

*II. INTERNATIONAL  
SYMPOSIUM ON ANGLO-  
AMERICAN CULTURAL AND  
LITERARY STUDIES*

*13-15 December 2023 / MARDIN, TÜRKİYE*

*EDITOR*

*Prof. Dr. Bülent Cercis TANRITANIR*



*ISBN: 978-1-955094-79-5*

## II. International Symposium on Anglo-American Culture and Literature

13-15 December 2023 / Mardin, Turkiye

EDITOR

Prof. Dr. Bülent Cercis TANRITANIR

Copyright © Liberty

25.12.2023

by Liberty Academic Publishers

New York, USA

ALL RIGHTS RESERVED NO PART OF THIS BOOK MAY BE REPRODUCED IN ANY  
FORM, BY PHOTOCOPYING OR BY ANY ELECTRONIC OR MECHANICAL MEANS,  
INCLUDING INFORMATION STORAGE OR RETRIEVAL SYSTEMS, WITHOUT  
PERMISSION IN WRITING FROM BOTH THE COPYRIGHT OWNER AND THE  
PUBLISHER OF THIS BOOK.

© Liberty Academic Publishers 2023

The digital PDF version of this title is available Open Access and distributed under the terms of the Creative Commons Attribution-Non Commercial 4.0 license (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits adaptation, alteration, reproduction and distribution for noncommercial use, without further permission provided the original work is attributed. The derivative works do not need to be licensed on the same terms.

ISBN: 978-1-955094-79-5

# **SYMPOSIUM ID**

## **SYMPOSIUM TITLE**

**II. INTERNATIONAL SYMPOSIUM ON ANGLO-AMERICAN CULTURE  
AND LITERATURE**

## **DATE AND PLACE**

**13-15 December 2023 / Mardin, Turkiye**

## **ORGANIZATION**

**IKSAD INSTITUTE  
VAN YÜZÜNCÜ YIL UNIVERSITY, DEPARTMENT OF ENGLISH  
LANGUAGE AND LITERATURE**

## **EDITOR**

**Prof. Dr. Bülent Cercis TANRITANIR**

## **PARTICIPANTS' COUNTRIES (14 countries)**

**TÜRKİYE, ROMANIA, BENIN, INDONESIA, IRAN, IRAQ, INDIA, KAZAKHSTAN,  
USA, NIGERIA, ALBANIA, MOROCCO, MALAYSIA, GEORGIA**

