

A TVE CURRICULUM FRAMEWORK FOR SUSTAINABILITY LITERACY

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APRIL 2019

DEDICATION

I dedicate this work

To the Almighty God, the giver of life, wisdom and everything good, whose grace
and mercy saw me through this research journey.

To my parents

Mr. & Mrs Chinedu N. George for your prayers, support and encouragement.



PTTA UTHM
PERPUSTAKAAN TUNKU TUN AMINAH

ACKNOWLEDGEMENT

My first and foremost appreciation and thanks go to the Almighty God whose mercy and grace kept me in good health, mental stability and wellness to complete this research work.

Secondly, my unreserved thanks and appreciations go to my supervisor Associate Professor Dr Wan Azlinda Binti Wan Mohamed for her professional guidance, tutelage, motivation, encouragements, support and unrelenting understanding throughout my research journey. For the opportunities you gave me to thrive upon, for the foundation you placed me to learn from, and for the experiences I gained being under your leadership, I say thank you, and I am eternally grateful. From the inception of my research to its completion she has been like a mother to me. I have learned a great deal being by your side, and these experiences will shape my life and career forever. My appreciation and thanks go to the Office for Research, Innovation Commercialization and Consultancy Management (ORICC), and the Centre for graduate studies, Universiti Tun Hussein Onn Malaysia for funding this research project.

I wish to also express my gratitude towards all the ESD experts who participated in this study, your invaluable experiences, feedback, and patience to see to the completion of the Delphi phase of the study encouraged me to keep working harder

To my parents Mr. & Mrs Chinedu N. George, I am grateful for the prayers, for the encouragements, for all the moral support you shared with me. Even when I missed home so much and could not find the will to write, your encouraging words were fire to my bones, they strengthened me and made me see the end even while I was not there at the time. To my special friends Noor Hafiza Binti Nordin, Salma Dahri, Tahmina Noor, Nazia Keerio who became my family here in Malaysia, thank you for being such good friends, and for the filling the gap I felt from missing home. To my special friend Patience, Princess Nkwocha thank you for being there for me.

ABSTRACT

Existing curriculum frameworks for sustainability literacy emphasize the importance of curriculum reorientation but do not take cognisance of the essential Education for Sustainable Development (ESD) components that are needed for such curricular reorientation. To develop sustainability literate citizens and workers, ESD must become an integral part of the learning experiences provided in TVE teacher education programs. Therefore, this study sought to develop a curriculum framework for sustainability literacy. The study was carried out in three phases using a triangulation design. Phase one explored the extent to which ESD is reflected in four TVE teacher training programs in Malaysia using Qualitative Document Analysis (QDA) approach. The study in phase two explored the perspectives of 15 ESD experts about the important curriculum components required for sustainability literacy in TVE using a modified Delphi method. In phase three a survey of 116 TVE educators was carried out to validate the identified curriculum framework components in terms of their utility value and feasibility for implementation in TVE. Findings from the QDA revealed that ESD was essentially minimal, as only minute depictions of the concept were reflected across the TVE programs. Four curriculum components for sustainability literacy in TVE were identified from the modified Delphi. These identified framework components reflect the sustainability knowledge, skills and attributes required to develop sustainability competent vocational teachers. Findings from phase three reveals that TVE educators consider all the identified framework components and dimensions important for inclusion in the existing TVE curriculum. These components provide opportunities to develop vocational teachers of the future, who possess the requisite skills to facilitate teaching and learning on sustainability issues and concepts. The framework also proposes using a range of active learning pedagogical approaches to develop pre-service teacher's competencies on sustainability literacy.

ABSTRAK

Kerangka kerja kurikulum yang sedia ada bagi literasi kemampanan menekankan pentingnya penyesuaian semula kurikulum tetapi tidak mengambil kira komponen Pendidikan untuk Pembangunan Mampan (PPM) yang diperlukan untuk penyesuaian semula kurikulum. Untuk membangunkan warga dan pekerja celik kelestarian, PPM mestilah menjadi sebahagian daripada pembelajaran dalam program pendidikan guru PTV. Oleh itu, kajian ini bertujuan untuk membangunkan kerangka kerja kurikulum bagi literasi kemampanan. Kajian ini dijalankan dalam tiga fasa menggunakan rekabentuk triangulasi. Fasa pertama adalah meneroka sejauh mana PPM terlihat dalam empat program latihan guru PTV di Malaysia dengan menggunakan Analisis Dokumentasi Kualitatif (QDA). Kajian di fasa dua mendapatkan perspektif 15 pakar PPM mengenai komponen kurikulum yang diperlukan untuk literasi kemampanan dalam PTV dengan menggunakan kaedah Delphi yang diubah suai. Dalam fasa tiga, soal selidik telah dilaksanakan kepada 116 pendidik PTV untuk mengesahkan komponen kurikulum yang dikenalpasti dari segi utiliti dan kebolehlaksanaannya. Hasil daripada QDA menunjukkan bahawa PPM pada dasarnya adalah minimum, kerana hanya sedikit sahaja konsep PPM digambarkan dalam program PTV. Empat komponen kurikulum bagi literasi kelestarian dalam PTV telah dikenalpasti. Komponen ini mencerminkan pengetahuan tentang kelestarian, kemahiran dan atribut yang diperlukan untuk membangunkan guru vokasional yang kompeten. Penemuan dari fasa tiga mendedahkan bahawa pendidik TVE menganggap semua komponen dan dimensi rangka kerja yang dikenal pasti penting untuk dimasukkan dalam kurikulum TVE sedia ada. Komponen ini menyediakan peluang untuk membangunkan guru vokasional masa depan, yang memiliki kemahiran yang diperlukan untuk memudahkan pengajaran dan pembelajaran mengenai isu-isu kemampanan dan konsep. Rangka kerja ini juga mencadangkan pelbagai pendekatan pedagogi pembelajaran aktif untuk membangunkan kompetensi guru pra-perkhidmatan mengenai literasi kemampanan.

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LIST OF ABBREVIATIONS

CAQDAS	Computer Assisted Qualitative Data Analysis Software
DESD	Decade of Education for Sustainable Development
EFS	Education for Sustainability
ESD	Education for Sustainable Development
ESF	Education for a Sustainable Future
ILO	International Labor Organization
IMF	International Monetary Fund
IQR	Interquartile Range
ITE	Institutes of Teacher Education
MED	Median
MTU	Malaysian Technical Universities
SD	Sustainable Development
SDG	Sustainable Development Goals
TATI	Terengganu Advanced Technical Institute
TEI	Teacher Education Institutions
TTC	Teacher Training Colleges
TVE	Technical and Vocational Education
TVET	Technical and Vocational Education and Training
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNESCO	United Nations Educational, Scientific and Cultural Organization

WCED	World Commission on Environment and Development
WHO	World Health Organization
WWF	World Wide Forum



CHAPTER 1

INTRODUCTION

1.1 Introduction

The world recognizes the need for ensuring the survival and continuity of the earth and its resources. To achieve this goal, some researchers have opined that people need to come to the understanding that unsustainable practices and ways of living, impact the ecosystem negatively (Armstrong, 2011; Birdsall, 2014; Burmeister and Eilks, 2013; Majumdar, 2009; Reid and Petocz, 2006; United Nations Educational Scientific and Cultural Organization, 2005). Thereby, disrupting earth's lifecycles and posing a threat to the environment, the economy, the health and survival of local communities. The results of these negative impact have contributed to continuous and rapid environmental degradation, natural disasters, social injustices, and economic consequences.

It, therefore, became apparent during the early 1970s, that the rate at which development and resource exploitation were occurring was exceeding the carrying capacity of the ecosystem. Subsequently, that such patterns of development and practices would eventually lead to the total depletion of earth's resources, causing continuous harm to the ecosystem (Brundtland, 1987; Carson, 2002; Meadows *et al.*, 1972; Sleurs, 2008).

Therefore, as factual evidence became more apparent about the severe harm human activities and development outside earth's carrying capacity was having on the ecosystem, world organizations and institutions began to realize that development needed to be carried out within the limits of the ecosystem and in a sustainable fashion.

The realization that earth's resources were finite gave rise to the call for a paradigm shift and a call for changes in the way humans related to nature. According to Tverberg (2016), because the world's resources are finite, it was only crucial that efforts and strategies were implemented to guide human action and inculcate the right values and attitudes about living sustainably and developing within the carrying capacity of the earth.

