs to be challenged and changed so sustainable consumption is ensured. PSTs were convinced that Saudi citizens could become informed and spread awareness of steps and actions that would protect the environment and preserve Saudi’s natural resources. They said that efforts to foster solidarity and help people come together to tackle climate change should be enacted.

Discussion and Pedagogical Implications

Study results and findings have pedagogical implications pertaining to (a) inquiry-based teaching and learning about sustainability in Saudi Arabia, an oil producing nation, and (b) what pre-service teachers need to learn given their many years of an oil-dependent life (Alyousef & Varnham, 2010). Discussion points and recommendations herein promote Alghamdi and El-Hassan’s (2019b) suggestion that Saudi secondary curricula should “privilege standalone courses pertaining to Saudi related energy issues. These curricula and courses should be ever-greened, kept fresh, current and relevant” (p. 534). Part of the ever-greening process could include imbuing curricula with interdisciplinary contextualized inquiry-based learning.

Supporting IBL with Saudi Cultural and Religious Practices

As Islam is deeply rooted in Saudi society, the PSTs’ conviction and belief in the earth’s health restoration was well-supported by their religion (see Table 1). They clarified that Islam urged people to preserve the environment and every living thing. Findings support the recommendation that educators use the Islamic teachings regarding the environment as a starting point when delivering sustainability lessons using the IBL approach. This would be an example of interdisciplinary contextualization (Baraquia, 2018). Several Saudi universities have already linked Islamic traditions to energy and sustainability related issues and concepts (Taleghani, Ansari, & Jennings, 2010). According to the findings of our study, in addition to focusing on culture and religion, IBL teaching materials for sustainability and climate change should cover aspects of the community and Saudi society.

Integrating IBL into Teacher Education

If educators use IBL activities as they draw on extreme weather conditions as evidence of unsustainability, students will not be able to turn a blind eye to these pressing issues. Interdisciplinary problem solving via IBL heightens awareness and promotes knowledge about how uncritically examined climate change will destroy their future (Baraquia, 2018; Cairns et al., 2020). PST participants successfully completed the IBL activity
about flash floods in Saudi Arabia, but they also wanted the activity to focus on a broader issue of climate change. This finding implies comfort with addressing broad interdisciplinary issues and teaching students using the IBL approach.

IBL can be task-oriented or based on a problem (Hwang, Chiu, & Chen 2015). The PSTs asked for more technical directions to complete the assignment likely due to insufficient scaffolding on the part of the researchers (Science Learning Hub, 2017). Teacher education programs need to integrate IBL into their curricula instead of erroneously assuming that university graduates coming into these programs have already experienced it. Any opportunities for PSTs to practice IBL while in a teacher education program should extend over several weeks, so they can gain more competence with the approach (Plevyak, 2007).

On a related note, the research design gave Saudi PSTs a task, which they did complete, but many suggested the work would have gone easier if the tasks were broken down into even more minute steps. They were not challenged to problem solving. Future researchers interested in how well Saudi PSTs accommodate themselves to IBL should also pose the learning experience as a problem and not just as a collection of steps (Hwang et al., 2015). This would yield comparative data for refining how to orient PSTs to the merit of inquiry-based learning to teach sustainability in an oil-producing nation. They could become champions of using IBL in EfS instead of promoting ESD with its focus on development. The best way to address sustainability is through problem posing, problem addressing and, if fortunate, problem solving. Technical, task-oriented approaches are useful but not enough (Ireland, 2007; Selby, 2006).

### Promoting IBL Collaboration with Online Academic Support

Ideally, the IBL approach encourages a culture of inquiry that is augmented with the creation of a community of learners, which is best achieved via group work (Banchi & Bell, 2008; Kuklthau et al., 2007). In our study, most (71%) PSTs eschewed group work, thereby losing the chance to work together in a learning community and foster a culture of collaborative inquiry and learning. They could have drawn on this experience when they became teachers. Other researchers replicating this research protocol should consider advocating group work over individual IBL (Baraquia, 2018). To better ensure collaborative work when using the IBL approach, the provision of online academic discussion forums is also recommended. Online tutors could be assigned to guide students and answer their queries, and moderators could monitor the social aspects of online discussions keeping them orderly and respectful.

### Augmenting IBL with Diverse Learning Tasks

The PSTs fervently shared ideas about how to augment IBL, which they enjoyed. Their recommended activities (e.g., videos, plenary sessions, artwork) would ensure that students with different learning styles could thoroughly and effectively use the IBL approach to learn about sustainability and climate change: visually, aurally, verbally and physically (i.e., kinesthetically using the body, hands and sense of touch) (Baraquia, 2018). Hwang et al. (2015) affirmed that IBL could be used with all learning styles if augmented with diverse learning tasks.
Communicating Anthropogenic Impact

On a final note, results affirm that earlier attempts by scientists to raise people’s concerns about climate change may not have been deeply taken in Saudi Arabia. To illustrate, virtually none (99%) of the PSTs had ever researched climate change before. They intimated that the anthropogenic (i.e., human generated) impact on the global climate would not become our immediate concern unless a closer connection was made for students between the imminent danger anthropogenic behavior posed to them and their habitats. Educators should strive to make this connection easier to understand.

Many online and offline resources can provide vivid images to convey this impact, and an array of school activities can raise people’s awareness of the link between the anthropogenic ethos and climate change (glaringly evident in flash floods happening in urban cities). Hand in hand, findings suggest that students need to acquire (a) research and inquiry skills and report writing skills; to learn (b) how to select reliable sources and accurate data through verification of multiple sources; and (c) how to solve problems if the IBL is presented as a problem (Hwang et al., 2015).

Conclusions

Despite the fact that the Saudi economy relies heavily on its oil industry, university respondents from multiple disciplines were convinced that sustainability had to be achieved, because it was a long-term solution to existing environmental degradation, which, if left unattended, would diminish the chances of a good environment locally. This result suggests that achieving the SDGs while implementing Vision 2030 depends on orienting university students to the impact of oil production on sustainability in the KSA. They are the future of industry, government and education. Furthermore, Saudi university respondents’ lack of awareness of global climate change youth movements raises concerns (and opportunities), because these already existing platforms pave the way for positive dispositions toward combating sustainability and climate change.

Most PSTs applauded the learning of climate change using inquiry-based learning. They felt that the research task they completed raised their awareness of the local effects of climate change. They benefited from investigating, exploring, searching, going on a quest, pursuing, researching and studying. Findings suggest that teacher education programs should orient all PSTs to IBL from the interdisciplinary contextualization perspective. This would honor the role of Islam and Saudi culture and language in learning about sustainability in an oil-producing nation that is committed to achieving SDGs.

In short, the PSTs’ positive feedback on the IBL experience was very encouraging. Their recommendations as emergent educators will aid in richer discussions of IBL pedagogical considerations for use in the Saudi educational context. Such initiatives bring the nation closer to Education for Sustainability implemented using interdisciplinary contextualization and inquiry-based learning. For this to happen, Saudi pre-service teachers must be socialized to these pedagogical innovations with on-the-ground findings from this study contributing to that vision. By reflecting on teaching and learning about sustainability, PSTs would be able to strengthen their “problem-solving and decision-making... and... critical-thinking abilities” (Aldahmash et al., 2017, p. 43).
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Environmental Education Competency: Enhancing the Work of Teachers

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Abstract
The research into the environmental education competency of secondary school teachers was conducted using mixed research methods. The data were collected using the questionnaire and the structured interview. The teachers of eco-schools completed the questionnaire and teacher advisors as well as mentor teachers of the eco-school project participated in the structured interview. The research findings revealed that most respondents had a moderate level of environmental education competency that involved six aspects: knowledge of the environment, basic understanding of the environment, responsibility for the environmental education of professional teachers, planning and practice with regard to the environmental education, promoting learning about the environmental education and evaluation of the environmental education. The approaches to enhance the environmental education competency of secondary school teachers should involve multidisciplinary instruction learning, community-based learning, project-based learning, happy teaching and learning, and holistic learning management.

Key words: Environmental education, multidisciplinary instruction learning, community-based learning, project-based learning, holistic learning management

Introduction
Environmental education (EE) is a tool to sustain development success. Chatzifotiou (2006) reported the impact of environmental education on primary teachers in England and discussed sustainable development in this field. Since environmental educators are considered one of the main actors in sustainable development, the article aims to show the interaction among environmental education, national curriculum and primary teachers. The conflict between the study of sustainable development and environmental education in the national curriculum seems to be both parallel and convergent. This article also describes some aspects of education for sustainable development based upon environmental education. Álvarez-García, Sureda-Negre, and Comas-Forgas (2015, pp. 72–85) evaluated and analyzed the relationship of environmental education.
The success of the environmental education process requires a standard teaching in all systems of school management that the environmental education is the policy, which lacks concrete and clear methods and practices. There is a need to recognize the unsustainability as a trend in global development known as Anthropocene that has been identified by studying human nature relationships (Salite, 2015; Salite et al., 2019). The teachers lack understanding and skills in environmental education. Teachers have many duties, lack the cooperation of the school system, and lack the knowledge of resources for learning from nature and environment to promote the learning of students. To find the ways for developing and managing the environment in a changing world, in teaching and the curriculum activities of the basic education the children have the opportunity to really practice, learn from some real experiences and experience more activities than in the past. Teachers have a lot of teaching and do not have enough time to find the information, as well as most teachers do not graduate in the field of teaching, although vocational education and higher education are interrelated and many are able to create the curriculum themselves. Various curricula lack environmental integration and students lack awareness of the energy and environment, including the advisor who lacks relevant information on the current situation (Salite et al., 2016).