**Total Accepted Article: 75**

**Total Rejected Papers: 18**

**Accepted Article (Türkiye): 37**

**Accepted Article (Other Countries): 38**

**ISBN: 978-1-955094-79-5**

# **ORGANIZING COMMITTEE**

**Prof. Dr. Bülent Cercis TANRITANIR**

**Doç. Dr. Aydın GÖRMEZ**

**Doç. Dr. M. Metin BARLIK**

**Doç. Dr. Gülşen TORUSDAĞ**

**Doç. Dr. Gönül SAMEDOVA**

**Dr. Öğr. Üyesi Leyla ADIGÜZEL**

**Dr. Öğr. Üyesi Zeki EDİS**

**Dr. Öğr. Üyesi Mehmet Şirin DEMİR**

**Dr. Öğr. Üyesi Ömer Aytaç AYKAÇ**

**Arş. Gör. Dr. Nevzat AĞÇAKAYA**

**Arş. Gör. Merve Betül GÖRMEZ**

# **SCIENTIFIC AND ADVISORY BOARD**

**Prof. Dr. Hasan BOYNUKARA**

**Prof. Dr. Bülent Cercis TANRITANIR**

**Prof. Dr. Mehmet TAKKAÇ**

**Prof. Dr. Mukadder ERKAN**

**Prof. Dr. Gencer ERKILIÇ**

**Prof. Dr. Mustafa Zeki ÇIRAKLI**

**Doç. Dr. M. Metin BARLIK**

**Doç. Dr. Aydın GÖRMEZ**

**Doç. Dr. Gülşen TORUSDAĞ**

**Doç. Dr. Süleyman KASAP**

**Doç. Dr. Emrullah ŞEKER**

**Doç. Dr. Faruk KALAY**

**Dr. Zafer GÜLSAR**

**Dr. Öğr. Üyesi Leyla ADIGÜZEL**

**Dr. Öğr. Üyesi Zeki EDİS**

**Dr. Öğr. Üyesi Mehmet Şirin DEMİR**

**Dr. Öğr. Üyesi Deniz ARAS**

**Dr. Öğr. Üyesi Bülent ALAN**

**Dr. Öğr. Üyesi Ömer Aytaç AYKAÇ**

**Dr. Öğr. Üyesi. Esra Ünsal OCAK**

**Arş. Gör. Dr. Nevzat AĞÇAKAYA**

**Öğr. Gör. Dr. Mehmet ASLAN**

**Öğr. Gör. Dr. Ela Ocak YELTEKİN**

**Öğr. Gör. ÖZCAN AKŞAK**

**Öğr. Gör. Cihat ÖZTAY**

**Öğr. Gör. Murat ALKAN**

**Öğr. Gör. Deniz Bingöl SARĞIN**

**Arş. Gör. Merve Betül GÖRMEZ**

# CONTENTS

AUTHOR	TITLE	No
Görkem Neşe ŞENEL	“THE SOUL OF MAN UNDER SOCIALISM”: A MARXIST INTERPRETATION OF OSCAR WILDE’S “THE HAPPY PRINCE”	1
Gülşen TORUSDAĞ	CRITICAL ANALYSIS ON A DYSTOPIAN FICTION 2BR02B BY KURT VONNEGUT	7
Hümeyra TÜREDİ Murat TÜREDİ	POLITICIZATION OF READING TEXTS IN FOREIGN LANGUAGE LEARNING: THE EXAMPLE OF 11TH-GRADE ENGLISH BOOKS IN TURKEY	13
Volkan KEKLİK Aydın GÖRMEZ	FOUR REPRESENTATIVES OF POSTCOLONIAL LITERARY CRITICAL THEORY: Frantz Fanon, Edward Said, Gayatri Chakravorty and Spivak Homi K. Bhabha	24
Metin DOĞAN	THE INTELLECTUAL BASIS OF THE EARLY TURKISH INTELLECTUALS AND THE SOCIAL FUNCTIONS THEY UNDERTAKED	26
Tapsa Verma Jyoti Dhingra	TO STUDY THE RELATIONSHIP BETWEEN LANGUAGE LEARNING & MATHEMATICS LEARNING	35
Kadir Nadir İLHAN	THE EFFECTS AND RESULTS OF THE GREAT GATSBY AND JAZZ AGE DREAM ON WORLD FASHION	37
Aydın GÖRMEZ	IS INSANITY A GIFT OR PUNISHMENT FOR WRITERS AND POETS?	44
Aziza Makhmudova Asel Shayakhmet	CONFUCIANISM IN CONTEMPORARY CHINESE POLITICAL CULTURE	45
Sümeyye ÇİFTÇİ Bülent Cercis TANRITANIR	THE TABOO OF SEXUALITY AND COMFORT OF RELATIONSHIPS: THE COLOR PURPLE BY ALICE WALKER AND COLD NIGHTS OF CHILDHOOD (ÇOCUKLUĞUN SOĞUK GECELERİ) BY TEZER ÖZLÜ	52
Mehmet Şirin DEMİR	TOWARDS A NEURO-AESTHETICAL PARADIGM FOR EDUCATIONAL WELLBEING: THE ROLE OF TRANSCENDENTAL TEXTS IN LITERATURE	53
Merve Feryal ASHMAWY	THE UNIQUE ROLE OF LITERATURE IN THE HEALING PROCESS OF TRAUMATIC EXPERIENCES: EMPATHY, EMOTIONAL EXPRESSION, AND PERSONAL DEVELOPMENT	55
Roger Alan TUNÇ Bülent Cercis TANRITANIR	MORAL TRANSITION IN JOHN BARTH’S THE END OF THE ROAD	56
Servais Dadjo Morel Marly MENSAH Désiré Christel ZINSOUVI	LANGUAGES FOR SUSTAINABLE DEVELOPMENT: CONNECTING CURRICULA WITH SDGS TO FOSTER 21 <sup>ST</sup> CENTURY’S SKILLS WITH BENINESE ESP LEARNERS	63
Mustafa CANLI	UNFAITH: IN SEARCH OF REVOLUTION IN THE DESOLATE WORLD OF BRECHT’S THE GOOD WOMAN OF SETZUAN (1943)	79

Mustafa CANLI	POLITICS, HYPOCRISY, RAKES, AND THE RESTORATION COMEDY: THE CITY-HEIRESS (1682)	86
Nevzat AĞÇAKAYA	LONDON: AN INDUSTRIAL CITY IN CHARLES DICKENS'S NARRATIVE	93
Özcan AKŞAK	EMILY DICKINSON: HOW TO GAIN EXISTENTIAL ESSENCE IN HER POEM "IF I CAN HELP..."	95
Kavita Mohit Mohan Pooja	RELATIONSHIP BETWEEN SOCIAL MEDIA MARKETING AND CUSTOMER BUYING BEHAVIOUR: A REVIEW STUDY	97
Natela Borisovna POPKHADZE	OVERESTIMATION OF THE ROLE OF THE CHRISTIAN RELIGION FOR THE AIAKOLKHETI//AIAKARDU//THE GEORGIAN//GURCI ETHNICITY IN MODERN SCHOOLBOOKS PRINTED IN TBILISI//TIFLIS LEADING TO THE LIES ABOUT OUR PRECHRISTIAN HISTORY	98
Khadija Hassan Ali Al-Qaseer	RELIGIOUS LIFE AMONG THE PEOPLE OF HIRA BEFORE ISLAM	100
Alek Alek	REVOLUTIONIZING LANGUAGE LITERACY IN INDONESIAN ISLAMIC HIGHER EDUCATION: A SYSTEMATIC LITERATURE REVIEW ON AI TOOLS' IMPACT	101
Bülent Cercis TANRITANIR Ebru ALAN	THE CONFLICTS BETWEEN PARENT & CHILD AND THE SYMPTOMS OF THE PETER PAN & EMPTY NEST SYNDROME IN THE HOUSE ON MANGO STREET BY SANDRA CISNEROS	102
Selin CEYLAN Gülşen TORUSDAĞ	CRITICAL ANALYSIS OF GENDER DISCRIMINATION IN THE TV SERIES MAD MEN	112
Muhammad Faisal	SEMANTIC RESEARCHER AND REFINITIV WORK AREA FOR PhD FELLOWS, FOR AI RESEARCH SIDEKICK OF EXAMINATION	114
Sinan GÜL	PURITANISM AND THEATRE: A COMPLEX RELATIONSHIP EXPLORED	115
Metin DOĞAN	THE IDEOLOGIES OF NATIONALISM AND SOCIALISM OF THE LATEST OTTOMAN BALKAN "MINORITIES" AND THEIR EFFECTS ON MUSLIM GEOGRAPHY	123
Bülent Cercis TANRITANIR	SUSPICION, STANDARDIZATION, AND MIND CONTROL IN "THE HANDMAID'S TALE" BY MARGARET ATWOOD AND "1984" BY GEORGE ORWELL	132
Volkan KEKLİK Bülent Cercis TANRITANIR	THE UNSUCCESSFUL INDIVIDUATION ADVENTURE OF AN EXTRAORDINARY HERO	138
Leyla Revşen ECE Zeki EDİS	'BLACK ON BLACK RACISM' IN A RAISIN IN THE SUN	147
Bülent Cercis TANRITANIR Taha Berk ASTAM	THE ENGLISH KIDS & 'MISE EN ABYME' IN THE GENRE OF HORROR: THE TURN OF THE SCREW AND THE CONJURING 2	161