Hence, the Sustainable Development (SD) agenda was initiated in 1987 by the United Nations (UN) at the World Commission on Environment and Development (WCED) (Brundtland, 1987). The purpose of initiating the SD agenda was to improve the quality of life of people and natural systems without compromising the capacity of future generations to do the same. SD also served the purpose of creating a level of awareness necessary for transitioning the world to becoming more sustainable and developing within citizens the consciousness of sustainable living (Majumdar, 2009, 2011). Sustainable Development (SD) was hence conceptualized as “the development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987; United Nations Educational Scientific and Cultural Organization, 2005).

To achieve Sustainable Development, 17 Sustainable Development Goals (SDGs) were formulated by the United Nations in 2015. The aim of the SDGs is to secure a sustainable, peaceful, prosperous and equitable life on earth for everyone, now and in the future (Rieckmann, 2017). These goals are considered crucial for the survival of humanity. In view of achieving sustainable development, Goal 4.7 of the SDG seeks to;

“ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development by 2030 (United Nations Educational Scientific and Cultural Organisation, 2014)”

To attain SDG 4.7, it was apparent that education was the most viable tool for creating this level of needed awareness, as well as developing the knowledge and capacities needed to transition societies and the world at large for Sustainable Development. Hence, Education for Sustainable Development (ESD) became the new

platform for developing sustainability conscious individuals and citizenry. In the literature, Education for Sustainable Development (ESD) has been synonymously referred to as Sustainability Education (SE), Education for Sustainability (EfS) and Education for a Sustainable Future (ESF). However, the most commonly used term recorded in the literature remains Education for Sustainable Development. Hence, Education for Sustainable Development (ESD) is used more in this thesis and interchangeably where necessary.

Irrespective of the various depictions of ESD, ESD focuses on the task of educating people to become aware of the implications and consequence of living unsustainable lifestyles and engaging in unsustainable practices both at home and in their workplaces. The goal of ESD is to educate people about the culture of living sustainably by inculcating the requisite knowledge, skills, and values needed to do so within people.

The Cloud Institute for Sustainable Education (2016) defines Education for Sustainable Development as a transformative learning process that equips students, teachers, and school systems with new knowledge and ways of thinking needed to achieve economic prosperity and responsible citizenship while restoring the health of the living systems upon which lives depends on. ESD empowers learners to make informed decisions, and take responsible actions for environmental integrity, economic viability and a just society for both present and future generations while respecting cultural diversity (United Nations Educational Scientific and Cultural Organisation, 2014). In other words, ESD aims at developing the competencies that enable individuals to reflect on their own actions, taking into consideration their current and future social, cultural, economic and environmental impacts from a local and global perspective.

It is thus evident that ESD has within its tenets, the primary goal of developing sustainable conscious citizenry to safeguard the future of the planet and improve living conditions for all. This has critical implications for teachers, as teachers who have the required level of understanding of both the conceptual and theoretical aspects of sustainability and its pedagogies, are required to teach across all levels of education.

To this end, the United Nations Educational Scientific and Cultural Organization (2005) declared ESD in teacher education the “priority of priorities.” This declaration was made to help improve the effectiveness of teaching and learning sustainability concepts and issues within schools and also to draw to the attention of

teacher training institutions, the necessity of preparing teachers to become knowledgeable, confident and well-motivated to undertake teaching and learning tasks with regards to Sustainable Development. Consequently, ESD continues to remain a global priority because the world continues to experience an array of issues that result from unsustainable practices and ways of living.

Malaysia strives to contribute to Sustainable Development both locally and globally by redefining its education system. Hence the purpose of education in Malaysia as defined in the Malaysian Blueprint 2013-2025, “is to enable the Malaysian society to have a command of the knowledge, skills and values necessary in a world that is highly competitive and globalized, arising from the impact of rapid development in science, technology and information”. To achieve this goal of developing a human capital with the capabilities for the sustainable advancement of the society and nation, Malaysia is guided by a National education philosophy:

“Education in Malaysia is an ongoing process towards further effort in developing the potential of individuals in a holistic and integrated manner; so as to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious, based on a firm belief in and devotion to God. Such an effort is designed to produce Malaysian citizens who are knowledgeable and competent, who possess high moral standards, and who are responsible and capable of achieving a high level of personal well-being as well as being able to contribute to the betterment of the society and the nation at large”.

Furthermore, Malaysia’s goal and commitment to sustainable development can be seen in a declaration by the former Prime Minister of Malaysia YAB Dato' Sri Haji Mohd Najib bin Tun Haji Abdul Razak in his address at the Commonwealth Business Council in December 2009, where he stressed that it was crucial for Malaysia to nurture a sustainability competent human capital if the nation was to resolve its sustainability challenges. Developing a sustainability human capital that is capable of responding and remedying the nation’s sustainability challenges is a task that requires the national education system to be reassessed including the training and retraining of Technical and Vocational teachers due to the role of TVET as a major supplier of skilled human capital for nations. Hence, realigning TVET for sustainable development by integrating ESD into all aspects of the TVE teacher training curriculum is an indispensable task that must be carried out.

REFERENCES

- Abdulrazak, S., & Ahmad, F. S. (2014). Sustainable Development: A Malaysian Perspective. *Procedia-Social and Behavioral Sciences*, 164, 237-241.
- Adenle, S., & Olukayode, S. (2007). *Technical and Vocational Education for Productivity and Sustainable Development in Nigeria*. Paper presented at the 20th annual national conference of National Association of Teachers of Technology (NATT) Kaduna Polytechnic.
- Ahmed, J. U. (2010). Documentary Research Method: New Dimensions. *Indus Journal of Management & Social Sciences*, 4(1), 1-14.
- Ajayi, K., Ogunyemi, B., & Sotonade, F. (2006). Teacher Education and the Challenge of Sustainable Development in Nigeria. *Educational Issues for Sustainable Development in Africa*, 17.
- Alumran, A., Hou, X.-Y., & Hurst, C. (2012). Validity and Reliability of Instruments Designed to Measure Factors Influencing the Overuse of Antibiotics. *Journal of Infection and Public Health*, 5(3), 221-232.
- Aminrad, Z., Zakariya, S., Hadi, A. S., & Sakari, M. (2013). Relationship between Awareness, Knowledge and Attitudes Towards Environmental Education among Secondary School Students in Malaysia. *World Applied Sciences Journal*, 22(9), 1326-1333.
- Armstrong, C. M. (2011). Implementing Education for Sustainable Development: The Potential Use of Time-Honored Pedagogical Practice from the Progressive Era of Education. *Journal of Sustainability Education*, 2.
- Armstrong, J. S. (2001). *Principles of Forecasting: A Handbook for Researchers and Practitioners* (Vol. 30): Springer Science & Business Media.

Arsat, M., Holgaard, J. E., & De Graaff, E. (2011). *Three Dimensions of Characterizing Courses for Sustainability in Engineering Education: Models, Approaches and Orientations*. Paper presented at the Engineering Education (ICEED), 2011 3rd International Congress on.

Association for the Advancement of Sustainability in Higher Education, A. (2017). *Stars Technical Manual Version 2.1*. In. Retrieved from <http://www.aashe.org/wp-content/uploads/2017/04/STARS-Technical-Manual-v2.1.2.pdf>

Atsumbe, B., Emmanuel, R., Igwe, C., & Atsumbe, J. (2012). Repositioning Vocational and Technical Education for Effective Manpower Production in Nigeria. *International Organization of Scientific Research Journal of Mechanical and Civil Engineering*, 1(4), 1-6.

Awang, Z. (2012). *Research Methodology and Data Analysis*: Penerbit Universiti Teknologi MARA Press.

Aziz, A. A., Sheikh, S. N. S., Yusof, K. M., Udin, A., & Yatim, J. M. (2012). Developing a Structural Model of Assessing Students' Knowledge-Attitudes Towards Sustainability. *Procedia-Social and Behavioral Sciences*, 56, 513-522.

Barlett, P. F., & Chase, G. W. (2013). *Sustainability in Higher Education: Stories and Strategies for Transformation*: MIT Press.

Bayani, A. (2010). Teacher Education Program: The Malaysian Perspective. In: Academia. edu.

Beder, S. (2000). Costing the Earth: Equity, Sustainable Development and Environmental Economics. *NZJ Envtl. L.*, 4, 227.