According to the research conducted by the Department of Environmental Quality Promotion (the Ministry of Natural Resources and Environment) in 2015, the problem of environmental education in schools is related to teachers because they create learning platforms for their classrooms. The development of the environmental education process is successful when all personnel in the school see the importance of working with the community. They look at the development of environmental education processes to link communities and schools, which cannot be separated because the process of raising awareness for children does not only happen in school. The children are the medium of linking environmental knowledge in school to the community and this results in concrete objectives to solve environmental problems and achieve sustainability in a community. Therefore, the present research examines the current situation of environmental education competency of secondary school teachers and investigates the ways how the teachers should improve their environmental education competency.

Research Methodology

Both quantitative and qualitative research methods were used to study the environmental education competency of teachers in secondary schools. The research examined secondary school teachers from 6 regions of Thailand. Questionnaires were used to collect data from 408 teachers involved in environmental activities and projects for secondary schools. The authors also conducted in-depth structured interviews to find out opinions on the environmental education competency from 19 mentor teachers from nine eco-schools, and the Director of the Environmental Education Sector, Department of Environmental Quality Promotion, Ministry of Natural Resources and Environment.

Research Results and Discussion

The research findings revealed that the teachers were largely female (73.28 %), over 50 years old for most of the professional level teachers (35.54 %), and had a Bachelor degree (65.69 %). Science teachers (44.36 %) participated in activities/environment-
mental training projects 1–2 times in the academic year or once per semester. The 20 participants of the in-depth interview were 19 secondary school teachers from 9 pilot schools of environmental education for sustainable development (eco-school), and the Director of the Environmental Education Sector, the Department of Environmental Quality Promotion, Ministry of Natural Resources and Environment.

Competency may be referred to the “ability, potentiality, performance, or desirable behavior” (Arporn Puvitayaphan, 2018, pp. 13–17). It has three components: 1) knowledge and understanding that refer to the recognition of thinking, principle, process, the stages of each subject, which require the pursuit of knowledge such as studying in schools, classroom training, reading, asking knowledgeable people, teaching; and study trips; 2) skills that are the actions or expressions, which are frequently practiced; and 3) attributes that refer to the mind of each person and the inner power that fuels inner growth or implantation developed from childhood such as patience, honesty, working commitment, conscious mind, ethics, positive thinking, circumspection, and responsibility, etc.

The characteristic of the environmental education competency has shown the ability of secondary school teachers to integrate environmental education with a variety of learning areas for the students in eco-school. The environmental education competency consists of six aspects (see Table 1).

Table 1
The EE Competency of Secondary School Teachers

<table>
<thead>
<tr>
<th>Environmental education competency</th>
<th>( \bar{x} )</th>
<th>S.D.</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Knowledge of the environment</td>
<td>3.51</td>
<td>0.73</td>
<td>High</td>
</tr>
<tr>
<td>2. Basic understanding of the environment</td>
<td>3.46</td>
<td>0.73</td>
<td>Moderate</td>
</tr>
<tr>
<td>3. Responsibility for the environmental education of professional teachers</td>
<td>3.39</td>
<td>0.83</td>
<td>Moderate</td>
</tr>
<tr>
<td>4. Planning and practice with regard to the environmental education</td>
<td>3.48</td>
<td>0.75</td>
<td>Moderate</td>
</tr>
<tr>
<td>5. Promoting learning about the environmental education</td>
<td>3.48</td>
<td>0.75</td>
<td>Moderate</td>
</tr>
<tr>
<td>6. Evaluation of the environmental education</td>
<td>3.33</td>
<td>0.76</td>
<td>Moderate</td>
</tr>
<tr>
<td>Average</td>
<td>3.44</td>
<td>0.76</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

1. **Knowledge of the environment.** Most respondents could select the sources of environmental education, which were correct and reliable sources of learning. They had the knowledge and understanding of the historical areas of biology and local culture, accompanied by a variety of biological issues. They had the knowledge and understanding of biological change, accompanied by the planning and management of the environmental issues that were linked to civil rights and responsibility. Thus, an approach was developed with regard to these environmental issues. After respondents researched, analyzed, evaluated the frame and cause, and the subsequent approach, they researched and evaluated various types of choice for solving problems. Accordingly, the total average of environmental education competency was high.

2. **Basis understanding of the environment.** Most respondents understood the goal, objectives, and the basis of environmental education, and knew about the departments/organizations related to the environmental education. They could also explain...
the current state of environmental education. Accordingly, the total average of environmental education competency was moderate.

3. **Responsibility for the environmental education of professional teachers.** Most respondents used the teaching method that determined real practice, teaching materials and instructional media to enhance student’s awareness of environmental education. New approaches that supported their beliefs and self-assessment to create plans/activities for their professional advancement were developed in the past, present and future. By following their explanations and examples, one could compare the difference between propaganda and education. They respectfully presented the academic work in committee meetings for a variety of activities in communication with the local community. They linked inquiry-based approaches to the academic standard of the provincial and national levels. Accordingly, the total average of environmental education competency was moderate.

4. **Planning and practice with regard to the environmental education.** Most respondents supported and promoted environmental education, and chose the appropriate technologies and instruments for teaching. They used the appropriate environmental education with teaching methods for natural subjects, and chose the instrumental media from community, organization, company, sectors, professional training curriculum development, and/or internet for the learners appropriately. They analyzed the environmental problems of the learners and used the contents of teaching methods appropriately. They understood the concept of content knowledge and skills, the order of learner’s development and the skills consistent with the curriculum, which followed the integration of environmental education subjects to link with the main curriculum, sub-curriculum, and the school mission. Subsequently, they provided the field experience to link the contents with the learner’s environment, and made the appropriate teaching methods consistent with a variety of learners, which considered the various differences of cultural and social background, economy, age, educational level, special needs, and learning abilities. They evaluated the basic environmental curriculum, which should lead to life-long learning of the learners. Accordingly, the total average of environmental education competency was moderate.

5. **Promoting learning about the environmental education.** Most respondents took the advantage of appropriate time to teach by being flexible and open-minded in asking and answering questions of the learners. They succeeded in inducing them to learn and provide investigative experience for the learner’s development. Moreover, they could stimulate and promote an interesting atmosphere among learners. Accordingly, the total average of environmental education competency was moderate.

6. **Evaluation of the environmental education.** Most respondents could apply the evaluation and/or assessment to improve teaching. They used evaluation to determine the efficiency of teaching methods. They used at least two methods to evaluate the knowledge, emotions and skills of the learners. It consisted of determining the teaching objectives and the learner’s expectations. They also used the methods to assess planning in order to improve the environmental education curriculum. Accordingly, the total average of environmental education competency was moderate.

The Committee of the North American Association of Environmental Education (NAAEE) has determined the core competency for students in the Graduate Diploma for Teacher Professionals of Environmental Education, which has 6 instances of frame-
work development. Likewise, Yavetza, Goldmanb, and Pe’erc (2014, pp. 354–371) studied the trainer teacher’s perceptions about the environment and subjects concerned. The environment not only involved ecological characteristics, but also structural concepts (construct) of cultural construct, society, and politics as well. The trainer teachers accepted the importance of teaching environmental issues in the future. These trainer teachers did not show sufficient understanding of the environmental concept, i.e., humans were not seen as part of the environment or the environment was not understood as a complex network of interactions among people. This concept included the idea that humans comprised various ecological systems in nature as well. The understanding of the trainer teachers was still at a basic level, which indicated the need to improve the curriculum of the professional teachers in the environmental education. The nature of the student’s perception of the environment related to their fields was a starting point for the change. The student’s explanations were relevant to the structural concepts of “environment.” The understanding of the environment was an object that was not linked to a holistic understanding of the human relationship and the various interventions and a dualistic view of a conflict between natural and man-made systems. Thus, the structural concepts should be considered in designing or planning a curriculum with a view to sustainable development.

The results of the interviewing secondary school teachers about the environmental education competency could be summarized according to five categories:

**Item 1:** Problem, situation, and activities/ environmental education projects in the environmental education for sustainable development in schools: eco-schools. There was framework management taking into account four missions:

- *The environmental policy and structural management as a mission,* which was relevant for school administrators who determined the policy, vision, and clear environmental education management structure leading to practice in schools and community. It was observed that many eco-schools could not operate in accordance with the policy of environmental education schools for sustainable development, because the school administrators lacked the understanding of environmental education. Therefore, it was policy change management, which did not provide for the environmental education management in schools.