Helena Mukli Grillo Miranda Enesi	AN OVERVIEW OF ALBANIAN PEDAGOGICAL DICTIONARIES PROBLEMS & TASKS	168
Nancy Bisht Rafrat Shakil Ansari	UNVEILING INJUSTICE: THE ARTISTIC RESONANCE OF OPPRESSION IN NAMDEO DHASAL'S POETRY	177
Yücel YILDIZ Gülcan YILDIZ	UTILIZING ALLEGORICAL LITERARY WORKS IN ENGLISH TEACHING	178
Boróka Prohászka Rád	WITHOUT A MAP, WITHOUT A DESTINATION: LIMINAL SPACES IN SAM SHEPARD'S THEATER	195
Merve Betül GÖRMEZ	WOMEN IN KEY ROLES IN THE MERCHANT OF VENICE, MACBETH AND OTHELLO	204
Major Gheorghe GIURGIU Manole COJOCARU	MICROBIOTA MODULATION AS THERAPEUTIC APPROACH IN THE NEUROPATHIC PAIN IN DOG WITH SPINAL CORD INJURY: IMPACT OF POLENOPLASMIN	206
Salako, Oluwaseun Adewale Ayelagbe, N. Abiodun	THE IMPLICATION OF GENDER INEQUALITY ON POLITICAL INVOLVEMENT OF STUDENTS IN TERTIARY INSTITUTION IN NIGERIA: A STUDY OF FEDERAL POLYTECHNIC, ILARO	207
Gülçin KARA Gülşen TORUSDAĞ	HUMAN ON THE BRINK OF APOCALYPSE: A TEXTLINGUISTIC ANALYSIS OF HOW CLOSE TO SAVAGE THE SOUL BY JOHN ATCHESON	208
Irina-Ana DROBOT	WHAT DID WOLF UNDERSTAND BY FREEDOM?	210
Sri Restu Ningsih Ade Irma Suryani Rahmadini Darwas Rahimullailiy	ANDROID BASED LEARNING MEDIA APPLICATION IN HIGHER EDUCATION	220
Mohammed Thamir Atta Awanis Romli	ALIGNMENT OF VIRTUAL REALITY WITH E- LEARNING: A NEW EDUCATION PERSPECTIVE	221
Nisrine TAMSOURI	TOURISM COMMUNICATION AND TOURISM DISCOURSE FACING TECHNOLOGICAL INNOVATIONS	222
Naseem Akhter	HISTORICAL AND CULTURAL ANALYSIS OF THE FORT BALA HISAR OF PESHAWAR	223
Naseem Akhter	THE SOCIAL AND CULTURAL LIFE OF FORT BALA HISAR (A GLIMPSE INTO THE FORT'S DAILY EXISTENCE)	224
Naseem Akhter	MASJID-E-NABWI (ASSET OF ISLAMIC ARCHAEOLOGY AND CULTURE)	225
Naseem Akhter	AN ANALYTICAL REVIEW OF THE SIGNIFICANCE OF MASJID-E-NABWI AS AN ASSET OF ISLAMIC ARCHAEOLOGY AND CULTURE	226
Boranbayeva Akbike Berdibekovna	SOFT SKILLS FORMATION BY MEANS OF INNOVATIVE TECHNOLOGIES FOR TRAINING FUTURE FOREIGN LANGUAGE TEACHERS	227
Ayşegül AZAKLI	RELIGION-BASED XENOMELIA IN EAVAN BOLAND'S ANOREXIC	228

Katayoun Fekripour	SURVEY OF CHRISTENSEN THEORY ABOUT BOZORGMİHR AND BORZŪYE (TWO IRANIAN HISTORICAL FIGURES)	229
Ömer Aytaç AYKAÇ	THE BATTLEFIELD AS A LITERARY SPACE: ONCE THERE WAS A WAR	230
Miranda Enesi Candidate Megi Plaku Silvana Shehu	ISSUES ON TRANSLATING MECHANICAL TERMINOLOGY FROM ENGLISH INTO ALBANIAN	232
Yıldız Hazal Çetin	PORTRAIT OF MIMESIS: DECODING OSCAR WILDE'S AESTHETIC REVOLUTION IN THE PICTURE OF DORIAN GRAY	233
Maha Zuhair Ahmed Mohammad Abu Aladeeb Mohammed Mai	THE IMPACT OF VISUAL EFFECTS IN DIGITAL CONTENT ON STUDENT PERFORMANCE IN PRIMARY SCHOOLS OF ABU DHABI	234
Monica Garoiu	PAUL CLAUDEL'S POETIC ART IN "KNOWING THE EAST"	235
Gangesh Shah Gondwana	MEANINGFUL DECIPHERMENT OF THE INDUS SCRIPT IN KOYA LANGUAGE	236
Albana Avrami	USING STUDENTS' MULTILINGUAL SKILLS IN TEACHING GERMAN LANGUAGE FOR PROFESSIONAL PURPOSES	237
Masa'udu ALIYU Muhammad Sada BATURE	FOOTBALL AND THEATRE FROM A CONCEPTUAL METAPHOR VIEWPOINT: AN ANALYSIS OF SPORTINGSUN PUBLICATION	243
Sibel Ezgi ZİREK	AMERICAN CULTURE IN THE 1920'S	244
Amine ACAR Leyla ADIGÜZEL	HOPEFULL JOURNEY OF SELF-SEARCHING IN SOUR SWEET BY TIMOTHY MO AND THE GRASS IS SINGING BY DORIS LESSING	251
Mehmet Faruk TOSON Bülent ALAN	THE PARODY OF UNCAUGHT FISH: A POSTMODERN TAKE ON TROUT FISHING IN AMERICA	260
Gülcan YILDIZ Yücel YILDIZ	UTILIZING OF STREAM-OF-CONSCIOUSNESS IN LITERARY WORKS	262
Anisa Trifoni Miranda Enesi	PRE-SERVICE ENGLISH TEACHERS ATTEMPTS IN THE TEACHING PROFESSION	264
Suganthi M	A CRITICAL ANALYSIS OVER THE INTERSECTION OF ACCESS TO KNOWLEDGE AND PAYWALLED ACADEMIC PUBLISHING WITH REFERENCE TO COPYRIGHT LAW	279
Aybike KELEŞ	TEXTUAL ANALYSIS IN TURKISH TRANSLATIONS OF OTHELLO WRITTEN BY SHAKESPEARE	280
Metin DOĞAN	AN EVALUATION OF THE ISSUE "THE POSITION OF WOMEN IN SOCIAL LIFE" IN OTTOMAN SOCIETY FROM THE PERSPECTIVE OF CELAL NURI (İLERİ) AS AN OTTOMAN AND TURKISH INTELLECTUAL	288
Buse Güner Usta	GOTHIC SUBLIMITY: THE TURN OF THE SCREW	297