Bell, B. S., Kanar, A. M., & Kozlowski, S. W. (2008). Current Issues and Future Directions in Simulation-Based Training in North America. *The International Journal of Human Resource Management*, 19(8), 1416-1434.

- Bent, D. (2016). What Brexit Means for Sustainability-Our First Thoughts. Retrieved from <https://www.forumforthefuture.org/blog/what-brexit-means-sustainability-%E2%80%93-our-first-thoughts>
- Beringer, A., & Adomßent, M. (2008). Sustainable University Research and Development: Inspecting Sustainability in Higher Education Research. *Environmental Education Research, 14*(6), 607-623.
- Birdsall, S. (2014). Analysing Teachers' Translation of Sustainability Using a Pck Framework. *Environmental Education Research, 1-24*.
- Bisaillon, V., Amor, M. B., & Webster, A. (2015). Sustainable Development Integration Strategies in Higher Education: Case Study of Two Universities and Five Colleges in Quebec. In W. Leal Filho, U. M. Azeiteiro, S. Caeiro, & F. Alves (Eds.), *Integrating Sustainability Thinking in Science and Engineering Curricula* (pp. 117-130). Cham: Springer International Publishing.
- Bolstad, R., Cowie, B., Eames, C. W., Baker, M., Keown, P. A., Edwards, R., Coll, R. K., & Rogers, N. (2004). Environmental Education in New Zealand Schools.
- Bosselmann, K. (2001). University and Sustainability: Compatible Agendas? *Educational Philosophy and Theory, 33*(2), 167-186.
- Bowen, G. A. (2009). Document Analysis as a Qualitative Research Method. *Qualitative research journal, 9*(2), 27-40.
- Brookfield, H. C. (1969). On the Environment as Perceived. *Progress in geography, 1*, 51-80.
- Brown, M., Sack, F., & Piper Rodd, C. (2013). Student Voice in 'Skills for Sustainability': A Missing Component from the Demand Side of Australian Vocational Education and Training. *International Journal of Training Research, 11*(3), 213-224.
- Brundtland, G. (1987). Our Common Future: Report of the 1987 World Commission on Environment and Development. *United Nations, Oslo*, 1-300.

- Burke, G., & Cutter-Mackenzie, A. (2010). What's There, What If, What Then, and What Can We Do? An Immersive and Embodied Experience of Environment and Place through Children's Literature. *Environmental Education Research*, 16(3-4), 311-330.
- Burmeister, M., & Eilks, I. (2013). An Understanding of Sustainability and Education for Sustainable Development among German Student Teachers and Trainee Teachers of Chemistry. *Science Education International*, 24(2), 167-194.
- Burton, D., & Bartlett, S. (2009). *Key Issues for Education Researchers*: Sage.
- Campbell, B., Vanslembroek, K., Whitehead, E., van de Wauwer, C., Eifell, R., Wyatt, M., & Campbell, J. (2004). Views of Doctors on Clinical Correspondence: Questionnaire Survey and Audit of Content of Letters. *Bmj*, 328(7447), 1060-1061.
- Capelo, A., Santos, M. C., & Pedrosa, M. A. (2012). Education for Sustainable Development Indicators, Competences and Science Education. *Contributions to the UN Decade of Education for Sustainable Development. Peter Lang, Frankfurt am Main, Berlin, Bern, Bruxelles, New York, Oxford, Wien*, 9.
- Carson, R. (2002). *Silent Spring*: Houghton Mifflin Harcourt.
- Cebrián, G., Grace, M., & Humphris, D. (2015). Academic Staff Engagement in Education for Sustainable Development. *Journal of Cleaner Production*, 106, 79-86.
- Cebrián, G., & Junyent, M. (2015). Competencies in Education for Sustainable Development: Exploring the Student Teachers' Views. *Sustainability*, 7(3), 2768-2786.
- Cedefop. (2017). *Conceptions of Vocational Education and Training: An Analytical Framework*. In The changing nature and role of vocational education and training in Europe. Volume 1, (pp. 54). Retrieved from https://www.researchgate.net/publication/321184380_Conceptions_of_vocational_education_and_training_an_analytical_framework
doi:<http://dx.doi.org/10.2801/532605>

- Chiong, K. S., Abdul Aziz, A. R., & Zeeda, F. M. (2014). *Integration of Sustainability into Chemical Engineering Curricula: A Malaysian Context*. Paper presented at the 4th International Congress on Green Proces Engineering, Seville, Spain
- Cloud Institute for Sustainable Education. (2016). Education for Sustainability. Retrieved from <http://cloudinstitute.org/brief-history/>
- Collins-Figueroa, M. (2012). Biodiversity and Education for Sustainable Development in Teacher Education Programmes of Four Jamaican Educational Institutions. *Journal of Education for Sustainable Development*, 6(2), 253-267.
- Colton, S., & Hatcher, T. (2004). The Web-Based Delphi Research Technique as a Method for Content Validation in Hrd and Adult Education Research. *Online Submission*.
- Consortium for Energy Efficiency, C. (1998). *Education for Sustainable Development in the Schools Sector*. Retrieved from
- Corney, G., & Reid, A. (2007). Student Teachers' Learning About Subject Matter and Pedagogy in Education for Sustainable Development. *Environmental Education Research*.
- Cortese, A. D. (2003). The Critical Role of Higher Education in Creating a Sustainable Future. *Planning for higher education*, 31(3), 15-22.
- Corvalan, C., Hales, S., & McMichael, A. (2006). *Ecosystems and Human Well-Being*.
- Costley, C., Elliott, G. C., & Gibbs, P. (2010). *Doing Work Based Research: Approaches to Enquiry for Insider-Researchers*: Sage.
- Creswell, J. W. (2012). *Educational Research: Planning, Conducting and Evaluating Quantitative and Qualitative* New York: Pearson.
- Creswell, J. W. (2013). *Qualitative Inquiry and Research Design: Choosing among Five Approaches*: Sage.
- Creswell, J. W., & Clark, V. L. P. (2007). *Designing and Conducting Mixed Methods Research*.

- Creswell, J. W., Klassen, A. C., Plano Clark, V. L., & Smith, K. C. (2011). *Best Practices for Mixed Methods Research in the Health Sciences*. Bethesda (Maryland): National Institutes of Health.
- Dajani, J. S., Sincoff, M. Z., & Talley, W. K. (1979). Stability and Agreement Criteria for the Termination of Delphi Studies. *Technological forecasting and social change*, 13(1), 83-90.
- Dalkey, N. C., Brown, B. B., & Cochran, S. (1969). *The Delphi Method: An Experimental Study of Group Opinion*. (Vol. 3). Santa Monica, CA: Rand Corporation.
- Daniel, J. (2011). *Sampling Essentials: Practical Guidelines for Making Sampling Choices*: Sage.
- Darton, R. C. (2015). Setting a Policy for Sustainability. In J. J. Klemeš (Ed.), *Assessing and Measuring Environmental Impact and Sustainability* (pp. 479-496). Oxford: Butterworth-Heinemann.
- Dattalo, P. (2008). *Determining Sample Size: Balancing Power, Precision, and Practicality*: Oxford University Press.
- David, M., & Sutton, C. D. (2011). *Social Research: An Introduction*: Sage.
- Day, J., & Bobeva, M. (2005). A Generic Toolkit for the Successful Management of Delphi Studies. *The Electronic Journal of Business Research Methodology*, 3(2), 103-116.
- De Vaus, D. (2001). *Research Design in Social Research* (1st ed.). London: Sage Publications.
- De Vet, E., Brug, J., De Nooijer, J., Dijkstra, A., & De Vries, N. K. (2004). Determinants of Forward Stage Transitions: A Delphi Study. *Health education research*, 20(2), 195-205.
- Delbecq, A. L., Van de Ven, A. H., & Gustafson, D. H. (1976). *Group Techniques for Program Planning: A Guide to Nominal Group and Delphi Processes*: Scott, Foresman Glenview, IL.