- *Learning process* was focused on teacher development and promoted in various environment education learning systems by focusing on learning management. It was linked to the issues of natural resources and local environment based on the concept of process learning “ABOUT” the learning environment “IN” that environment and learning “FOR” the environment (Learning ABOUT-IN-FOR ENVIRONMENT) by using problem-based learning instead of coaching. The coaching process was not successful as employed by professors at the university. The authors of the study observed that teachers did not understand the goals of environmental education, which focused on developing citizens for sustainable development, so it was needed to promote the competency of social studies teachers. It could enable the teachers to provide the environmental education activities without feeling that environmental education activities were the load of the work of learning management.


- **Natural and environmental management in schools was promoted by the teachers who applied activities for outdoor learning by using resource centers in schools and locally instead of strictly classroom.** The authors of the study observed that most learning activities were taught in the classroom only. The learning activities were a result of static curriculum content over time. There was a photo monoculture that it could not take the content from the curriculum into the integration of learning activities.

- **Participation and networking of environmental education would provide the opportunities for parents, communities, and other departments or various organizations to participate and support the school management that created the learning resources within the school by focusing on the participation.**

**Item 2:** Factors promoting environmental education in schools:

- **The focus was on the participation by building the resource center within the school.** “One Classroom – One Resource Center” in the classroom where teachers served as mentors.

- **Teachers must know their own communities,** and that their learning was about geography, climate, ecological characteristics, geography and ecology of the area, using the benefit of the resources in the community, and the impact of the environment on the community.

- **The school administrators must promote and support curriculum development** that needs to be flexible and consistent with the school policy. It should include the participation of the administrators and teachers, who have to conduct a SWOT analysis together to evaluate the strengths and weaknesses of the school in order to determine whether the school is a distinctive part of the environment. Thus, the direction of a school policy must promote and support the students to have the morals based on the philosophy of sufficiency economy through the environmental education process, etc.

**Item 3:** Promoting secondary school teacher’s competency in the environmental education would enable the schools to be successful in integrating important contents of the environmental education into the curriculum. All teachers, administrators, and supervisors need to meet together, critically examine the issues and vote. The administration should initiate the PDCA (Plan-Do-Check-Act) process. The administrators would need to perform a SWOT analysis in order to find out the distinctive points.

The curriculum developed on the basis of the PDCA process could be adjusted all the time and made flexible. In addition, environmental education curriculum focuses on using the process and it will be flexible following the interests of children because each year the interests of children are different. Thus, the learning process will enable the children to learn something that they want to know, by discovering knowledge themselves. Accordingly, there is a need to have a flexible curriculum for children to learn what they want to know.

**Item 4:** Important components to develop secondary school teacher’s competency:

- **Teachers need to understand environmental education integrated methods and use them** in accordance with the standards of the Office of National Education Standards and Quality Assessment and the Office of the Basic Education Commission.
• **Teachers must know the seven stages of environmental education.** This was one of the problem situations to bring the school to the community or bring the community into the school. The seven stages of environmental education process are the following: to choose a situation or a learning issue, to provide a knowledge base, to analyze the linked relationships, to study the options and make various choices, to design the planning, train and practice, and to exchange learning. This way, teachers must plan their PDCA.

• **Community-based learning.** It involves the knowledge of the community, geography, climate, ecological characteristics and ecology of the area, benefits of resources in the ecology, and the impact of the problem on the community.

• **Problem-based learning** involves the examination of problems of community and uses these problems to set up learning opportunities for a child. The teacher would know what children were interested in after letting them explore problems and analyze the relationships. They would learn the community situation: what was happening, how problems would be solved, and analyze alternatives. This would be in accordance with the children planning the real practice and sharing their learning to solve the problem affecting their communities.

• **Integration of environmental education into various subjects.** It focuses on using process and flexibility according to the interests of different learners because what students are interested in and want to learn is the result of their own discovery. Thus, learning management must be flexible for the learners to learn in the area and solve the problem themselves.

• **The evaluation of learning in the subjects is the result of the learning process.** Learners would be tested without knowing it, and teachers would test the learners through authentic assessments.

Therefore, the model of environmental education competency development for secondary school teachers should consist of three concepts: Integrated Instructions (focusing on the integration of various learning areas into environmental education), Community-Based Learning (focusing on the use of the environmental education for solving environmental problems in the community) and Project-Based Learning (focusing on writing the plans or the projects to solve environmental problems). The focus is to promote student’s consciousness of the environment and follow environmental conservation practices in their communities. The quality of environmental education should be evaluated by the experts and its efficiency should be evaluated by actual performance, thus enabling students to get involved in both integrated learning and community development (Rawang, 2020, pp. 46–52). The important approaches to enhance the environmental education competency of secondary school teachers should consist of multidisciplinary instructional learning, community-based learning, project-based learning, happy teaching and learning, and holistic learning management.

**Multidisciplinary Instruction Learning**

The research findings revealed that environmental education learning management needs to be integrated with multidisciplinary instruction and the teachers should meet together and discuss the subjects. Environmental issues in the community should have
the Theme of Conceptual Framework of integrated learning management. Then, each teacher, who is responsible for different subjects, will decide on which aspects to focus in the integrated learning management. Teachers will be able to independently choose their learning management and how to use the authentic assessments. After the students finish the subject, teachers should inform of the results of integrated learning during meetings and they should together seek ways to improve or develop their subjects through more effective learning management. Integrated teaching is linked to many subjects and is not a subject itself, but it is involved in teaching methods. If the teacher is separated by different fields of learning, then the other subjects are not taught. In addition, the environment in the classroom, for example, arranging chairs in rows or circles also affects learning of the students (White, 1981, p. 16). This opens up an opportunity to allow students and teachers to cooperate in order to make the learning process interesting and let the students study in small groups or individually. The curriculum of integration needs to arrange the appropriate time to meet different student’s interests and grant more freedom and creativity as a basis of knowledge. In addition, the teachers can find the students who have the capability and interests, including the students who have the opportunity to develop their skills (Blishen, 1969, p. 27; Heasly et al., 2020). The teaching process, which combines the content of the subjects into a unit of study as well as the student’s activities, can solve problems in appropriate situations (Hopkins, 1973, pp. 21–22).

Community-Based Learning

The environmental education learning management for secondary school learners should incorporate community-based learning, within which the learners develop an understanding of the quality of life and the quality of environment in their community. Thus, the real environmental problems must be managed according to the concept of integrated learning, which is important for successful outcomes. The place-based curriculum represents the ultimate goals of education that meaningfully connect local knowledge and modern knowledge together in order to empower the students and community in a sustainable way (Jatuporn & Wattanaton, 2015, pp. 83–111). In terms of highly effective pedagogy, community-based learning should be used to enable learners to acquire 21st century skills. This is a teaching strategy that links the contents of the lessons to the community through the integration of knowledge in many subjects, the examination of real-life problems and its proximity to the community and the environment of the learner, thus focusing on thinking skills, problem-solving and learning through hands-on experience. The evaluation is an authentic assessment with the involvement of relevant people. It should be noted that successful implementation of community-based learning depends on the teacher who needs to clearly specify learning strategies and learning outcomes. Learners learn from their actions in the community through collaboration among the representatives of the educational network, the community and the learners (Rittikoop, 2018, pp. 179–189). However, community-based learning is a pedagogical approach, which has tremendous potential to produce better citizens. The success of a community-based learning experience relies on considering a number of factors, such as thorough planning, critical reflection, effective project management, assessment and effective project evaluation (Bedri, Ruairí de Fréin, & Dowling, 2017, p. 1).
Project-Based Learning

Project-based learning is a system approach to develop the learner’s intelligence. It is the learning model based on the concepts of constructivism that enables students to create new knowledge from real problems in the world, which is the learning context. The learning process focuses on the students, i.e., to make them develop thinking skills, analytical and problem-solving skills, including knowledge in their subjects that enables the students to practice methods and solve problems themselves. Project-based learning is an active student-centered form of instruction, which is characterized by student’s autonomy, constructive investigations, goal-setting, collaboration, communication and reflection within real-world practices (Kokotsaki, Menzies, & Wiggins, 2016, pp. 267–277). It was found that after using a set of guided activities, the students had higher problem-solving skills than before the experiment with a statistical significance at .05 level (Srisaiphet, 2016, pp. 61–68). Project-based learning is the process that requires understanding and problem-solving. This process encourages the student to practice in many ways, such as critical thinking, analytical thinking and synthesis thinking (Suwannoi, 2016, pp. 1–10).

Happy Teaching and Learning

The environmental education for secondary school teachers consists of five steps: analyzing the educational policy, studying the community environmental problems, designing the environmental project, identifying the standard of learning, and performing the integrated lesson plans. These five steps will be implemented through happy teaching and learning to teachers, students, and community, for this learning is to link real-life problems to the learning process. The Happy School Criteria should consist of the three categories: people, process, and place (UNESCO, 2016, pp.12–15). People refer to friendships and relationships in the school community, positive teacher attitudes and attributes, and positive and collaborative values and practices. Process encompasses teaching and learning methodologies that can enhance learner’s sense of well-being as having reasonable and fair workload, learner freedom, creativity and engagement, and useful, relevant and engaging learning content. Place refers to contextual factors, both in terms of the physical environment and the school atmosphere as having a warm and friendly learning environment, free from bullying, with school vision and leadership, and open and green learning and playing spaces.