M. Metin BARLIK	A CONDITIONED POETIC SALVATION: A SOCIO-ANALYTICAL APPROACH TO DONNE'S POETIC CAREER	305
Julius Oluwayomi OLUWADAMILARE	ECOMUSICOLOGICAL NARRATIVES OF AYO BANKOLE 'S MUSIC (OJO MAARO) ON FOOD SOVEREIGNTY, HUMAN WELLNESS AND SUSTAINABLE DEVELOPMENT AMONG THE YORUBA OF SOUTHWESTERN NIGERIA.	306
Favour C. Uroko Peace Ubah	A LITERARY ANALYSIS OF HATE SPEECH IN A MULTI-RELIGIOUS NIGERIA AND ITS IMPACT ON SOCIO-CULTURAL UNITY	307
Shuaeeb, A. I. Bello, M. R. Idris, U. S. B. (PhD) Laka, A. U. Saifullahi, M.	AWARENESS OF DIGITAL ECO-LITERACY CONCEPTS AMONG PRE-SERVICE SCIENCE TEACHERS OF THE FEDERAL UNIVERSITY OF TECHNOLOGY MINNA	308
Ardita Dylgjieri	MULTILINGUAL COMPETENCE AND ITS ROLE IN THE ALBANIAN UNIVERSITY SYSTEM	319
Madri Kakoti Vishnu Kumar Singh Kavita Rastogi	DEVELOPMENT OF SUSTAINABLE ECONOMIC INITIATIVES ROOTED IN THE TRADITIONAL KNOWLEDGE OF RAJI COMMUNITY	326
Candidate Megi Plaku Miranda Shahini Silvana Shehu (Vishkurti)	CONTRIBUTION OF INCIDENTAL TERMINOLOGY ACQUISITION MECHANISMS ON THE ACQUISITION OF ENGINEERING TERMINOLOGY	327

**AWARENESS OF DIGITAL ECO-LITERACY CONCEPTS AMONG PRE-SERVICE  
SCIENCE TEACHERS OF THE FEDERAL UNIVERSITY OF TECHNOLOGY  
MINNA**

**Shua'eb, A. I.**

Department of Science Education, Federal University of Technology Minna, Niger State,  
Nigeria.

**Bello, M. R. (PhD)**

Department of Science Education, Federal University of Technology Minna, Niger State,  
Nigeria.

**Idris, U. S. B. (PhD)**

Department of Science Education, Federal University of Technology Minna, Niger State,  
Nigeria.

**Laka, A. U.**

Department of Science Education, Federal University of Technology Minna, Niger State,  
Nigeria.

**Saifullahi, M.**

Department of Science Education, Federal University of Technology Minna, Niger State,  
Nigeria.

**ABSTRACT**

This study investigated the awareness of digital eco-literacy concepts among pre-service science teachers of FUT Minna. The concepts under study include energy management, e-waste management and digital eco-citizenship concepts. Descriptive survey research design was used for this study. This design was considered most appropriate because it is a method involving seeking and searching for opinions of pre-service science teachers at the Federal University of Technology Minna, Niger State through the use of a questionnaire named **QADIEC** with a reliability coefficient of 0.87 using Cronbach alpha. The questionnaire comprised two (2) section response patterns with a modified four-point awareness rating scale. The data collected was analyzed using the frequency count, percentages, mean ( $\bar{x}$ ) scores and standard deviation of each questionnaire item to answer the research questions with the aid of SPSS version 23. The decision rule regarding disagreeing and agreeing was based on a mean range of 0-2.49 as disagree/rejected and a mean range of 2.50-4.0 as agree/accepted. The population for the survey study comprises 525 with a sample of 217 pre-service science teachers in FUT Minna using Krejcie and Morgan's (1970) table. Based on the outcomes of

this research, it was concluded that there was high awareness and lack of practice regarding the concepts of Digital Eco-literacy among pre-service science teachers of FUT Minna. There is growing importance of understanding and addressing the environmental impact of digital technologies, as our society becomes increasingly dependent on digital tools and platforms, it is crucial to raise awareness and educate individuals about the environmental consequences of their digital actions. This research highlights the need for educational institutions, governments, tech companies, and environmental organizations to collaborate in promoting digital eco-literacy, by integrating these concepts into education, fostering critical thinking, and encouraging sustainable practices, we can work toward a more environmentally responsible digital future.

**Keywords:** Awareness, Digital Eco-literacy concepts, Digital Technologies & Pre-service Science Teachers.

## **Introduction**

Environment is the most pivotal component of the universe which provides man with all the necessary materials needed for his survival and his lineage. Man depends on the environment for food, shelter, oxygen, etc.; yet, he destroys the environment. His remarkable development in science and technology, coupled with high population growth and the frequent exploration of natural resources is resulting in several environmental issues such as erosion, drought, climate change, increase in environmental temperature, etc. These affect every continent and country in the world and have been profoundly explained in the existing literature. Dan (2019), reported that the Sahel region of Africa is the most affected part of the world by the dwindling of natural resources. In Nigeria, the major causes of these environmental issues or problems have been identified as urbanization, overpopulation, deforestation, desertification and pollution (Isife, 2012). Therefore, improving the environment is the responsibility of all members of the society, including educational institutions, teachers and students.

One of the major contradictions in the twenty-first century is the unique technological advancement and economic growth, which have contributed to devastating socio-environmental impacts on humanity despite accruing numerous benefits for people. In the quest for survival, humankind is significantly exposing the planet to severe biodiversity threats, climate change threats, and waste management threats, which pose issues to energy, ecology security, food, and politics which are impediments to sustainable development (Olawuyi, 2015). The African continent is also experiencing various and complex environmental challenges, including the threat of significant extinction of species due to the adoption of a global capitalist system that creates a production treadmill due to its increasing urge for enormous profits (Adenike & Foluke, 2021). The rising demand for products has led to the proliferation of this system in Africa due to its ability to avail products at a lower price. Nigeria is part of this environmental conundrum due to anthropogenic activities contributing to ecosystem degradation, biodiversity loss and reduction in agricultural production (Olawuyi & Olusegun, 2018). Northern Nigeria is under threat due to the Eastward rapid encroachment that threatens sustainable livelihoods while environmental degradation in the Niger Delta continues making the region prone to conflicts due to quests for resource control and environmental justice (Ekwueme et al., 2016). Life-consuming floods, erosions, waste-polluted environs, and naked electric wires found on the ground of the environmental ecosystem, have increasingly become reoccurring issues in environmental challenges that Nigeria has been associated with, in which these challenges raise the need for sustainability education that empowers

policymakers and stakeholders in Nigeria to urgently implement environmental protection measures (Babalola & Olawuyi, 2021). Environmental Education and eco-literacy can serve as a tool for propagating United Nations Sustainable Development Goals (SDGs) in Nigeria, especially those relating to ecological protection (biodiversity), resource conservation and climate change (Adenike & Foluke, 2021). Therefore, in this context, the concepts of ecology, literacy, environmental education, eco-literacy or ecological literacy or environmental literacy, digital literacy and digital eco-literacy are to be discussed concerning Nigeria's ecosystem as the centre of this research study.