- Denzin, N. K. (2012). Triangulation 2.0. *Journal of mixed methods research*, 6(2), 80-88.
- Diesendorf, M. (2001). Models of Sustainability and Sustainable Development. *International Journal of Agricultural Resources, Governance and Ecology*, 1(2), 109-123.
- Dillon, J., & Reid, A. (2004). Issues in Case-Study Methodology in Investigating Environmental and Sustainability Issues in Higher Education: Towards a Problem-Based Approach? *Environmental Education Research*, 10(1), 23-37.
- Diwekar, U. (2015). Engineering Sustainability. In J. J. Klemeš (Ed.), *Assessing and Measuring Environmental Impact and Sustainability* (pp. 1-24). Oxford: Butterworth-Heinemann.
- Doubleday, N., Mackenzie, A. F. D., & Dalby, S. (2004). Reimagining Sustainable Cultures: Constitutions, Land and Art. *Canadian Geographer/Le Géographe canadien*, 48(4), 389-402.
- Duffield, C. (1993). The Delphi Technique: A Comparison of Results Obtained Using Two Expert Panels. *International journal of nursing studies*, 30(3), 227-237.
- Dumitru, D. E. (2017). Reorienting Higher Education Pedagogical and Professional Development Curricula toward Sustainability—a Romanian Perspective. *International Journal of Sustainability in Higher Education*, 18(6), 894-907.
- Duxbury, N. (2007). *Culture as a Key Dimension of Sustainability: Exploring Concepts, Themes, and Models*. In (pp. 24). Retrieved from <http://www.cultureandcommunities.ca/resources/publications.html>
- Effeney, G., & Davis, J. (2013). Education for Sustainability: A Case Study of Pre-Service Primary Teachers' Knowledge and Efficacy. *Australian Journal of Teacher Education*, 38(5), 32-46.
- Egan, J. (2004). Skills for Sustainable Development. *London: Office of the Deputy Prime Minister*.

- Eilam, E., & Trop, T. (2010). Esd Pedagogy: A Guide for the Perplexed. *The Journal of Environmental Education*, 42(1), 43-64.
- Eilks, I. (2015). Science Education and Education for Sustainable Development-Justifications, Models, Practices and Perspectives. *Eurasia Journal of Mathematics, Science & Technology Education*, 11(1).
- Emas, R. (2015). The Concept of Sustainable Development: Definition and Defining Principles. *Florida International University*.
- Erffmeyer, R. C., Erffmeyer, E. S., & Lane, I. M. (1986). The Delphi Technique: An Empirical Evaluation of the Optimal Number of Rounds. *Group & organization studies*, 11(1-2), 120-128.
- Esa, N. (2010). Environmental Knowledge, Attitude and Practices of Student Teachers. *International Research in Geographical and Environmental Education*, 19(1), 39-50.
- Essel, C. H. (2013). Sustainability of TVET: Analyzing the Critical Choice Factors. *CAPA Scientific Journal*, 1(1), pp. 18 - 27.
- Evans, N., Stevenson, R. B., Lasen, M., Ferreira, J.-A., & Davis, J. (2017). Approaches to Embedding Sustainability in Teacher Education: A synthesis of the Literature. *Teaching and Teacher Education*, 63, 405-417. doi:<https://doi.org/10.1016/j.tate.2017.01.013>
- Evans, N., Tomas, L., & Woods, C. (2016). Impact of Sustainability Pedagogies on Pre-Service Teachers' Self-Efficacy. *Journal of Education for Sustainable Development*, 10(2), 243-261.
- Evans, N., Whitehouse, H., & Hickey, R. (2012). Pre-Service Teachers' Conceptions of Education for Sustainability. *Australian Journal of Teacher Education*, 37(7), pp. 1 - 13.
- Everett, J. (2008). Sustainability in Higher Education: Implications for the Disciplines. *Theory and Research in Education*, 6(2), 237-251.

- Falkenberg, T., & Babiuk, G. (2014). The Status of Education for Sustainability in Initial Teacher Education Programmes: A Canadian Case Study. *International Journal of Sustainability in Higher Education*, 15(4), 418-430.
- Faucheux, S. (2001). Summary Principles for Sustainable Development. *Our Fragile World, Challenges and opportunities for sustainable development*, Oxford: Eolss.
- Ferreira, J. A., Ryan, L., & Tilbury, D. (2007). Mainstreaming Education for Sustainable Development in Initial Teacher Education in Australia: A Review of Existing Professional Development Models. *Journal of Education for Teaching*, 33(2), 225-239.
- Fien, J., & Maclean, R. (2000a). Teacher Education for Sustainability. In K. A. Wheeler & A. P. Bijur (Eds.), *Education for a Sustainable Future* (pp. 91-111). Boston, MA: Springer US.
- Fien, J., & Maclean, R. (2000b). Teacher Education for Sustainability. Ii. Two Teacher Education Projects from Asia and the Pacific. *Journal of Science Education and Technology*, 9(1), 37-48.
- Fien, J., Maclean, R., & Park, M.-G. (2008). *Work, Learning and Sustainable Development: Opportunities and Challenges* (Vol. 8): Springer Science & Business Media.
- Fien, J., & Tilbury, D. (1996). *Learning for a Sustainable Environment: An Agenda for Teacher Education in Asia and the Pacific: Asia-Pacific Programme of Educational Innovation for Development*, Unesco Principal Regional Office for Asia and the Pacific.
- Fien, J., & Wilson, D. (2005). Promoting Sustainable Development in Tvet: 1 the Bonn Declaration. *Prospects*, 35(3), 273-288.
- Fink, A., Kosecoff, J., Chassin, M., & Brook, R. H. (1984). Consensus Methods: Characteristics and Guidelines for Use. *American journal of public health*, 74(9), 979-983.

- Fleurbaey, M. (2015). On Sustainability and Social Welfare. *Journal of Environmental Economics and Management*, 71(0), 34-53. doi:10.1016/j.jeem.2015.02.005
- Fraenkel, J. R., & Wallen, N. E. (2000). *How to Design and Evaluate Research in Education*: McGraw-Hill Higher Education.
- Franklin, S., & Walker, C. (2003). *Survey Methods and Practices*. Canada: Statistics Canada. Social Survey Methods Division.
- Gadotti, M. (2010). Reorienting Education Practices Towards Sustainability. *Journal of Education for Sustainable Development*, 4(2), 203-211.
- Gall, M. D., Borg, W. R., & Gall, J. P. (2006). *Educational Research: An Introduction*: Pearson.
- George, D., & Mallery, M. (2003). Using Spss for Windows Step by Step: A Simple Guide and Reference. *Boston, MA: Allyn y Bacon.[Links]*.
- Godina, H., & McCoy, R. (2000). Emic and Etic Perspectives on Chicana and Chicano Multicultural Literature. *Journal of Adolescent & Adult Literacy*, 44(2), 172-179.
- Gough, A. (2009). *Teacher Education for Sustainable Development within Tvet: An Australian Perspective*. Paper presented at the UNESCO-UNEVOC Regional Seminar on TVET Teacher Education for Sustainable Development, RMIT University, Ho Chi Minh City, Vietnam, RMIT University, Ho Chi Minh City, Vietnam, .
https://www.academia.edu/21337437/Teacher_Education_for_Sustainable_Development_within_TVET_An_Australian_Perspective
- Gough, A. (2018). Sustainable Development and Global Citizenship Education: Challenging Imperatives. In *The Palgrave Handbook of Global Citizenship and Education* (pp. 295-312): Springer.
- Gravetter, F. J., & Wallnau, L. B. (2009). *Statistic for the Behavioral Sciences*. . In: Wadsworth, Cenage Learning, Belmont, CA.

- Gravetter, F. J., & Wallnau, L. B. (2016). *Statistics for the Behavioral Sciences*: Cengage Learning.
- Greatorex, J., & Dexter, T. (2000). An Accessible Analytical Approach for Investigating What Happens between the Rounds of a Delphi Study. *Journal of advanced nursing*, 32(4), 1016-1024.
- Green, B., Jones, M., Hughes, D., & Williams, A. (1999). Applying the Delphi Technique in a Study of Gps' Information Requirements. *Health Soc Care Community*, 7(3), 198-205.
- Green, J., & Thorogood, N. (2013). *Qualitative Methods for Health Research*: Sage.
- Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a Conceptual Framework for Mixed-Method Evaluation Designs. *Educational evaluation and policy analysis*, 11(3), 255-274.
- Gregg, K. (2011). A Document Analysis of the National Association for the Education of Young Children's Developmentally Appropriate Practice Position Statement: What Does It Tell Us About Supporting Children with Disabilities? *Contemporary Issues in Early Childhood*, 12(2), 175-186.
- Griggs, D., Stafford-Smith, M., Gaffney, O., Rockstrom, J., Ohman, M. C., Shyamsundar, P., Steffen, W., Glaser, G., Kanie, N., & Noble, I. (2013). Policy: Sustainable Development Goals for People and Planet. *Nature*, 495(7441), 305-307. doi:10.1038/495305a
- Guijt, I., & Moiseev, A. (2001). Resource Kit for Sustainability Assessment. *IUCN, Gland, Switzerland and Cambridge, UK*.
- Hadi, A. S., Idrus, S., Shah, A. H. H., & Mohamed, A. F. (2011). Malaysian Path to Sustainable Development: Transitions to Sustainability. *Malaysian Journal of Environmental Management*, 12(2), 77-89.
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). Pls-Sem: Indeed a Silver Bullet. *Journal of Marketing theory and Practice*, 19(2), 139-152.