It should be emphasized that happiness and well-being are increasingly recognized as a global priority, including in the new international development agenda. This has followed from the recognition that the pressure of today’s ever-changing world, including the changing nature of work, may lead people to become unhappy. Therefore, education systems need to adapt and shift towards prioritizing ‘non-academic’ domains of learning. At the global, national and education levels, efforts have been made to measure well-being and the skills and competencies that enhance happiness and well-being. This is demonstrated by the seventh target of SDG4, which is dedicated to promoting the skills and competencies that are reflected in concepts such as Learning to Be and Learning to Live Together as well as Education for Sustainable Development and Global Citizenship Education (UNESCO, 2016, p. 35).
Holistic Learning Management

Holistic learning management is related to UNESCO (2020, pp. 16–17); for a radical reconfiguration of our paradigms, it is necessary to confront the complexity of our time with a holistic perspective and to find creative solutions to achieve sustainable development. In this context, ‘learning to become’ is the new perspective and it will require experimental research through immersive practices and experiences of active listening to foster the growth of self-awareness and awareness of the whole. The meditative practices required to gain this awareness are contained in the heritage of certain cultures, some of which are not completely foreign to the Western world. Nowadays, meditative practices can serve as a tool in formal educational systems to strengthen the necessary skills, to root the individual in the journey, to navigate emotions, perceptions and understanding of the global challenges as a whole as well as to promote the awareness of the choices available for oneself and for the whole.

The research findings revealed that Sathyasai School, Lopburi province taught systematically using knowledge-integrated teaching to develop the students, school, community, and environment. Sathya Sai School curriculum is based on the Education Human Values Program, which consists of the human values such as truth, right behavior, peace, love, and non-violence (Art-ong Jumsai Na Ayudhya and Loraine Burrows, 1991). It is the principle of the school to build the character of the children. The human values like truth, honesty, love, loyalty, sharing, compassion, courage, and determination are imparted in day-to-day functioning. The weekends are devoted to activities like planting trees or planting rice seedlings, to inculcate environmental awareness. In the process, the children are taught to develop their commitment to the society. The teacher must be creating inspirational teaching; teachers must be good role models, who develop the human values within the learners, integrate human values in various subjects and activities, and use collaborative learning. Then, every facet of teaching activities, be it living, studying, or playing, places an emphasis on teamwork rather than on individual achievement (Art-ong Jumsai Na Ayudhya, 2007).

Mahidol University has been trying to develop “an ideal campus” for providing favorable environment for learning and having physical structure, which is in harmony with society and environment. The sustainable policy consists of five aspects: land use development, landscape system development, in-campus traffic circulation development, infrastructure service system development, and building and construction control. The environmental, economic, and social impacts of a green office were consistent with sustainable development goals (SDGs) (Aroonsrimorakot, Laiphrakpm, & Paisanathanakij, 2020, pp. 164–177; Pipere, Veisson, & Salute, 2015). Students have to develop the skills they need to overcome global challenges, explore new opportunities, and grow as globally competent citizens. We focus on student centered and active learning so that all graduates have the professional skills they need for their work, as well as creativity and adaptability necessary for the changing world.

Conclusions

The environmental education competency of secondary school teachers involves six aspects: knowledge of the the environment, basic understanding of the environment, responsibility for the environmental education of professional teachers, planning and
practice with regard to the environmental education, promoting learning of the environmental education, and evaluation of the environmental education.

The approaches to enhance the environmental education competency of secondary schools teachers should focus on promoting student’s awareness of the environment, feeling love for the environment before environmental conservation in their communities. The approaches should involve multidisciplinary instruction learning, community-based learning, project-based learning, happy teaching and learning, and holistic learning management.

However, the recommendation of the practical research is to support student’s participation in the environmental community management through integrated learning. This means getting community support, and thus local organizations should be part of an integrated learning about environmental education continuously. The administrator should evaluate the integrated learning performance of teachers to determine the school level policy, schools should be understood as having a shared vision. Integrated activities should be used in the environmental education in response to the Ministry of Education policy about “Moderate Class, More Knowledge”, giving the students to practice “learning by doing than learning in the classroom”. The constructive punishment should be used as creative punishment for environmental education activities, environmental education activities should be applied to local culture, and environmental school management should focus on supporting the environment. Student activities should be designed through the “one classroom one project/ or one classroom one goodness/ or one classroom one product”, concepts. Loving the environment through teachers and students involves opening teacher opportunities to lead the classroom through the concept of neo-humanism for environmental awareness, and it should be a standard for the environmental education in the teaching profession.

Moreover, the recommendation for further research may involve an environmental youth leader development process, master-teacher creation process, various forms of integrated learning, such as infusion, and paralleled instruction, supporting ways or promoting administrators to use the knowledge in order to determine the policy, methods of extending integrated learning research for secondary school teachers to other educational levels, such as kindergarten, primary school, and vocational college, and applying teacher-directed roles to support student’s knowledge.

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What Factors Matter for
the Sustainable Professional Development of Teachers?
Analysis from Four Countries

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Abstract

In the 21st century, teachers’ learning is viewed through the lens of sustainable development as a holistic, transformative and collaborative learning process. Acknowledging that teacher professional development is a prerequisite for educational quality, it becomes necessary to look for professional development factors that could be relevant to sustainable professional development. The article explores factors of sustainable professional development of teachers based on data of TALIS 2018 from four Baltic countries (Estonia, Finland, Latvia, and Lithuania). The study also discusses distinct characteristics of teacher professional development in the analyzed countries. Although traditional forms and methods of professional development still prevail in all countries, teachers also learn through active cooperation. Finnish teachers, more often than teachers in the other countries, worked in teams and shared material, knowledge, etc. with each other; Estonian teachers, more so than teachers in the other countries, took part in long-term training; Latvian teachers were more likely than teachers in the other countries to observe other teachers’ classes and provide feedback. Lithuanian teachers were perhaps the most active in terms of learning, but young teachers with fewer years of service were more likely to engage in long-term and collaborative activities. Finally, the implications for further research are discussed.

Key words: teacher learning, sustainable professional development, professional development factors, collaborative learning, TALIS

Introduction

As economic, environmental and globalisation challenges constantly arise, sustainable development is seen as a key factor in the development of society in the 21st century (United Nations, 2015). The guidelines for achieving the fourth goal (UNESCO, 2015) highlight the unique role of education in implementing the sustainable development goals and ensuring economic, environmental and social sustainability. Education for Sustainable Development at all levels of the educational system is recognized for its...
essential goal of developing the attitude and ability of all members of society to act responsibly, creating a more sustainable world and tackling sustainability-related problems (UNESCO International Bureau of Education, 2015; UNESCO, 2017). The global context of COVID-19 compelled the educational community to return to sustainable education goals (United Nations, 2020; UNESCO, 2020). In light of The 2030 Agenda for Sustainable Development, the International Commission on the Futures of Education (2020) proposed nine ideas: to strengthen education as a common good; to expand the definition of the right to education, addressing the importance of connectivity and access; to value the teaching profession and teacher collaboration; to promote student, youth and children’s participation in education, viewing them as co-constructors of education; to enhance and protect the social spaces provided by schools, exploring potentials for a diverse learning environment; to make free and open source technologies available to teachers and students; to ensure scientific literacy within the curriculum; to protect domestic and international financing of public education; and to advance global solidarity to end current levels of inequality.

Education focused on the principles of sustainable development helps teachers not only understand better what the fundamental principles of education of the future are, but also see the content of education as an opportunity to provide learners with competences and knowledge that enable them to act in a world of exponential and systemic changes. For this reason, teacher education and professional development must be refocused on the needs of sustainability-specific educational policy, curricula and practices. This means that in order to achieve sustainable educational goals, teachers need to acquire competences such as critical thinking, collaborative skills, problem-solving, decision-making, and others that encourage involvement and ongoing research (Iliško, Ignatjeva, & Mičule, 2010; Wells, 2013).

In the scientific literature, sustainable professional development of teachers is linked to effective learning (Villegas-Reimers, 2003), which encourages the accumulation of teachers’ acquired knowledge, based on local knowledge and experience. Sustainable professional development of teachers is also based on research; it enables teachers to act when solving problems, strengthens professional networks, and encourages the formation of a vocational learning community where teachers share, cooperate, understand and support each other, which allows for systemic educational changes to be achieved not only in the institutional but also in the country’s educational context (Villegas-Reimers, 2003).

The modern professional development of teachers is focused on the fact that it would be meaningful not only for the teachers themselves when developing curricula, testing new methods, carrying out evaluation, but that the benefits of their professional development would be obvious to learners as well (Meesuk, Sramoon, & Wongrugsa, 2020). Self-directed teacher improvement is encouraged, abandoning traditional professional development models, which were oriented towards teachers as recipients of knowledge rather than active creators of knowledge (Makovec, 2018; Sumaryanta et al., 2019).