Eco-literacy, also known as ecological literacy or environmental literacy, is the knowledge and understanding of ecological principles and concepts that enable individuals to make informed decisions and take responsible actions towards environmental sustainability (Aina, 2016). In Nigeria, as a country with diverse ecosystems and pressing environmental challenges, the concept of eco-literacy plays a vital role in promoting sustainable development. Eco-literacy is crucial for addressing environmental issues, conserving biodiversity, and promoting sustainable development in Nigeria (Ismaila & Salman, 2015). By fostering an understanding of ecological concepts and principles, individuals can make informed choices regarding natural resource management, waste disposal, energy consumption, and sustainable agricultural practices. Eco-literacy also enhances environmental stewardship and encourages the adoption of eco-friendly behaviours at individual, community, and societal levels (Olatoye, et al., 2017). In recent years, there has been an increased recognition of the importance of eco-literacy in Nigeria (Aina, 2016). Efforts have been made to incorporate eco-literacy into formal education systems, develop educational materials and resources, and promote public awareness campaigns on environmental issues (Aigbokhan & Adesina, 2017). However, there is still a need for continued research, curriculum development, and capacity-building initiatives to enhance eco-literacy among different segments of the population in Nigeria (Ogbeide & Ibude, 2018).

Digital literacy refers to the ability to use digital technologies effectively and responsibly to access, evaluate, create, and communicate information. In today's digital age, digital literacy is essential for individuals to fully participate in the social, economic, and educational opportunities enabled by technology. In Nigeria, a country experiencing rapid technological advancements, the concept of digital literacy is of utmost importance. Digital literacy is crucial for Nigeria's socio-economic development, knowledge acquisition, and digital inclusion because it enables individuals to navigate digital platforms, critically evaluate information, communicate effectively, and utilize digital tools for personal and professional growth (Onyebuchi & Ogwo, 2015). Digital literacy also plays a significant role in bridging the digital divide and fostering digital citizenship (Adedjoja et al., 2016). In recent years, Nigeria has witnessed efforts to enhance digital literacy across various sectors. The government, educational institutions, and non-governmental organizations have implemented initiatives to provide digital skills training, establish digital literacy centres, and promote digital inclusion programs (Ololube & Agbor, 2017). However, challenges such as limited access to technology and infrastructure gaps still exist, emphasizing the need for continued investment in digital literacy education and policy reforms (Oyewole et al., 2020).

Digital eco-literacy refers to the combination of digital literacy and ecological literacy, encompassing the knowledge, skills, and attitudes required to navigate digital technologies in an environmentally sustainable manner (Eneh & Ndujiuba, 2016). As Nigeria experiences increasing digitalization and environmental challenges, the concept of digital eco-literacy becomes essential for promoting sustainable development. Digital eco-literacy plays a crucial role in fostering environmentally responsible behaviour and sustainable development in Nigeria's digital age because it enables individuals to leverage digital tools and platforms for

accessing environmental information, engaging in eco-friendly practices, and advocating for environmental conservation (Oluwafemi & Omoogun, 2018). Digital eco-literacy empowers citizens to make informed decisions and take actions that contribute to a more sustainable future (Adegoke & Oyelekan, 2020). In recent years, Nigeria has witnessed several developments in the promotion of digital eco-literacy. Non-governmental organizations, educational institutions, and government agencies have initiated programs to enhance digital eco-literacy skills, foster environmental consciousness, and encourage sustainable practices (Adegoke & Oyelekan, 2020). However, there is a need for continuous research, capacity-building efforts, and policy reforms to strengthen digital eco-literacy education and ensure its integration into various sectors of Nigerian society.

Digital eco-literacy awareness refers to the level of knowledge, understanding, and consciousness among individuals in Nigeria regarding the intersection of digital technologies and environmental sustainability (Adegbite & Adekunle, 2017). As Nigeria undergoes rapid digital transformation and faces pressing environmental challenges, promoting digital eco-literacy awareness becomes crucial for fostering sustainable development. Digital eco-literacy awareness plays a vital role in encouraging individuals to adopt environmentally responsible behaviours and leverage digital tools for sustainable practices (Olawumi & Akinbode, 2018). By raising awareness about the environmental impact of digital technologies and promoting best practices, Nigeria can harness the potential of the digital revolution to address ecological concerns and advance sustainable development goals. Recent developments in Nigeria have seen increased efforts to promote digital eco-literacy awareness. Non-governmental organizations, government agencies, and educational institutions have initiated awareness campaigns, workshops, and policy discussions to raise consciousness about the environmental implications of digital technologies (Iyamu & Abolarin, 2019). Future directions should focus on integrating digital eco-literacy awareness into educational curricula, fostering collaboration among stakeholders, and promoting sustainable digital practices through innovative strategies.

Energy management, as a crucial component of digital eco-literacy, emphasizes the responsible and efficient use of energy resources in a digitally connected world. It involves harnessing digital technologies and data-driven approaches to reduce energy consumption, lower environmental impact, and promote sustainability. Energy management is the process of monitoring, controlling, and optimizing the use of energy in various sectors, including industrial, commercial, and residential. It aims to reduce energy consumption, improve energy efficiency, and promote sustainability. Digital technologies, such as energy management software and smart meters, enable real-time data collection and analysis.

E-waste management is a critical concept within the framework of digital eco-literacy, focusing on the responsible handling, recycling, and disposal of electronic waste generated by digital technologies. E-waste includes items like old computers, mobile phones, and other electronic devices. This concept aligns with sustainability principles and emphasizes minimizing the environmental impact of digital technology consumption. Digital eco-literacy involves advocating for eco-design principles that make electronic devices more durable, repairable, and recyclable. Extending the product lifecycle can reduce e-waste generation. Another aspect of e-waste management is promoting the reuse and refurbishment of electronic devices. Reusing electronics or extending their lifespan through repairs can significantly reduce e-waste.