- Hamiti, S., & Wydler, H. (2014). Supporting the Integration of Sustainability into Higher Education Curricula—a Case Study from Switzerland. *Sustainability*, 6(6), 3291-3300.
- Harris, J. M. (2000). *Basic Principles of Sustainable Development*: Tufts University Medford, MA.
- Harun, R. R., Lee, J. F., Omar, A., Hanif, M., & Arumugam, L. P. (2018). *Developing and Validating a Curriculum Framework for Preparing Quality Teachers for the Future*.
- Hasson, F., Keeney, S., & McKenna, H. (2000). Research Guidelines for the Delphi Survey Technique. *J Adv Nurs*, 32(4), 1008-1015.
- Headland, T. N., Pike, K. L., & Harris, M. E. (1990). *Emics and Etics: The Insider/Outsider Debate*. Paper presented at the This book had its genesis at a symposium of the 87th Annual Meeting of the American Anthropological Association in Phoenix, Arizona, on Nov 19, 1988.
- Heiko, A. (2012). Consensus Measurement in Delphi Studies: Review and Implications for Future Quality Assurance. *Technological forecasting and social change*, 79(8), 1525-1536.
- Hesse-Biber, S. N., & Leavy, P. (2010). *The Practice of Qualitative Research*: Sage.
- Hezri, A. A., & Nordin, H. M. (2006). Towards Sustainable Development? The Evolution of Environmental Policy in Malaysia. *Natural Resources Forum*, 30(1), 37-50.
- Hill, S. B., Wilson, S., & Watson, K. (2004). Learning Ecology. A New Approach to Learning and Transforming Ecological Consciousness. In E. V. O'Sullivan & M. M. Taylor (Eds.), *Learning toward an Ecological Consciousness: Selected Transformative Practices*. New York: Palgrave, Macmillian. pp. 47 – 64.
- Hiser, K. K. (2012). *Sustainability: Perspectives of Students as Stakeholders in the Curriculum*. University of Hawaii, Ph.D. Thesis.

- Hofman, M. (2015). What Is an Education for Sustainable Development Supposed to Achieve—a Question of What, How and Why. *Journal of Education for Sustainable Development*, 9(2), pp. 213 - 228.
- Hofmann, C., & Strietska-Ilina, O. (2013). Skills for Green Jobs: Gearing up Education and Training for Green Growth. In (pp. 83-93,219,223). Paris: Organisation for Economic Cooperation and Development (OECD).
- Holey, E. A., Feeley, J. L., Dixon, J., & Whittaker, V. J. (2007). An Exploration of the Use of Simple Statistics to Measure Consensus and Stability in Delphi Studies. *BMC medical research methodology*, 7(1), 52.
- Hopkinson, P., Huges, P., & Layer, G. (2008). Education for Sustainable Development: Using the Unesco Framework to Embed Esd in a Student Learning and Living Experience. *Policy & Practice-A Development Education Review*(6).
- Hopkinson, P., & Layer, G. (2008). Education for Sustainable Development: Using the Unesco Framework to Embed Esd in a Student Learning and Living Experience. *Policy & Practice-A Development Education Review*(6).
- Hsu, C.-C., & Sandford, B. A. (2007). The Delphi Technique: Making Sense of Consensus. *Practical assessment, research & evaluation*, 12(10), 1-8.
- Hu, Z., & Li, J. (2015). The Integration of Efa and Cfa: One Method of Evaluating the Construct Validity. *Global Journal of Human-Social Science Research*.
- Hyndman, B. P. (2017). A Simulation Pedagogical Approach to Engaging Generalist Pre-Service Teachers in Physical Education Online: The Gopro Trial 1.0. *Australian Journal of Teacher Education*, 42(1), 6.
- Hyytiäinen, J., Hämeenoja, E., Hänninen, T., Leinonen, E., & Tenhunen, R. (1999). Kestävä Kehitys Oppilaitoksissa.–Ekoauditoinnin Opas [Sustainable Development in Educational Institutions–Eco Auditing Instructions]. In. Helsinki Opetushallitus.

- Ikerd, J. E. (2005). *Sustainable Capitalism: A Matter of Common Sense*: Kumarian Press Bloomfield, CT.
- Imenda, S. (2014). Is There a Conceptual Difference between Theoretical and Conceptual Frameworks. *Journal of Social Sciences*, 38(2), 185-195.
- Irdayanti, M., Ramlee, M., & Abdullah, Y. (2015). Delphi Technique: Enhancing Research in Technical and Vocational Education. *Journal of Technical Education and Training*, 7(2), 12.
- Jabbari, L. (2015). The Study of Technical and Vocational Education and Training Needs of Dairy and Cooking Oil Producing Companies in Tehran Province. *Journal of education and practice*, 6(10), 97-102.
- Janicke, M., Weidner, H., & Jörgens, H. (1997). National Environmental Policies.
- Jirwe, M., Gerrish, K., Keeney, S., & Emami, A. (2009). Identifying the Core Components of Cultural Competence: Findings from a Delphi Study. *Journal of Clinical Nursing*, 18(18), 2622-2634.
- Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed Methods Research: A Research Paradigm Whose Time Has Come. *Educational researcher*, 33(7), 14-26.
- Jones, J., & Hunter, D. (1995). Consensus Methods for Medical and Health Services Research. *BMJ: British Medical Journal*, 311(7001), 376.
- Jones, J., & Hunter, D. (2000). Using the Delphi and Nominal Group Technique in Health Services Research. *Qualitative research in health care*, 2, 40-45.
- Jones, P., Selby, D., & Sterling, S. R. (2010). *Sustainability Education: Perspectives and Practice across Higher Education*: Earthscan.
- Junyent, M., & Ciurana, A. M. G. (2008). Education for Sustainability in University Studies: A Model for Reorienting the Curriculum. *British Educational Research Journal*, 34(6), 763-782.

- Karpudewan, M., Ismail, Z., & Roth, W.-M. (2012). Fostering Pre-Service Teachers' Self-Determined Environmental Motivation through Green Chemistry Experiments. *Journal of Science Teacher Education*, 23(6), 673-696.
- Keeney, S., Hasson, F., & McKenna, H. P. (2001). A Critical Review of the Delphi Technique as a Research Methodology for Nursing. *International journal of nursing studies*, 38(2), 195-200.
- Kennelly, J., Taylor, N., Maxwell, T., & Serow, P. (2012). Education for Sustainability and Pre-Service Teacher Education. *Australian Journal of Environmental Education*, 28(01), 57-58.
- Kosta, K. (2015). Exploring the Views of Postgraduates on Higher Education Sustainability. *Education for Sustainable Development: Towards the Sustainable University*, 34.
- Lahiry, D., Sinha, S., & Gill, J. (1988). Environmental Education: A Process for Pre-Service Teacher Training Curriculum Development. In *Environmental Education Series: UNESCO. Division of Science Technical and Vocational Education*.
- Lambrechts, W., Mulà, I., Ceulemans, K., Molderez, I., & Gaeremynck, V. (2013). The Integration of Competences for Sustainable Development in Higher Education: An Analysis of Bachelor Programs in Management. *Journal of Cleaner Production*, 48, 65-73.
- Leal Filho, W., Manolas, E., & Pace, P. (2009). Education for Sustainable Development: Current Discourses and Practices and Their Relevance to Technology Education. *International Journal of Technology and Design Education*, 19(2), 149-165.
- Lemmer, B. (1998). Successive Surveys of an Expert Panel: Research in Decision-Making with Health Visitors. *Journal of advanced nursing*, 27(3), 538-545.
- Libunao, W. H., & Peter, C. J. (2013, 4th-5th June). *Education for Sustainable Development Practices among Polytechnics in Malaysia*. Paper presented at

the International Conference on Social Science Research (ICSSR), Penang, Malaysia.