In addition, according to Hargreaves and Fink (2006), the educational system itself can borrow some very important postulates from the sustainable development movement: to see things from a long-term perspective, in pursuit of change not to fear decisions that require courage, and to have patience while awaiting results. Finally, the learning process in which the sustainable development goals are being pursued must in its particu-
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In terms of the quality of education, the issue of school learners’ achievements is central. While Darling-Hammond with colleagues (Darling-Hammond, Hyler, & Gardner, 2017) emphasize that effective professional development changes the quality of teacher education and improves student performance, there is little valid and scientifically grounded evidence of a clear link between teachers’ professional development and student achievement (Guskey, 2009; Fletcher-Wood & Zuccollo, 2020; Sims & Fletcher-Wood, 2020). Nevertheless, countries are often compared with each other on the basis of various educational quality parameters and student achievements. Finland is recognized as among the countries having the highest-quality educational systems. Many international studies testify to the success of the Estonian educational system. Meanwhile, the quality of the educational systems in Latvia and Lithuania not only lags significantly behind their neighbors, but often does not exceed the EU average. When comparing the above-mentioned geographically close countries, it is natural that we want to look more closely at the similarities and differences of teacher professional development in order to find logical arguments for the ongoing debate on the quality of national educational systems. This article therefore raises the following problematic questions: What teacher professional development factors are specific to the Baltic countries and what characteristics of teacher professional development factors are specific to each of these countries? In search of answers to these questions, the article compares the professional development of teachers in Finland, Estonia, Latvia and Lithuania based on the 2018 international study “Teaching and Learning International Survey” (TALIS).

Factors of the Process of Sustainable Professional Development of Teachers

Almost two decades ago, Guskey and Sparks (2002) suggested that the quality of teacher professional development could be determined by various groups of factors, but three would have the strongest and direct impact: content characteristics (knowledge and skills), process variables (types of professional development activities, forms and methods of how the activity is carried out) and context characteristics (the system and culture itself). In recent scientific analyses, although the factors have been named differently, the most important ones remain the same: quality content (subject-specific and pedagogical content knowledge), learning design and implementation (a range of opportunities for active and varied continuing professional development, collaborative learning experiences and job-embedded learning), support and sustainability (sufficient time and duration of continuing professional development, availability of resources, and supportive and engaged leadership in schools and at the system level) (Campbell, 2019). This study will focus on the professional development process factors that, as recognized in recent studies, are the most effective, i.e., long-term, systematic, contextualized, taking place at workplaces, in local learning communities (Hargreaves & Fullan, 2012; Postholm, 2012; Li & Dervin, 2018).
Collaborative learning experiences can be described as one of the factors of effective and sustainable teacher professional development (Campbell, 2019), which is typical of educational systems demonstrating a high level of learning outcomes for school learners (Jensen et al., 2016). According to Li and Dervin (2018), in order to enable teachers to exchange best practices, it is important to find out what the individual needs of each teacher are and what teachers can learn from each other, based on their professional practice or subsequent experience. Although a teacher’s daily life has no lack of individual work and individual reflection, it makes sense for teachers to reflect together on their teaching practices in order to improve them (Postholm, 2012). It is becoming apparent that teachers’ collective collaborative learning strengthens the professional development of teachers (Postholm, 2016), improves teaching inquiry (Volkinsteine & Namson, 2016), contributes to the development of a new collaborative culture among teachers (Silova et al., 2010), and is also associated with higher job satisfaction and teacher self-efficacy (OECD, 2020). According to Hargreaves and Fullan (2012), teachers improve at the workplace by exchanging ideas, cooperating, participating in such activities as study groups, research, etc. Such professional learning communities can be effective because they promote sharing of insights into problems and foster mutual collective responsibility for interventions and improvements that directly affect school learners’ learning. However, the same authors observe that learning together may also be ineffective, when teachers simply discuss and share ideas and practices, not seeking to explore or evaluate them, without any clear link with the improvement of practice (Hargreaves & Fullan, 2012). We believe that this emphasis on the essence and expediency of cooperation is very important and explains why some researchers argue that cooperation among teachers cannot be recognized unambiguously as an effective part of their professional development (Sims & Fletcher-Wood, 2020). Cordingley clearly defines a necessary condition of effective collaborative learning: “Professional learning conversations and collaboration need to be rooted in experimentation with new approaches to be linked with success” (Cordingley, 2019, p. 140). It should be noted that cooperation among teachers as one of the essential elements of professional development is sought in many countries. For example, Darling-Hammond, Hyler and Gardner (2017), reviewing the professional development experience of teachers in different countries, observe that such countries (e.g., Singapore, the United Kingdom, Australia, Canada) aim to provide teachers with opportunities to share their teaching, mentoring, educational content (curriculum) and leadership experiences, and to learn from each other.

Weston and Hindley (2019), performing a systematic analysis of various reviews in 2015–2019, identified one of the most important factors of effective professional development as iterative process, with opportunities to apply learning in real practice. This process of professional development takes place, e.g., in the context of the school, by clearly linking teacher professional development opportunities to their practical classroom experience. In this way, the role of teachers as active learners becomes more apparent. They can engage in learning, evaluation, monitoring and reflection processes, use authentic artifacts, interactive activities and other strategies for deeply integrated, highly contextual professional learning (Darling-Hammond, Hyler, & Gardner, 2017). Such training may benefit from operational research. Research performed by Iliško, Ignatjeva and Mičule (2010) confirmed that when teachers perform research with the purpose of improving their educational practice, they gain new and better ways of
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seeing their classroom practice, and see new perspectives in the context in which they operate. Thus, teachers become active decision makers about what concerns their work (Iliško, Ignatjeva, & Mičule, 2010). According to Harrison and co-authors (Harrison et al., 2006), effective teacher professional development needs to enable teachers to reflect on and learn about new practices and how they can evolve or be modified from the existing classroom practice.

The length of time for learning becomes one of the most controversial factors in discussing the effectiveness of teacher professional development. On the one hand, it is obvious that professional development itself is an ongoing, long-term process, since, as already mentioned, the changes that take place constantly put new demands on teachers to develop new competences (e.g., require leadership competence, preparation and team work opportunities, interdisciplinary skills, etc.). Teachers must also have sufficient time to practice, implement and reflect on new strategies to facilitate changes in their practical activities (Darling-Hammond, Hyler, & Gardner, 2017). Therefore, the process of professional development itself is long-term and encompasses ongoing purposeful and systematic opportunities and experiences to stimulate one’s professional growth. However, the duration of the professional development learning activity is not unambiguously clear. Sims and Fletcher-Wood (2020) argue that there is a lack of evidence to show that long-term programs make professional training effective, while Basma and Savage (2018) indicate that short-term, but high-quality, teacher learning is effective.

The analysis of scientific literature certainly makes it possible to create a fairly wide range of factors for sustainable professional development, but in our research we have identified those which, in today’s situation, are gaining ever stronger weight for sustainable professional development of educators (Wells, 2013; Weston & Hindley, 2019; Sims & Fletcher-Wood, 2020). In this article, we present an analysis of the factors of the process of professional development of teachers in Lithuania, Latvia, Estonia and Finland, such as mutual cooperation, place of learning and time, and their characteristics, based on the data of the TALIS 2018. Some limitations of this investigation are also to be noted. Firstly, the TALIS database is very important due to the open access to data of different countries, but in this case it does not allow all the factors of sustainable professional development to be explored. Secondly, the area of teacher professional development is still lacking in theoretical conceptual models and mechanisms (Weston & Hindley, 2019), teachers learn and improve in different ways, so it is difficult to unambiguously describe the factors of effective teacher professional development and their characteristics.