Digital citizenship involves responsible and ethical online behaviour. Therefore, digital eco-citizenship is a concept within the framework of digital eco-literacy that emphasizes responsible and environmentally conscious behaviour in the digital age. It entails understanding and practicing sustainable digital habits, reducing the environmental impact of

digital technologies, and contributing to global efforts to mitigate the ecological footprint of the digital world. Digital eco-citizenship begins with adopting sustainable digital habits.

### **Statement of the Problem**

Environmental issues have become increasingly significant in recent years, necessitating a focus on eco-literacy awareness and knowledge to promote sustainable behaviours and attitudes. However, there is a lack of comprehensive research examining the specific viewpoints and approaches of pre-service science teachers towards digital eco-literacy awareness in this region. As global environmental concerns continue to escalate, the need for comprehensive environmental education becomes imperative to foster sustainable practices and attitudes among future generations (Smith, 2018; Johnson et al., 2020). Considering the importance of digital eco-literacy and the need for a digital ecologically literate society, the Nigerian government through the National University Commission (NUC), introduced a general and compulsory course titled Environmental Education and Sustainable Development which is to provide every person with opportunities to acquire knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment for sustainable development. One common problem associated with the Federal University of Technology Minna in Niger State is poor energy management and e-waste management especially in and around students' hostel which often results in the pollution of the hostel environment and blockage of drainages, leaving electrical appliances turned on in the daylight (like bulbs, fans, air conditions, etc.) even when not in use. This may make someone wonder if members of the university community are digitally and ecologically literate considering their exposure to learning experiences relating to ecological management and environmental protection, hence the need to investigate the reason for these problems to solve them. Therefore, this study aims to determine the awareness and practices of digital eco-literacy among Pre-service Science Teachers of the Federal University of Technology, Minna. Despite the increasing integration of digital technologies in education, there is a lack of understanding of their usage regarding the ecological aspects of digital literacy among pre-service science teachers (Adebayo & Ajibola, 2018). This knowledge gap hinders their ability to effectively incorporate environmental sustainability concepts into their teaching practices.

### **Aim and Objectives of the Study**

This research aims to investigate the awareness of digital eco-literacy concepts among pre-service science teachers of the Federal University of Technology Minna, Niger State. Specifically, the study sought to achieve the following objectives:

1. to examine the level of awareness of the concept of energy management among pre-service science teachers of FUT Minna.
2. to examine the level of awareness of the concept of e-waste management among pre-service science teachers of FUT Minna.
3. to examine the level of awareness of the concept of digital eco-citizenship among pre-service science teachers of FUT Minna.

### **Research Questions**

The following research questions are raised:

1. What is the level of awareness of the concept of energy management among pre-service science teachers of FUT Minna?



2. What is the level of awareness of the concept of e-waste management among pre-service science teachers of FUT Minna?
3. What is the level of awareness of the concept of digital eco-citizenship among pre-service science teachers of FUT Minna?

### Research Methodology

Descriptive survey research design was used for this study. This design was considered most appropriate because it is a method involving seeking and searching for opinions of pre-service science teachers at the Federal University of Technology Minna, Niger State through the use of a questionnaire. The population for the survey study constituted all the pre-service science teachers in FUT Minna which comprises 525 pre-service teachers. A two-stage sampling technique will be employed to select the respondents. Judgemental (purposive) sampling will be used to select pre-service teachers based on their academic level (i.e. 100-500). From the selected levels, a simple random sampling technique will be applied to select pre-service teachers who will participate in the study using Krejcie and Morgan's (1970) table to obtain 217 respondents. A structured survey questionnaire named **Questionnaire on the Awareness of Digital Eco-Literacy Concepts (QADIEC)** was designed based on the concepts of Digital Eco-literacy to elicit information from pre-service science teachers of FUT Minna. The instruments comprise two (2) section response patterns, section A comprises the Demographic data of the respondents while Section B comprises 13 items to address the research questions. Thus, **QADIEC** is presented in a modified four-point awareness rating scale which is composed of Very Much Aware (VMA) =4 points, Moderately Aware (MA) =3 points, Slightly Aware (SA) =2 points and Not Aware (NA) =1 point. The instrument was vetted for face and content validity by four (4) experts from the Department of Science Education and Educational Technology Department, Federal University of Technology, Minna. The researcher reconstructed the instrument based on the suggestions of the experts.

In determining the reliability of the instrument (questionnaire), the researcher piloted the questionnaire to 28 students from the Educational Technology Department within SSTE because the students did not form part of the study. The pilot study enabled the researcher to determine the clarity, readability, appropriateness and adequacy of the instrument and the scores obtained from pilot testing were computed using Cronbach alpha in which the result obtained gives a reliability coefficient of 0.87 for the **QADIEC**. The data collected was analyzed using the frequency count, percentages, charts, mean (x) scores and standard deviation of each questionnaire item to answer the research questions with the aid of Statistical Package for Social Sciences (SPSS) version 23. The decision rule regarding disagreeing and agreeing on an item for **QADIEC** was based on a mean range of 0 - 2.49 as disagree/rejected and a mean range of 2.50 - 4.0 as agree/accepted.

### Results

#### Analysis of Demographic Data

##### Demographic Distribution of Respondents

	Frequency	Percentage	
		%	Valid Percent
Male	123	59	59
Female	87	41	41
Total	210	100%	100%

### Students Level of Study

	Frequency	Percent	Valid Percent	Cumulative Percent
200	60	28.6	28.6	28.6
300	50	23.8	23.8	52.4
400	40	19.0	19.0	71.4
500	60	28.6	28.6	100.0
Total	210	100.0	100.0	

### Age Bracket

	Frequency	Percent	Valid Percent	Cumulative Percent
15-18	03	1.40	1.40	1.40
19-22	70	33.3	33.3	34.80
23-26	101	48.1	48.1	82.90
27-30	32	15.2	15.2	98.10
30-Above	04	1.90	1.90	100.0
Total	210	100.0	100.0	

The table above shows that the student in the sampled school is FUT Minna, School of Science and Technology Education (SSTE) Department of Science Education, they constituted 210 respondents which is 100% of the sample. The number of male respondents is 123, which is 58.6% and the number of female respondents is 87, which is 41.4%. The questionnaire was administered to all levels except 100L which was used to test for reliability; 200L (30.0%), 300L (18.57%), 400L (41.43%) and 500L (10.00%). Their ages ranged between 15-18 years is 1.40%, 19-22 years is 33.3%, 23-26 years is 48.1%, 27-30 years is 15.2% and for above 30 years 1.90%.