Lieberman, A., & Darling-Hammond, L. (2012). *Teacher Education around the World: Changing Policies and Practices*. In: New York: Routledge Chapman Hall.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic Inquiry* (Vol. 75): Sage.

Linstone, H. A., & Turoff, M. (1975). *The Delphi Method: Techniques and Applications* (Vol. 29): Addison-Wesley Reading, MA.

Linstone, H. A., & Turoff, M. (2002). The Delphi Method. *Techniques and applications*, 53.

Lozano, R., Merrill, M. Y., Sammalisto, K., Ceulemans, K., & Lozano, F. J. (2017). Connecting Competences and Pedagogical Approaches for Sustainable Development in Higher Education: A Literature Review and Framework Proposal. *Sustainability*, 9(10), 1889.

Ludwig, B. (1997). Predicting the Future: Have You Considered Using the Delphi Methodology? *Journal of extension*, 35(5), 1-4.

Maclean, R. (2005). Orientating Tvet for Sustainable Development Introduction to the Open File. *Prospects*, 35(3), 269-272.

Madeley, J. (2015). Sustainable Development Goals. *Appropriate Technology*, 42(4), 32.

Madhavi, J., Shailaja, R., Gopal, K. J., & Keren, N. (2007). *Sustainable Development: An Introduction*. In Vol. Internship Series. (pp. 40). Retrieved from <http://www.sayen.org/volume-i.pdf>

Mahat, H., & Idrus, S. (2016). Education for Sustainable Development in Malaysia: A Study of Teacher and Student Awareness.

Majumdar, S. (2005). Greening Tvet: Connecting the Dots in Tvet for Sustainable Development. *Organization*.

- Majumdar, S. (2009). *Major Challenges in Integrating Sustainable Development in Tvet*. Paper presented at the International Conference: Reorienting TVET Policy Towards Education for Sustainable Development, Berlin, Germany. Retrieved from http://www.unevoc.unesco.org/fileadmin/user_upload/docs/402-0002-2010_lowquality.pdf
- Majumdar, S. (2011). Teacher Education in Tvet: Developing a New Paradigm. *International Journal of Training Research*, 9(1-2), 49-59.
- Majumdar, S. (2012). Developing a Greening Tvet Framework. In: UNESCO-UNEVOC International Centre. Online: <http://www.unevoc.unesco.org/go.php>.
- Marsden, J., Medhurst, J., & Irving, P. (2013). The Case for a Global Green Skills Training Action Plan. In (pp. 29-40,219-221). Paris: Organisation for Economic Cooperation and Development (OECD).
- Masa'deh, R. e. (2016). The Role of Knowledge Management Infrastructure in Enhancing Job Satisfaction at Aqaba Five Star Hotels in Jordan.
- Mat Said, A., & Paim, L. (2010). Preparedness of Malaysian Pre-School Educators for Environmental Education. *Pertanika Journal of Social Sciences & Humanities*, 18(2), 271-283.
- McClanahan, L. G. (2010). Essential Elements of Sustainability Education. *Education*, 2010.
- McKeown, R., Hopkins, C. A., Rizi, R., & Chrystalbridge, M. (2002). *Education for Sustainable Development Toolkit: Energy, Environment and Resources Center*, University of Tennessee Knoxville.
- McNaughton, M. J. (2004). Educational Drama in the Teaching of Education for Sustainability. *Environmental Education Research*, 10(2), 139-155.

- Meadows, D. H., Meadows, D., Randers, J., & Behrens III, W. W. (1972). *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind* (New York: Universe). In: New York: Univers.
- Merriam, S. B. (1998). *Qualitative Research and Case Study Applications in Education. Revised and Expanded From*: ERIC.
- Michalos, A. C., Creech, H., Swayze, N., Maurine Kahlke, P., Buckler, C., & Rempel, K. (2011). Measuring Knowledge, Attitudes and Behaviours Concerning Sustainable Development among Tenth Grade Students in Manitoba. *Social Indicators Research*, 106(2), 213-238. doi:10.1007/s11205-011-9809-6
- Mokthsim, N., & Salleh, K. O. (2014). *Malaysia's Efforts toward Achieving a Sustainable Development: Issues, Challenges and Prospects*. Paper presented at the 3rd International Geography Symposium, GEOMED2013, Procedia - Social and Behavioral Sciences, Antalya, Turkey. <http://www.sciencedirect.com/science/article/pii/S1877042814016371>
- Moon, J. A. (2013). *A Handbook of Reflective and Experiential Learning: Theory and Practice*: Routledge.
- Morgan, D. L. (2014). Pragmatism as a Paradigm for Social Research. *Qualitative Inquiry*, 20(8), 1045-1053.
- MOSTE. (2000). *Malaysia Initial National Communication*. Malaysia. In. Malaysia:: Ministry of Science, Technology and Environment.
- Murphy, M., Black, N., Lamping, D., McKee, C., Sanderson, C., Askham, J., & Marteau, T. (1998). Consensus Development Methods, and Their Use in Clinical Guideline Development. *Health technology assessment (Winchester, England)*, 2(3), i.
- Nature, S. (2017). Sustainability Curriculum Framework, 2. Retrieved from <https://2.files.edl.io/rKcietoAEgdoZNd6HIvIGRIYpr0nyB8to39Bu7qCoAUbsJ.pdf>

- New Zealand Ministry of Education. (2015). Education for Sustainability. *The New Zealand Curriculum Online*. Retrieved from <http://nzcurriculum.tki.org.nz/Curriculum-resources/Education-for-sustainability>
- Newby, P. (2010). *Research Methods for Education*: Pearson Education.
- Nolet, V. (2009). Preparing Sustainability-Literate Teachers. *Teachers College Record*, 111(2), 409-442.
- Nolet, V. (2013). Teacher Education and Esd in the United States: The Vision, Challenges, and Implementation. In *Schooling for Sustainable Development in Canada and the United States* (pp. 53-67): Springer.
- O’Gorman, L., & Davis, J. (2013). Ecological Footprinting: Its Potential as a Tool for Change in Preservice Teacher Education. *Environmental Education Research*, 19(6), 779-791.
- Obeidat, B. Y., Al-Suradi, M. M., Masa’deh, R. e., & Tarhini, A. (2016). The Impact of Knowledge Management on Innovation: An Empirical Study on Jordanian Consultancy Firms. *Management Research Review*, 39(10), 1214-1238.
- Ogwo, B., & Oranu, R. (2006). Methodology in Formal and Non-Formal Technical/Vocational Education. *Nsukka: University of Nigeria Press Ltd.*
- Okoli, C., & Pawlowski, S. D. (2004). The Delphi Method as a Research Tool: An Example, Design Considerations and Applications. *Information & management*, 42(1), 15-29.
- Openg, A. S. (2012). *Developing Pre-Service Teacher Education in Environmental Education for Sustainability in Papua New Guinea*. (Doctor of Philosophy (PhD)), University of Waikato, University of Waikato. (<http://hdl.handle.net/10289/6593>)
- Opoku, A., & Egbu, C. (2018). Students’ Perspectives on the Relevance of Sustainability Literacy in a Postgraduate Built Environment Program. *International Journal of Construction Education and Research*, 14(1), 46-58.

- Owens, S. (2010). We Teach How We've Been Taught: Expeditionary Learning Unshackling Sustainability Education in Us Public Schools. *Education*, 2010.
- Paige, K., Lloyd, D., & Chartres, M. (2008). Moving Towards Transdisciplinarity: An Ecological Sustainable Focus for Science and Mathematics Pre-Service Education in the Primary/Middle Years. *Asia-Pacific Journal of Teacher Education*, 36(1), 19-33.
- Pallant, J. (2011a). Spss Survival Manual 4th Edition: A Step by Step Guide to Data Analysis Using Spss Version 18. Maidenhead, Berkshire: Open University Press. Retrieved on from.
- Pallant, J. (2011b). Survival Manual. A Step By Step Guide to Data Analysis Using SPSS.
- Parkin, S., Johnson, A., Buckland, H., & White, E. (2004). Learning and Skills for Sustainable Development: Developing a Sustainability Literate Society. *Higher Education Partnership for Sustainability (HEPS), London*.
- Parkyn, G. W. (1973). *Towards a Conceptual Model of Life-Long Education*: Unesco.
- Pavlova, M. (2006). Technology Education for Sustainable Futures. *Design and Technology Education: An International Journal*, 11(2).
- Pavlova, M. (2007). *Two Pathways, One Destination—Tvet for a Sustainable Future*. Paper presented at the Conference report for the UNESCO-UNEVOC virtual conference.
- Pavlova, M. (2008). *Technology and Vocational Education for Sustainable Development: Empowering Individuals for the Future* (Vol. 10): Springer Science & Business Media.
- Pavlova, M. (2012). *Perception of Sustainable Development and Education for Sustainable Development by African Technology Education Academics*. Paper presented at the PATT 26 Conference; Technology Education in the 21st Century; Stockholm; Sweden; 26-30 June; 2012.