Method

Study Participants

The TALIS 2018 data set was downloaded from http://www.oecd.org/education/talis/talis-2018-data.htm. The distribution of study participants by gender, age group and education is presented in Table 1. Lithuanian teachers who participated in the survey stand out for their age: 40.8 % are 50–59 years old. Finnish teachers are distinguished by their education, with the vast majority having a Master’s degree and, in addition, almost a third of the Finnish teachers participating in the survey were male.
Table 1
Descriptive Statistics of the Socio-Demographic Characteristics of Teachers

<table>
<thead>
<tr>
<th></th>
<th>Estonia (N = 3083)</th>
<th>Finland (N = 2851)</th>
<th>Latvia (N = 2315)</th>
<th>Lithuania (N = 3759)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>82.5</td>
<td>69.6</td>
<td>88</td>
<td>84.3</td>
</tr>
<tr>
<td>Male</td>
<td>17.5</td>
<td>30.4</td>
<td>12</td>
<td>15.7</td>
</tr>
<tr>
<td>Age Groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 29</td>
<td>7</td>
<td>6.7</td>
<td>7.8</td>
<td>2.7</td>
</tr>
<tr>
<td>30–39</td>
<td>15.5</td>
<td>25.5</td>
<td>13.8</td>
<td>13.9</td>
</tr>
<tr>
<td>40–49</td>
<td>23.2</td>
<td>32.1</td>
<td>27.3</td>
<td>27.3</td>
</tr>
<tr>
<td>50–59</td>
<td>32.7</td>
<td>28.2</td>
<td>33.7</td>
<td>40.8</td>
</tr>
<tr>
<td>60 and above</td>
<td>21.6</td>
<td>7.5</td>
<td>17.4</td>
<td>15.3</td>
</tr>
<tr>
<td>Highest level of formal education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below ISCED level 6</td>
<td>6.5</td>
<td>2.5</td>
<td>3</td>
<td>0.2</td>
</tr>
<tr>
<td>ISCED level 6</td>
<td>22.1</td>
<td>5.8</td>
<td>33.1</td>
<td>63.3</td>
</tr>
<tr>
<td>ISCED level 7</td>
<td>70.7</td>
<td>90.4</td>
<td>63.5</td>
<td>35.9</td>
</tr>
<tr>
<td>ISCED level 8</td>
<td>0.7</td>
<td>1.3</td>
<td>0.4</td>
<td>0.6</td>
</tr>
</tbody>
</table>

The distribution according to teaching experience of the teachers participating in TALIS 2018 is shown in Table 2. More than half of the teachers from Estonia, Latvia and Lithuania have more than 20 years of experience in teaching, while more than half of the teachers from Finland have 6 to 20 years of experience in teaching.

Table 2
Descriptive Statistics of Teaching Experience, by Country

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Min</th>
<th>Max</th>
<th>Less than or equal to 5 years</th>
<th>6 to 20 years</th>
<th>More than 20 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estonia</td>
<td>22.63</td>
<td>12.788</td>
<td>1</td>
<td>58</td>
<td>12.9%</td>
<td>31.6%</td>
<td>55.5%</td>
</tr>
<tr>
<td>Finland</td>
<td>15.94</td>
<td>9.428</td>
<td>1</td>
<td>50</td>
<td>16.1%</td>
<td>52.5%</td>
<td>31.4%</td>
</tr>
<tr>
<td>Latvia</td>
<td>23.74</td>
<td>11.987</td>
<td>1</td>
<td>58</td>
<td>10.3%</td>
<td>28.6%</td>
<td>61.2%</td>
</tr>
<tr>
<td>Lithuania</td>
<td>24.49</td>
<td>10.281</td>
<td>1</td>
<td>54</td>
<td>4.5%</td>
<td>29.7%</td>
<td>65.8%</td>
</tr>
</tbody>
</table>

Instruments

The questionnaire for teachers participating in TALIS 2018 was composed of 58 questions related to the current work of teachers, teaching and feedback about teaching, school climate and job satisfaction, professional development and teacher mobility (OECD, 2018). Questions related to teacher professional development and its impact on teaching practice were selected from the questionnaire for use in this article:

- **TQ22** During the last 12 months, did you participate in any of the following professional development activities?
- **TQ25** Thinking of all of your professional development activities during the last 12 months, did any of these have a positive impact on your teaching practice?
- **TQ26** Thinking of the professional development activity that had the greatest positive impact on your teaching during the last 12 months, did it have any of the following characteristics?

These three questions offered a dichotomous choice: yes (1) and no (2).
The following statements were also selected, revealing the attitude of teachers to the co-operation factor and its characteristics (forms and frequency):

- TQ33a How often do you teach jointly as a team in the same class?
- TQ33b How often do you observe other teachers’ classes and provide feedback?
- TQ33d How often do you exchange teaching materials with colleagues?
- TQ33e How often do you engage in discussions about the learning development of specific students?
- TQ33f How often do you work with other teachers in this school to ensure common standards in evaluations for assessing student progress?
- TQ33h How often do you take part in collaborative professional learning?

For each item, teachers rated the extent to which they agreed with each item on a 6-point scale ranging from 1 (never) to 6 (once a week or more).

Data Analysis

The statistical analyses were performed using IBM SPSS Statistics 22.0. Frequency and percentage values were calculated to determine the demographic characteristics of teachers (gender, age group, highest level of formal education, and total years of teaching experience). For research data analysis, Pearson’s chi-squared test and ANOVA were used to find differences among the teachers of different countries. Statistical significance was set at $p < 0.05$ for all tests.

Results

Overview of teacher professional development activities. Looking at the results of teacher professional development according to their chosen forms of learning (Table 3), it can be seen that teachers from all four countries choose ways of developing organizational partnerships (e.g., learning networks) and small groups (e.g., courses) or individual (e.g., reading literature). The absolute majority of teachers took part in seminars/courses during the 12 months prior to the survey, i.e., they chose a traditional way of learning. It is noteworthy that younger teachers (under 29) in Lithuania participate somewhat more actively in such professional development activities than in other countries (Estonia – 85.8 %; Finland – 63.3 %; Latvia – 88.8 %; Lithuania – 92.2 %). It was also found that in all age groups, there were fewer teachers from Finland who attended seminars or courses than teachers from other countries. The second most popular form of teacher professional development in all countries is reading professional literature. The number of Estonian and Lithuanian teachers who learned in this way was relatively larger, while the number of Finnish teachers was relatively smaller. Looking at the number of teachers involved in teacher networks created specifically for teacher professional development, there is again a similar trend: more teachers from Estonia and Lithuania than from Latvia and Finland indicated this form of learning. Latvian teachers are distinguished for their active participation in educational conferences (71.5 %), while slightly more than half of Lithuanian and Estonian teachers and only one-third of Finnish teachers did so. Observation of colleagues and/or their work and coaching, visits to other schools as professional development activities were noted by more teachers in Latvia and Lithuania.
Also noteworthy is the extremely low number of Finnish teachers who chose this form of learning (14.7%). Less than half of the teachers from all four countries participated in other professional development activities (online courses/seminars, observation visits, formal qualification programs).

Table 3
Descriptive and Non-Parametric Statistics on Participation in Professional Development Activities, by Country

<table>
<thead>
<tr>
<th>Activity</th>
<th>Estonia (N = 3004)</th>
<th>Finland (N = 2851)</th>
<th>Latvia (N = 2315)</th>
<th>Lithuania (N = 3759)</th>
<th>Chi-squared test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses / seminars attended in person</td>
<td>89.1</td>
<td>68</td>
<td>95.4</td>
<td>97</td>
<td>$\chi^2 = 1451.220$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$p &lt; 0.0001$</td>
</tr>
<tr>
<td>Reading professional literature</td>
<td>90.3</td>
<td>75.1</td>
<td>81.5</td>
<td>94</td>
<td>$\chi^2 = 568.573$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$p &lt; 0.0001$</td>
</tr>
<tr>
<td>Participation in a network of teachers formed specifically for the professional development of teachers</td>
<td>58.6</td>
<td>34.3</td>
<td>39.4</td>
<td>55.6</td>
<td>$\chi^2 = 496.341$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$p &lt; 0.0001$</td>
</tr>
<tr>
<td>Educational conferences where teachers and/or researchers present their research or discuss educational issues</td>
<td>53.2</td>
<td>35.1</td>
<td>71.5</td>
<td>59.7</td>
<td>$\chi^2 = 737.618$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$p &lt; 0.0001$</td>
</tr>
<tr>
<td>Peer and/or self-observation and coaching as part of a formal school arrangement</td>
<td>51.3</td>
<td>14.7</td>
<td>61.5</td>
<td>69.1</td>
<td>$\chi^2 = 2070.554$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$p &lt; 0.0001$</td>
</tr>
<tr>
<td>Observation visits to other schools</td>
<td>41.4</td>
<td>31.4</td>
<td>58.6</td>
<td>63.3</td>
<td>$\chi^2 = 807.259$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$p &lt; 0.0001$</td>
</tr>
<tr>
<td>Online courses / seminars</td>
<td>39.9</td>
<td>22.6</td>
<td>29.9</td>
<td>46.7</td>
<td>$\chi^2 = 461.093$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$p &lt; 0.0001$</td>
</tr>
<tr>
<td>Observation visits to business premises, public organizations or non-governmental organizations</td>
<td>22.1</td>
<td>25.6</td>
<td>31</td>
<td>36.3</td>
<td>NS</td>
</tr>
<tr>
<td>Formal qualification program</td>
<td>11.7</td>
<td>11</td>
<td>18.3</td>
<td>18.3</td>
<td>$\chi^2 = 113.723$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$p &lt; 0.0001$</td>
</tr>
</tbody>
</table>

Note: NS – no statistically significant difference.