### Analysis of Research Questions

The data collected were analyzed using mean and standard deviation to answer the given study questions. The following were the questions and the analysis:

**Research Question 1:** What is the level of awareness of the concept of energy management among pre-service science teachers of FUT Minna?

### Analysis of Mean (x) of Respondents on the Energy Management

S/NO.	ITEM	N	Mean (x)	Standard Dev SD	Decision
1.	Energy management involves energy consumption and conservation	210	3.23	0.82	Highly Aware
2.	Digital devices (like laptops, smartphones, drones, CCTV, webcams, and so on) consume energy	210	3.24	0.84	Highly Aware
3.	Digital device usage affects energy consumption and the environmental ecosystem	210	3.06	0.83	Highly Aware
4.	Energy-saving features or apps (like optimizing apps, battery saver apps, and so on) available on your digital devices	210	3.25	0.80	Highly Aware
5.	Sustainable energy management practices involve optimizing energy use and adopting renewable energy sources	210	2.98	0.88	Moderately Aware
	<b>Grand Mean</b>		<b>3.15</b>	<b>0.83</b>	

The result presented in the table above revealed that the respondents agreed that items 1,2,3, and 4 were "Highly Aware", at the same time, having "Moderately Aware" in item 5 with a grand mean (x) of 3.15. This implied that there is high awareness among pre-service science teachers of FUT Minna on the concept of energy management.

**Research Question 2:** What is the level of awareness of the concept of e-waste management among pre-service science teachers of FUT Minna?

**Mean (x) of respondents on the E-Waste Management**

S/NO.	ITEM	N	Mean (x)	SD	Decision
6.	E-waste management is important as it helps in the conservation of the ecosystem	210	3.10	0.80	Highly Aware
7.	Digital technology contributes to the generation of electronic waste (e-waste)	210	3.02	0.86	Highly Aware
8.	Responsible e-waste disposal mechanism for environmental conservation involves the 3Rs (reduce, reuse and recycle)	210	2.90	0.84	Moderately Aware
9.	Responsible disposal of digital devices when they are no longer of use includes removal of some parts like batteries, and personal information, checking for appropriate recyclers, checking for reuse or donation, and so on	210	3.01	0.90	Highly Aware
<b>Grand Mean</b>			<b>3.01</b>	<b>0.85</b>	

The result presented in the table above revealed that the respondents agreed that items 6,7 and 9 were "Highly Aware", at the same time, having "Moderately Aware" in item 8 with a grand mean (x) of 3.01. This implied that there is high awareness among pre-service science teachers of FUT Minna on the concept of e-waste management.

**3.2.3 Research Question 3:** what is the level of awareness on the concept of digital eco-citizenship among pre-service science teachers of FUT Minna?

**Mean (x) of respondents on the Digital Eco-Citizenship**

S/NO.	ITEM	N	Mean (x)	SD	Decision
10.	Digital eco-citizenship involves using digital technologies in ways that minimize their negative impact on the ecosystem	210	3.10	0.87	Highly Aware
11.	There are digital platforms and reliable information sources (like Facebook, Instagram, Twitter, Google, and so on) where you can learn about ecosystem management	210	3.20	0.79	Highly Aware
12.	There are digital and online activities, initiatives or campaigns related to activism on deforestation, wildlife preservation, water resource management and sustainable agriculture.	210	3.14	0.80	Highly Aware
13.	There are Government policies regarding the use of eco-friendly and non-eco-friendly technologies within the ecosystem	210	2.90	0.84	Moderately Aware
<b>Grand Mean</b>			<b>3.09</b>	<b>0.83</b>	

The result presented in the table above revealed that the respondents agreed that items 10,11 and 12 were "Highly Aware" and at the same time, having "Moderately Aware" in item 13 with

a grand mean ( $\bar{x}$ ) of 3.09. This implied that there is high awareness among pre-service science teachers of FUT Minna on the concept of digital eco-citizenship.

## **Conclusion**

Based on the outcomes of this research, it was concluded that there is high awareness of the concepts of Digital Eco-literacy among pre-service science teachers of FUT Minna, and there is growing importance of understanding and addressing the environmental impact of digital technologies. As our society becomes increasingly dependent on digital tools and platforms, it is crucial to raise awareness and educate individuals about the environmental consequences of their digital actions. This research highlights the need for educational institutions, governments, tech companies, and environmental organizations to collaborate in promoting digital eco-literacy. By integrating these concepts into education, fostering critical thinking, and encouraging sustainable practices, we can work toward a more environmentally responsible digital future "(Adela et al., (2018); Kim et al., (2017); Lee and Kim (2017)."

## **Recommendations**

Some general recommendations based on common findings in this study include:

1. Digital eco-literacy concepts should be integrated into formal education systems at various levels by creating a curricula that teach students about digital sustainability, online environmental impacts, and how to use digital tools responsibly. Also, there should be collaboration between environmental organizations, tech companies and educational institutions through which a multidisciplinary research approach like this can be encouraged and may provide more effective measures in addressing digital eco-literacy challenges.
2. Critical thinking when it comes to digital consumption should be encouraged. Teach individuals to assess the environmental impact of their digital activities, such as the carbon footprint of streaming services or the energy efficiency of electronic devices.
3. Public awareness campaigns about the environmental consequences of digital technologies should be launched/raised. Use social media, workshops, and educational events to inform the public about the issues and potential solutions.
4. Tech companies should be encouraged to adopt sustainable practices and transparently report their environmental impact in which consumers can be able to make informed choices about the products and services they use. Also, they should prioritize the creation of user-friendly tools that allow individuals to measure and track their digital footprint which can help users understand the environmental impact of their online activities and make adjustments.
5. Governments can implement regulations and incentives to promote digital sustainability. This could include tax incentives for green data centres, carbon pricing for internet services, and regulations on e-waste management. Also, innovation in green technology should be supported for sustainability, such as renewable energy sources for data centers and energy-efficient hardware design.