- Pavlova, M. (2013). Teaching and Learning for Sustainable Development: Esd Research in Technology Education. *International Journal of Technology and Design Education*, 23(3), 733-748.
- Payne, S. L. (2004). Who Left It Open? A Description of the Free-Answer Question and Its Demerits. *Questionnaires*, 1, 131-147.
- Pearce, D., Hamilton, K., & Atkinson, G. (1996). Measuring Sustainable Development: Progress on Indicators. *Environment and Development Economics*, 1(1), 85-101.
- Peck, R., & Devore, J. L. (2011). *Statistics: The Exploration & Analysis of Data*: Cengage Learning.
- Philip, S. (2007). Guidelines for Constructing a Curriculum Framework for Basic Education. In (pp. 14). Kigali: IBE- UNESCO.
- Powell, C. (2003). The Delphi Technique: Myths and Realities. *J Adv Nurs*, 41(4), 376-382.
- Quist, J., Rammelt, C., Overschie, M., & de Werk, G. (2006). Backcasting for Sustainability in Engineering Education: The Case of Delft University of Technology. *Journal of Cleaner Production*, 14(9-11), 868-876.
- Rajakorpi, A., & Rajakorpi, H. (Eds.). (2001). *Sustainable Development in Schools and Educational Institutions? Yliopistopaino*, Helsinki: Finnish National Board of Education.
- Raskin, M. S. (1994). The Delphi Study in Field Instruction Revisited: Expert Consensus on Issues and Research Priorities. *Journal of Social Work Education*, 30(1), 75-89.
- Ratnavadivel, N., Hoon, C. L., Salih, M., Low, J., Karuppiah, N., Omar, A., Yassin, S. M., Dawi, A. H., Saad, N. S., & Hashim, A. T. M. (2014). Curriculum Framework for Preparing Quality Teachers for the Future: Developing Guiding Principles. *Journal of Research Policy & Practice of Teachers Teacher Education*, 4(2), 32-44.

- Reid, A., & Petocz, P. (2006). University Lecturers' Understanding of Sustainability. *Higher Education, 51*(1), 105-123.
- Reid, N. (1988). The Delphi Technique: Its Contribution to the Evaluation of Professional Practice. *Professional competence and quality assurance in the caring professions, 230-262.*
- Rieckmann, M. (2017). *Education for Sustainable Development Goals: Learning Objectives*: UNESCO Publishing.
- Robbins, L. (1932). The Nature and Significance of Economic Science. *The Philosophy of Economics: An Anthology, 1, 73-99.*
- Robertson, J., le Sueur, H., & Terblanche, N. (2019). An Account of Practice: Employing Drawings and Stories to Enable Reflective Learning. *Action Learning: Research and Practice, 16*(1), 77-86.
- Roorda, N. (2004). Developing Sustainability in Higher Education Using Aishe. In *Higher Education and the Challenge of Sustainability* (pp. 305-318): Springer.
- Rowe, G., Wright, G., & McColl, A. (2005). Judgment Change During Delphi-Like Procedures: The Role of Majority Influence, Expertise, and Confidence. *Technological forecasting and social change, 72*(4), 377-399.
- Rusinko, C. A. (2010). Integrating Sustainability in Higher Education: A Generic Matrix. *International Journal of Sustainability in Higher Education, 11*(3), 250-259.
- Sack, F. (2016). Education for Sustainability: Examples from a Living Lab. *AVETRA 19th Annual Conference- TAFE NSW – Northern Sydney Institute*: AVETRA.
- Sammalisto, K., & Lindqvist, T. (2008). Integration of Sustainability in Higher Education: A Study with International Perspectives. *Innovative Higher Education, 32*(4), 221-233.
- Saunders, M., Lewis, P., & Thorhill, A. (2016). *Research Methods for Business Students* (7 ed.). England: Pearson Education Limited.

- Savelyeva, T., & McKenna, J. R. (2011). Campus Sustainability: Emerging Curricula Models in Higher Education. *International Journal of Sustainability in Higher Education*, 12(1), 55-66.
- Scott, W., & Gough, S. (2003). *Sustainable Development and Learning: Framing the Issues*: Routledge.
- Segalàs, J., Ferrer-Balas, D., & Mulder, K. F. (2010). What Do Engineering Students Learn in Sustainability Courses? The Effect of the Pedagogical Approach. *Journal of Cleaner Production*, 18(3), 275-284.
- Sekaran, U., & Bougie, R. (2013). *Research Methods for Business: A Skill Building Approach* (6 ed.): John Wiley & Sons Ltd. United Kingdom.
- Semken, S., & Freeman, C. B. (2008). Sense of Place in the Practice and Assessment of Place-Based Science Teaching. *Science Education*, 92(6), 1042-1057.
- Sharma, R. (2009). *Education for Sustainability in Certificate and Vocational Education at a New Zealand Polytechnic*. (Master of Education Master's Dissertation), UNITEC Institute of Technology, Auckland, Newzealand. Retrieved from <http://unitec.researchbank.ac.nz/handle/10652/1390>
- Simmons, B. (2014). Essential Elements of Sustainability Education. *Journal of Sustainability Education*, 6.
- Singh, G. (2011). *Green EcOonomy, Sustainable Development & Poverty Eradication – Some Views*. Retrieved from Malaysia:
- Sivapalan, S. (2016). Engineering Education for Sustainable Development in Malaysia: Student Stakeholders Perspectives on the Integration of Holistic Sustainability Competences within Undergraduate Engineering Programmes. In W. Leal Filho & L. Brandli (Eds.), *Engaging Stakeholders in Education for Sustainable Development at University Level* (pp. 263-285). Cham: Springer International Publishing.
- Sleurs, W. (2008). Competencies for Esd (Education for Sustainable Development) Teachers: A Framework to Integrate Esd in the Curriculum of Teacher Training

Institutes—Comenius 2.1 Project 118277-Cp-1-2004-Be-Comenius-C2. 1. 2008. In.

Sprain, L., & Timpson, W. M. (2012). Pedagogy for Sustainability Science: Case-Based Approaches for Interdisciplinary Instruction. *Environmental Communication: A Journal of Nature and Culture*, 6(4), 532-550.

Stables, A., & Scott, W. (2002). The Quest for Holism in Education for Sustainable Development. *Environmental Education Research*, 8(1), 53-60.

Stake, R. E. (1995). *The Art of Case Study Research*. Thousand Oaks: Sage Publications.

Sterling, S. (1998). Sustainable Development Education Panel. Retrieved from <http://webarchive.nationalarchives.gov.uk/20080306221400/http://www.defra.gov.uk/environment/sustainable/educpanel/1998ar/ann4.htm>

Sterling, S. (2004). Higher Education, Sustainability, and the Role of Systemic Learning. In *Higher Education and the Challenge of Sustainability* (pp. 49-70): Springer.

Stevenson, R. B. (2007). Schooling and Environmental Education: Contradictions in Purpose and Practice. *Environmental Education Research*, 13(2), 139-153.

Stitt-Gohdes, W. L., & Crews, T. B. (2005). The Delphi Technique: A Research Strategy for Career and Technical Education.

Stukenberg, T. (2016). *Curriculum Framework; Education for Sustainable Development*. In J.-R. Schreiber & H. Siege (Eds.), *A contribution to the Global Action Programme; Education for Sustainable Development* (pp. 447). Retrieved from <https://www.engagement-global.de>

Sutton, P. (2004). A Perspective on Environmental Sustainability. *Paper on the Victorian Commissioner for Environmental Sustainability*.