Teacher professional development through collaboration. Professional collaboration among teachers is an essential precondition for the sustainable professional development of teachers at school. Table 4 shows how often there is collaboration from the point of view of those teachers who claimed that participation in professional development activities had a positive impact on their teaching practices. Different forms of collaborative learning are presented according to the distribution in the TALIS 2018 based on the nature of interaction among teachers (OECD, 2020). The first form: professional collaboration group activities imply a deeper level of co-operation among teachers and a high degree of interdependence among them; the second form: exchange and co-ordination for teaching includes simple exchanges or co-ordination between teachers (ibid).
Analyzing the presented ANOVA test results, it is seen that Finnish teachers more often than those of the other three countries teach jointly as a team in the same class \( (F = 198.145, p < 0.0001) \), exchange teaching materials with colleagues \( (F = 58.816, p < 0.0001) \), and engage in discussions about the learning development of specific students \( (F = 615.053, p < 0.0001) \). Latvian teachers more often observe other teachers’ classes and provide feedback \( (F = 473.063, p < 0.0001) \), while Estonian teachers take part in collaborative professional learning \( (F = 179.510, p < 0.0001) \). Moreover, it turned out that Estonian and Latvian teachers more often than Finnish and Lithuanian teachers work with other teachers in school to ensure common standards in evaluations for assessing student progress \( (F = 151.155, p < 0.0001) \). The teachers of all four countries indicate as having an effect on their teaching practice the different forms of collaboration, which are related to a deeper level of co-operation as well as to simple exchange and co-ordination for teaching.

Table 4
ANOVA Test Results for Different Collaborative Learning Forms, by Country

<table>
<thead>
<tr>
<th>Professional collaboration</th>
<th>Teach jointly as a team in the same class</th>
<th>Mean</th>
<th>SD</th>
<th>Mean Square</th>
<th>ANOVA test</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estonia</td>
<td>2.76</td>
<td>1.720</td>
<td></td>
<td>466.991</td>
<td>198.145</td>
<td>0.0001</td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>3.41</td>
<td>1.912</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Latvia</td>
<td>2.67</td>
<td>1.558</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lithuania</td>
<td>2.36</td>
<td>1.056</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observe other teachers’ classes and provide feedback</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estonia</td>
<td>2.16</td>
<td>1.141</td>
<td></td>
<td>568.938</td>
<td>473.063</td>
<td>0.0001</td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>1.66</td>
<td>1.240</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latvia</td>
<td>2.83</td>
<td>1.093</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lithuania</td>
<td>2.59</td>
<td>0.967</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take part in collaborative professional learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estonia</td>
<td>3.32</td>
<td>1.273</td>
<td></td>
<td>249.617</td>
<td>179.510</td>
<td>0.0001</td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>2.55</td>
<td>1.335</td>
<td></td>
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<tr>
<td>Latvia</td>
<td>3.11</td>
<td>1.132</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lithuania</td>
<td>3.21</td>
<td>1.031</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exchange teaching materials with colleagues</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estonia</td>
<td>3.47</td>
<td>1.448</td>
<td></td>
<td>114.853</td>
<td>58.816</td>
<td>0.0001</td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>3.91</td>
<td>1.552</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latvia</td>
<td>3.82</td>
<td>1.331</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Lithuania</td>
<td>3.49</td>
<td>1.371</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engage in discussions about the learning development of specific students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estonia</td>
<td>4.98</td>
<td>1.117</td>
<td></td>
<td>898.975</td>
<td>615.053</td>
<td>0.0001</td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>5.07</td>
<td>1.131</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latvia</td>
<td>4.77</td>
<td>1.128</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lithuania</td>
<td>3.85</td>
<td>1.353</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See next page for continuation of table
Continuation of Table 4

<table>
<thead>
<tr>
<th>Exchange and co-ordination for teaching</th>
<th>Work with other teachers in school to ensure common standards in evaluations for assessing student progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estonia</td>
<td>4.02 1.440</td>
</tr>
<tr>
<td>Finland</td>
<td>3.81 1.551</td>
</tr>
<tr>
<td>Latvia</td>
<td>4.01 1.321</td>
</tr>
<tr>
<td>Lithuania</td>
<td>3.33 1.278</td>
</tr>
</tbody>
</table>

290.806 151.155 0.0001

Note. Response options: 1 – never; 2 – once a year or less; 3 – 2–4 times a year; 4 – 5–10 times a year; 5 – 1–3 times a month; 6 – once a week or more.

The survey results presented in Table 4 show that, according to teachers, collaborative learning activities take place on average several times a year. However, it is important to analyze these answers in more detail and to draw attention to cases where teachers say that activities take place at least once a month or more frequently. It is in this case that sustainable professional development based on collaborative learning takes place at school. Summarizing the results of the survey (Table 5), it has become clear that more teachers from Finland, Estonia and Latvia than from Lithuania participate in collaborative learning activities at school.

Table 5

<table>
<thead>
<tr>
<th>Collegial Cooperation Activities, Once A Month or More Often, from the Point of View of Teachers (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estonia (N = 2164)</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Teach jointly as a team in the same class</td>
</tr>
<tr>
<td>Observe other teachers’ classes and provide feedback</td>
</tr>
<tr>
<td>Take part in collaborative professional learning</td>
</tr>
<tr>
<td>Exchange teaching materials with colleagues</td>
</tr>
<tr>
<td>Engage in discussions about the learning development of specific students</td>
</tr>
<tr>
<td>Work with other teachers in school to ensure common standards in evaluations for assessing student progress</td>
</tr>
</tbody>
</table>

The factor of teacher learning at school and its characteristics. The next point to be analyzed is what characterizes the professional development that took place in the
environment closest to teachers (school) and was sustainable, i.e., it had a positive impact on teaching practices. Table 6 shows the number of teachers participating in the TALIS 2018 and the characteristics of the courses/seminars taking place at school. Summarizing the results of the survey, it was clear that most teachers emphasized that seminars/courses gave them the opportunity to learn actively (mainly Estonian teachers) and through collaboration. It should be noted that more Estonian teachers than those of the other three countries participated in long-term seminars/courses. More teachers of younger age (under 30) chose this professional development method at their school, especially in Estonia (56 %; $\chi^2 = 7.810, p < 0.05$) and in Lithuania (46 %; $\chi^2 = 25.702, p < 0.0001$). It should be noted that more Lithuanian teachers (N = 1984) indicated that they attended courses/seminars, but only 20.1 % of them noted that such professional development activities were long-term.

Table 6
Characteristics of Seminars/Courses that had a Positive Impact on Teaching Practices and took Place in Schools, from the Point of View of Teachers (%)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Estonia (N = 1013)</th>
<th>Finland (N = 446)</th>
<th>Latvia (N = 819)</th>
<th>Lithuania (N = 1984)</th>
<th>Chi-squared test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active learning</td>
<td>83.4</td>
<td>78</td>
<td>81</td>
<td>68.9</td>
<td>$\chi^2 = 96.090$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p &lt; 0.0001</td>
</tr>
<tr>
<td>Collaborative learning</td>
<td>83.5</td>
<td>79.4</td>
<td>77.2</td>
<td>84.5</td>
<td>NS</td>
</tr>
<tr>
<td>Long-term learning</td>
<td>46.9</td>
<td>22.9</td>
<td>39</td>
<td>20.1</td>
<td>$\chi^2 = 269.892$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p &lt; 0.0001</td>
</tr>
</tbody>
</table>

Note: NS – no statistically significant difference.

The characteristics of the peer and/or self-observation and coaching that took place at school and had a positive impact on teaching practice are shown in Table 7. Most teachers from all four countries highlighted the opportunity to learn actively in this way. The opinion of teachers from three countries (Estonia, Latvia and Finland) did not depend on the length of service or age, while the sample of teachers from Lithuania showed statistically significant differences. Peer and/or self-observation and coaching provided opportunities to learn actively more for young teachers (80.9 %, length of service less than 5 years) than for those who have worked longer than 20 years (68 %; $\chi^2 = 10.646, p < 0.01$). In addition, most teachers, irrespective of their length of service and age, suggested that participation in such professional development activities enabled them to learn through cooperation. More teachers from Estonia (49.9 %) and from Latvia (42.7 %) than from Finland and Lithuania indicated that they participated in long-term peer and/or self-observation and coaching. It was again established that although a significant number of Lithuanian teachers participated in such professional development activities, only 20 % indicated that such activities were long-term, and again long-term learning was more characteristic of younger teachers ($\chi^2 = 7.340, p < 0.05$).
Table 7

**Characteristics of Peer and/or Self-Observation and Coaching which had a Positive Impact on Teaching Practices and took Place at School, from the Point of View of Teachers (%)**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Estonia (N = 672)</th>
<th>Finland (N = 142)</th>
<th>Latvia (N = 567)</th>
<th>Lithuania (N = 1530)</th>
<th>Chi-squared test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active learning</td>
<td>85.4</td>
<td>78.2</td>
<td>82.2</td>
<td>70.8</td>
<td>NS</td>
</tr>
<tr>
<td>Collaborative learning</td>
<td>86.3</td>
<td>81</td>
<td>80.6</td>
<td>87.1</td>
<td>NS</td>
</tr>
<tr>
<td>Long-term learning</td>
<td>49.9</td>
<td>26.8</td>
<td>42.7</td>
<td>20</td>
<td>$\chi^2 = 233.156$ $p &lt; 0.0001$</td>
</tr>
</tbody>
</table>

Note: NS – no statistically significant difference.