## **REFERENCES**

Adebayo, O. O., & Ajibola, O. O. (2018). Investigating Digital Eco-literacy Misconceptions among Teachers in Nigerian Secondary Schools. *Journal of Education and Practice*, 9 (7), 19-26.

- Adedoja, G. A., Adeyemi, T. O., & Adetuyi, O. M. (2016). Digital Literacy Skills among University Students in Southwestern Nigeria. *Information Development*, 32(3), 822-837.
- Adegbite, S. A., & Adekunle, A. A. (2017). Assessing Digital Eco-literacy Awareness among Nigerian University Students. *Global Journal of Environmental Science and Management*, 3(3), 301-312.
- Adegoke, B. A., & Oyelekan, O. S. (2020). Promoting Digital Eco-literacy for Sustainable Development: Perspectives from Nigeria. *Journal of Research in Environmental Science and Toxicology*, 9(2), 15-24.
- Adela, D., Sukarno, S., & Indriayu, M. (2018). Integration of environmental education at the Adiwiyata program recipient school in growing ecoliteracy of students. In *International Conference on Teacher Training and Education 2018 (ICTTE 2018)* (pp. 67–71). Atlantis Press.
- Adenike, A. A. & Foluke, V. A. (2021). Current Trends in Sustainability Education and the Future of Sustainability Education in Nigeria, *The Journal of Sustainable Development, Law and Policy*, 12:2, 421-440.
- Adeyemi, A. O., & Akinbode, M. O. (2020). Addressing Digital Eco-literacy Misconception in Nigeria: Insights from Awareness Campaigns. *International Journal of Environmental Science and Sustainable Development*, 5(2), 62-73.
- Aigbokhan, E. E., & Adesina, A. F. (2017). Environmental Education in Nigeria: Challenges, Prospects, and the Way Forward. *International Journal of Education, Learning and Development*, 5(1), 24-36.
- Aina, O. A. (2016). Eco-literacy among Secondary School Students in Southwest Nigeria. *Journal of Sustainable Development Studies*, 8(2), 104-119.
- Ajayi, A. O., & Agodzo, S. K. (2018). Assessment of Ecological Literacy among Secondary School Students in Nigeria. *Global Journal of Environmental Science and Management*, 4(4), 419-432.
- Aminu, M. A., & Uzairu, A. (2021). Environmental Education and Ecological Literacy in Nigerian Universities: Perspectives and Practices. *Journal of Environmental Education*, 52(3), 175-186.
- Babalola, A. & Olawuyi, D. (2021). Advancing Environmental Education for Sustainable Development in Higher Education in Nigeria: Current Challenges and Future Directions. *Journal of Sustainability*, (13), 191.
- Ekwueme, D. C., Ekon, C. O., & Ezenwa-Nebife, E. E., (2016). Education for Sustainability through Academic Freedom. *Research Global Journal of Education*, 15-23.
- Eneh, S. O., & Ndujiuba, C. U. (2016). Digital Eco-literacy among University Students in Nigeria: A Study of Digital Skills and Environmental Consciousness. *International Journal of Education and Development using Information and Communication Technology*, 12(2), 39-54.
- Ismaila, Y. K., & Salman, K. K. (2015). Eco-literacy and Sustainable Development: A Focus on Nigeria. *Sustainable Development and Planning VII*, 55-65.
- Iyamu, T., & Abolarin, F. T. (2019). Digital Eco-literacy Awareness and Practices among Small and Medium Enterprises in Nigeria. *Information and Knowledge Management*, 9(2), 39-48.

- Kim, G., Vaswani, R. T., Kang, W., Nam, M., & Lee, D. (2017). Enhancing ecoliteracy through traditional ecological knowledge in proverbs. *Sustainability*, 9(7), 1182.
- Lee, S.-K., & Kim, N. (2017). Environmental education in schools of Korea: Context, development and challenges. *Japanese Journal of Environmental Education*, 26(4), 4\_7-14.
- Ogbeide, O. E., & Ibude, E. C. (2018). Eco-literacy and Sustainable Development in Nigeria: The Role of Environmental Education. *Journal of Environmental Science, Toxicology and Food Technology*, 12(7), 10-16.
- Okebukola, P. A., & Jegede, O. J. (2016). Environmental Education in Nigeria: Content analysis of approved textbooks. *International Journal of Environmental & Science Education*, 11(15), 7759-7772.
- Olatoye, R. A., Adeyemo, A. J., & Aina, O. A. (2017). Assessing University Students' Eco-literacy and Attitudes towards Sustainable Development in Nigeria. *Journal of Education and Practice*, 8(5), 111-119.
- Olawumi, T. O., & Akinbode, M. O. (2018). Digital Eco-literacy Awareness and Sustainable Development in Nigeria: A Perception Study. *Journal of Sustainable Development in Africa*, 20(4), 179-195.
- Olawuyi, D. S. & Olusegun, O. (2018). Achieving the United Nations Sustainable Development Goals on Biological Diversity in Nigeria: Current Issues and Future Directions. *Global Journal of Comparative Law*, 7 (1) 37-60.
- Olawuyi, D. S. (2015). *The Principles of Nigerian Environmental Law*. (Afe Babalola University Press, 2015) 1-25.
- Ololube, N. P., & Agbor, C. N. (2017). Digital Literacy among Pre-Service Teachers in Nigerian Universities: A Case Study. *Journal of Education and Practice*, 8(7), 125-132.
- Oluwafemi, O. S., & Omoogun, A. C. (2018). Digital Eco-literacy as a Determinant of Sustainable Development: A Study of Nigerian Youths. *International Journal of Environmental Science and Sustainable Development*, 4(1), 17-25.
- Onyebuchi, C. N., & Ogwo, B. A. (2015). Digital Literacy Competencies among Undergraduate Students in Nigerian Universities: Implications for E-Learning. *Journal of Information Technology Education: Research*, 14, 409-424.
- Oyewobi, L. O., & Osibanjo, A. O. (2017). Digital Eco-literacy Misconceptions among Undergraduate Students in Nigerian Universities: Implications for Sustainable Development. *Journal of Sustainable Development in Africa*, 19(2), 94-111.
- Oyewole, I. M., Popoola, O. S., & Adu, E. T. (2020). Digital Literacy Competencies and Academic Performance of Nigerian Undergraduates. *Journal of Computing in Higher Education*, 32(3), 423-442.