Svanström, M., Lozano-García, F. J., & Rowe, D. (2008). Learning Outcomes for Sustainable Development in Higher Education. *International Journal of Sustainability in Higher Education*, 9(3), 339-351.

- Sydow, B. C. (2012). *Sustainability Design in Higher Education: Curriculum, Teaching Methods, and Program Integration*. (Ph.D.), University of South Dakota,
- Tanner, D., & Tanner, L. N. (1980). *Curriculum Development: Theory into Practice*: Macmillan New York.
- Tapio, P., Paloniemi, R., Varho, V., & Vinnari, M. (2011). The Unholy Marriage? Integrating Qualitative and Quantitative Information in Delphi Processes. *Technological forecasting and social change*, 78(9), 1616-1628.
- Tashakkori, A., & Teddlie, C. (1998). *Mixed Methodology: Combining Qualitative and Quantitative Approaches* (Vol. 46): Sage.
- Taylor, S. J., Bogdan, R., & DeVault, M. (2015). *Introduction to Qualitative Research Methods: A Guidebook and Resource*: John Wiley & Sons.
- Teddlie, C., & Tashakkori, A. (2003). Major Issues and Controversies Inthe Use of Mixed Methods in the Social and Behavioral Sciences. *Handbook of mixed methods in social & behavioral research*, 3-50.
- Thangaratinam, S., & Redman, C. W. (2005). The Delphi Technique. *The obstetrician & gynaecologist*, 7(2), 120-125.
- Thienemann, E. R. C. (2014). *Education for Sustainable Development in Technical and Vocational Education and Training*. (Master of Education), Stockholm University, Retrieved from http://www.edu.su.se/polopoly_fs/1.204488.1411628990!/menu/standard/file/Elisabeth%20Thienemann%20No.%2027.pdf
- Thomas, I. (2004). Sustainability in Tertiary Curricula: What Is Stopping It Happening? *International Journal of Sustainability in Higher Education*, 5(1), 33-47.
- Thomas, I. (2009). Critical Thinking, Transformative Learning, Sustainable Education, and Problem-Based Learning in Universities. *Journal of Transformative Education*, 7(3), 245-264.

- Thompson, J. F. (2002). *Foundations of Vocational Education: Social and Philosophical Concepts*: Prentice-Hall Englewood Cliffs, NJ.
- Thürer, M., Tomašević, I., Stevenson, M., Qu, T., & Huisingh, D. (2018). A Systematic Review of the Literature on Integrating Sustainability into Engineering Curricula. *Journal of Cleaner Production*, 181, 608-617.
- Tilbury, D. (1992). Environmental Education within Pre-Service Teacher Education: The Priority of Priorities. *International Journal of Environmental Education and Information*, 11(4), 267-280.
- Tilbury, D. (1995). Environmental Education for Sustainability: Defining the New Focus of Environmental Education in the 1990s. *Environmental Education Research*, 1(2), 195-212.
- Tilbury, D., & Fellow, M. (2010). Sustainability in the DNA of the University. *Sustainable Mediterranean* 1(63 & 64), pp. 9 - 13.
- Tomas, L., Girgenti, S., & Jackson, C. (2015). Pre-Service Teachers' Attitudes toward Education for Sustainability and Its Relevance to Their Learning: Implications for Pedagogical Practice. *Environmental Education Research*, 1-24.
- Tverberg, G. (2016, 8/08/2016). An Updated Version of the "Peak Oil" Story. *Our Finite World*. Retrieved from <https://ourfiniteworld.com/>
- UNESCO. (1978). Final Report, Intergovernmental Conference on Environmental Education, Tbilissi (Ussr),. In. Paris (France): UNESCO.
- UNESCO. (1995). *The Cultural Dimension of Development: Towards a Practical Approach*. Mayenne, France: UNESCO.
- UNESCO. (2006a). *Education for Sustainable Development Toolkit, Learning & Training Tools*. Retrieved from Paris France: <http://unesdoc.unesco.org/images/0015/001524/152453eo.pdf>
- UNESCO. (2006b). Framework for the Undesd International Implementation Scheme. In E. Sector (Ed.), (Vol. ED/DESD/2006/PI/1.): Paris, FR: UNESCO.

UNESCO. (2006c). *Orienting Technical and Vocational Education and Training for Sustainable Development: A Discussion Paper* (1817-0374). Retrieved from

UNESCO. (2006d). *United Nations Decade of Education for Sustainable Development*. In. Retrieved from www.unesco.org/education

UNESCO (2007). [Planning Meeting of Regional Resource Persons in Tvet from South-East Asia and South Asia].

UNESCO. (2012). *Education for Sustainable Development Country Guidelines for Changing the Climate of Teacher Education to Address Sustainability: Putting Transformative Education into Practice* In M. Y. Choi (Ed.). Jakarta, Indonesia.

UNESCO. (2013). *Proposal for a Global Action Programme on Education for Sustainable Development as Follow-up to the United Nations Decade of Education for Sustainable Development after 2014*. In.

United Nations Educational Scientific and Cultural Organisation. (2014). *Unesco Roadmap for Implementing the Global Action Programme on Education for Sustainable Development*. Retrieved from

United Nations Educational Scientific and Cultural Organization. (2004). *Improving Access, Equity and Relevance in Technical Vocational Education and Training (Tvet)*. Retrieved from Bangkok, Thailand:

United Nations Educational Scientific and Cultural Organization. (2005). *Contributing to a More Sustainable Future: Quality Education, Life Skills, and Education for Sustainable Development*. In (pp. 8). Retrieved from <http://unesdoc.unesco.org/images/0014/001410/141019e.pdf>

United Nations Educational Scientific and Cultural Organization. (2008). *Efa-Esd Dialogue: Educating for a Sustainable World*. In. Paris, France: Author.

UTM, U. T. M. (2007). *National Coastal Vulnerability Index Study–Phase 1*. In: Drainage and Irrigation Department (DID), Ministry of Natural Resources and Environment Malaysia.

- Van Bon, J., de Jong, A., & Pieper, M. (2008). *It Service Management-Global Best Practices* (Vol. 1): Van Haren Publishing.
- Wade, R. (2008). Education for Sustainability: Challenges and Opportunities. *Policy & Practice-A Development Education Review*(6).
- Wagen, L. V. d. (2007). Human Resource Strategic Planning: Establishing the Context. In *Human Resource Management for Events* (pp. 1). Oxford: Routledge
- Wals, A. E. (2009a). A Mid-Desd Review Key Findings and Ways Forward. *Journal of Education for Sustainable Development*, 3(2), 195-204.
- Wals, A. E. (2009b). *Review of Contexts and Structures for Education for Sustainable Development: 2009*: Unesco.
- Weidner, H. (2002). Capacity Building for Ecological Modernization Lessons from Cross-National Research. *American behavioral scientist*, 45(9), 1340-1368.
- Whitehouse, H. (2008). "Ee in Cyberspace, Why Not?" Teaching, Learning and Researching Tertiary Pre-Service and in-Service Teacher Environmental Education Online. *Australian Journal of Environmental Education*, 24, 11-21.
- Widener, J. M., Widener, J. M., Gliedt, T., Gliedt, T., Tziganuk, A., & Tziganuk, A. (2016). Assessing Sustainability Teaching and Learning in Geography Education. *International Journal of Sustainability in Higher Education*, 17(5), 698-718.
- Wiek, A., Withycombe, L., & Redman, C. L. (2011). Key Competencies in Sustainability: A Reference Framework for Academic Program Development. *Sustainability science*, 6(2), 203-218.
- Wilson, S., & Moffat, M. (2010). Using a Delphi Survey to Identify Priorities. *British Journal of Healthcare Management*, 16(6), 284-289.
- Winter, J., & Cotton, D. (2010). 'It's Not Just Bits of Paper and Light Bulbs': A Review of Sustainability Pedagogies and Their Potential for Use in Higher Education. In *Sustainability Education* (pp. 54-69): Routledge.

WWF, W. W. F. (2016). Reducing Humanity's Impact. Retrieved from http://wwf.panda.org/what_we_do/footprint/

Yin, R. (1994). Case Study Research: Design and Methods . Beverly Hills. In: CA: Sage publishing.

Yin, R. K. (2003). *Case Study Research Design and Methods* (3rd ed.). London: Sage Publications.

Young, W. H., & Hogben, D. (1978). An Experimental Study of the Delphi Technique. *Education Research Perspective*, 5, 57-62.