The typical positive impact of school visits on teaching practices is shown in Table 8. The majority of teachers in all four countries stressed that this professional development activity enabled them to learn through active and collaborative learning. Among Estonian teachers, the possibility of active learning was more often identified by those teachers whose length of service was 6–20 years ($\chi^2 = 11.886$, $p < 0.01$), and among teachers in Lithuania who had worked for not longer than 5 years ($\chi^2 = 14.440$, $p < 0.001$). The percentage of Estonian teachers who participated in long-term school visits was significantly higher than in the other three countries ($\chi^2 = 267.164$, $p < 0.0001$). Lithuanian teachers stand out for their activeness: as many as 2,151 teachers indicated that they participated in visits to other schools. However, of these, only 19.4 % took part in long-term visits, more often younger (44.4 %; $\chi^2 = 14.552$, $p < 0.001$) and having up to 5 years of service (32.4 %; $\chi^2 = 20.316$, $p < 0.0001$).

Table 8

**Characteristics of School Visits which have had a Positive Impact on Teaching Practice, from the Point of View of Teachers (%)**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Estonia (N = 993)</th>
<th>Finland (N = 736)</th>
<th>Latvia (N = 1200)</th>
<th>Lithuania (N = 2151)</th>
<th>Chi-squared test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active learning</td>
<td>86.7</td>
<td>79.1</td>
<td>81.9</td>
<td>71.4</td>
<td>NS</td>
</tr>
<tr>
<td>Collaborative learning</td>
<td>84.1</td>
<td>78.9</td>
<td>77.1</td>
<td>85.7</td>
<td>NS</td>
</tr>
<tr>
<td>Long-term learning</td>
<td>45.9</td>
<td>21.2</td>
<td>32.5</td>
<td>19.4</td>
<td>$\chi^2 = 267.164$ $p &lt; 0.0001$</td>
</tr>
</tbody>
</table>

Note: NS – no statistically significant difference.

Summarizing teacher professional development activities with a positive impact on teaching practice and taking place at school, it is noted that active and collaborative learning predominates, although such professional development is not always long-term.

**Discussion**

Discussing the results, it is important to note that there is no ‘one size fits all’ approach to professional learning (Campbell, 2019). The aim of this article was to reveal similarities and differences in the sustainable professional development of teachers in four Baltic countries and to describe the characteristics of teacher professional development in each country.
Teachers from all of the studied countries are actively involved in various professional development activities. However, courses and seminars predominate, along with reading of professional literature; formal qualification programs are the least acceptable method of professional development. The results of this study reflect the general trends in traditional teacher learning in Europe and the world. Another growing trend is the inclination of young teachers towards long-term professional development.

Countries differ most according to forms of collaborative learning; they are more characteristic of teachers in Finland, Estonia and Latvia, while in Lithuania they are more characteristic of younger teachers. A more detailed review of the professional development of teachers in the four countries reveals more subtle differences and similarities.

Compared to the neighboring three countries (Latvia, Estonia and Finland), Lithuanian teachers participate the most in professional development activities (see Table 3), but we certainly cannot say that this will be linked to a higher level of achievements by school learners in Lithuania. Finnish teachers participate the least among all countries examined and this difference is significant. On the one hand, this may be explained by the fact that most Finnish teachers have a Master’s degree. According to Tonga and co-authors (Tonga et al., 2019), high standards are set for the teaching profession (e.g., rigorous pre-selection and assessment of teacher candidates, minimum of a Bachelor’s degree) in countries with high levels of school learner achievement (in this case, in Estonia and in Finland). On the other hand, Li and Dervin (2018) argue that the forms of non-formal learning of Finnish teachers – cooperation and mutual learning – can take place of formal professional development. Our analysis also shows that teachers in Finland (together with Estonian and Latvian teachers) are more likely to participate in collaborative learning activities than Lithuanian educators. Thus, Finland’s teachers seem to participate less in formal professional development activities, but their learning can be of high quality and their professional development is sustainable.

Sarv (2014) notes that in Estonia, a teacher is an active learner who plans, manages and evaluates his/her learning and professional growth. As a teacher’s life-long learning takes place in a specific working environment, teacher professional development is a collegial process influenced by colleagues, school leaders, parents and a community of teachers in a broad sense. The Estonian Teacher Education Strategy (2012) also emphasizes collegial learning by encouraging and supporting professional learning communities, while the results of study of their activities and best practices need to be shared among colleagues in their region or across the country. Our comparative analysis of the four countries also showed that Estonian teachers, more than in the other countries, took part in collaborative professional learning, long-term seminars/courses and long-term peer and/or self-observation and coaching. It is assumed that such sustainable learning by Estonian teachers can be one of the factors that creates teacher working culture and an educational system where practically every member of the staff is able to perform their work well, which is likely to influence the good learning achievements of Estonian school learners. According to Sarv (2014), her country’s school is an active learning organization that participates in a teacher’s personal, professional and collegial/community growth.

Discussing the professional development experience of Latvian teachers, it should be noted that Latvian teachers, more often than teachers from the other three countries, observe other teachers’ classes and provide feedback, and, together with Estonian teachers
and more often than Lithuanian and Finnish teachers, work with other teachers at school to ensure common standards in evaluations for assessing student progress and participate in long-term peer and/or self-observation and coaching. A review of the scientific literature reveals a certain focus by Latvian teachers on classroom action research that becomes a bridge between theory and practice in contextual teacher development (Meesuk, Sramoon, & Wongrugsa, 2020; Volkinsteine & Namsone, 2016) that promises participants a new perspective and an opportunity to explore a phenomenon in a broader cooperation and partnership unit (Salite et al., 2016). Thus, a certain common model of teachers’ learning in a team (teacher learning-team model) puts more emphasis on practical issues related to classroom activities (Iliško, Ignatjeva, & Mičule, 2010), which is confirmed by our results.

Real excellence grows through learning from practical activities, when decisions are based on such learning, which influences the quality of education and learner outcomes. Observation of colleagues and/or their work and coaching, and visits to other schools as professional development activities, were noted by many Lithuanian teachers, and most teachers according to the research data took part in collaborative professional learning. The study shows that more active and long-term learning forms are characteristic of young teachers. We would dare say that the attitude of Lithuanian teachers towards professional development is gradually changing. The results of research performed more than five years ago (Valuckienë et al., 2015) showed that on their own initiative Lithuanian teachers rarely looked for solutions to improve school activities, actively discussed, presented proposals, and undertook measures to implement such proposals themselves. Based on the results of this research, it is thought that teachers in Lithuania are perhaps beginning to see professional development as a long-term, cooperative, reflexive process taking place in the context of a particular school community.

Implications for Future Research

It must be recognized that teacher professional development is a large space for scientific research because, as already mentioned, this field still lacks conceptual foundations. Dromantienë, Indrašienë, Merfeldaitë and Prakapas (2013) postulate that researchers in education sciences do not conduct targeted studies of Lithuanian teacher qualification improvement processes and studies on the impact of in-service training on the quality of education. Current studies focus only on solitary, quite specialized problematic questions, rarely and indirectly linking them with teacher professional development. Systematic research is therefore needed to provide a conceptual basis for professional development processes and for measuring their success, reflecting all of which through the perspective of sustainable development.

The results of this study revealed similarities and differences among teacher professional development in four countries, which, on the one hand, are somewhat surprising given the common past of the three Baltic countries (Lithuania, Latvia and Estonia) and the fact that their educational systems were quite similar. On the other hand, we have to recognize that countries do not have their own uniform, refined educational models with a clear direction of development, e.g., Latvia and Lithuania are moving closer to a liberal Anglo-Saxon model, while Estonia in certain respects shows greater similarity to Finland (Želvys, Jakaitienë, & Stumbrienë, 2017). This calls for in-depth research into national educational developments and national educational policy, which could possibly
explain the qualitative differences among the educational systems of the countries. The use of international coordinated teams of researchers would be useful for such research.

A cautious assumption based on the found statistical differences, that collaborative and long-term teacher learning has an impact on school learner performance, should be verified by separate research, with particular reference to impact measurement tools. Such research (particularly longitudinal studies) would most clearly ground the effectiveness of teacher professional development. According to Hanushek (2011), research unambiguously confirms the importance of a teacher as a factor, but it is very difficult to identify the characteristics of the teacher’s learning that are reliably linked to school learner’s results. However, even if we do not see a clear link between teacher professional development and school learner’s results, we would still think it is very important to discuss teacher professional development (making use of contributions from other fields of science). The contemporary theory of teaching and learning is complemented by data from other sciences, such as the recent debate on educational neuroscience as an area of science that combines education (how teaching affects learning) and neuroscience (the understanding of how the nervous system works) (Mayer, 2017).

We believe that the concept of learning emphasized by Education for Sustainable Development, namely, active, learner-oriented, partnership-based, reflexive learning (Salóte, 2008), should also become the basis for research on teacher professional development, without forgetting a postulate of sustainable development: have patience while awaiting results.

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References


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