JOURNAL OF SCIENCE, TECHNOLOGY, MATHEMATICS AND EDUCATION (JOSTMED)



ISSN: 0748 – 4710

VOLUME 17(3), SEPTEMBER, 2021

WELCOME TO JOSTMED

Welcome to the Journal of Science, Technology, Mathematics and Education (JOSTMED). The JOSTMED is a scholarly based journal published four times in a year by the Department of Science Education, School of Science and Science Education, Federal University of Technology, Minna, Nigeria, since September 1998. The scope of the Journal includes the research, development, and practice in all areas of Science, Technology, Mathematics and Education.

INSTRUCTIONS TO CONTRIBUTORS

1. General Guidelines

(i) **Types of Manuscripts:** The Editorial Board of the Journal of Science, Technology, Mathematics and Education accepts only scholarly and original articles that meet its aim and scope. Contributions must be original therefore, authors is/are to guarantee that their article is original and not currently being considered for publication elsewhere.

(ii) **Language:** The JOSTMED is published in English Language.

(iii) **Length:** Usually full-length article, survey or report should be between 3,000 - 5,000 words (12 – 15 pages).

(iv) **Abstract and Keywords:** Each article should be summarized in about 150 -200 words, serving as a brief description of the content of the article. In addition, following the abstract, supply 4 - 5 keywords/phrases that characterize the content of the paper and which can be used for indexing purposes.

(v) **Manuscript:** Manuscripts, including the abstract and references, should be typed double-spaced on A4 paper set-up using Times New Roman, 12 font size.

(vi) **Review:** Each submission will be subjected to blind peer-review by at least two experts in the fields of the articles. Before the publication of accepted article, corresponding authors will receive a PDF version of their manuscript for final proofing. It should, however, be emphasized that changes in content (new or additional results, corrected values, changes in article title, etc) are not permitted without the approval of the Managing Editor.

2. Copyright

Only original papers will be accepted and processed. Paper accepted will be subjected to viper antiplagiarize detector software. In addition, no compensation will be given in respect of published papers. However, authors reserve the right to use their own materials for purely educational and research purposes.

3. Format of Submitted Manuscripts

All manuscripts, written in good English, should be submitted electronically as an e-mail attachment (in Microsoft Word format not scanned copy) to the journal e-mail: <u>jostmed@futminna.edu.ng</u>, <u>jostmedscience@yahoo.com</u> or managing editor's e-mail: <u>gambarii@yahoo.com</u>, <u>gambarii@futminna.edu.ng</u>.

When submitting manuscript in a paper version three copies should be submitted in double line spacing with wide margins, and not more than 12 pages with illustrations inserted. Extra page will attract additional amount of N1,000.00/\$7.00 per page. Each article submitted must be accompanied with an assessment fee of three thousand naira (N3,000) only in cash or bank draft in favour of the Managing Editor (JOSTMED). Submission of manuscript is accepted throughout the year.

The beginning of the manuscript must bear the title of the paper and the full names of authors and their affiliations for correspondence (including e-mail and telephone number). Where there are two or more authors include the addresses for correspondence (e-mail and postal addresses) for the contact author.

Once the article is accepted for publication, the final version should be submitted online. Where that is not possible, the manuscript must be provided, accompanied by a Recordable CD of the same version labelled with: author name(s); titles of article and file name. The author must ensure that the final submission is complete, grammatically correct and without spelling or typographical errors. In preparing the disk, please use Microsoft Word. The sum of Fifteen Thousand (N15,000) naira only (£50.00 or \$100 US Dollar) should be paid to journal account. The online version of the published articles are available at www.futminna.edu.ng and can be accessed through the Internet free of charge.

4. Organization

The background and purpose of the manuscript should be given first, followed by details of methods, materials, procedures and equipment used (where applicable). Findings, discussion, conclusions and recommendations should follow in that order. Appendices are not encouraged but may be countenanced if considered necessary for the manuscript content to be understood. Specifically, author is/are advised to consult the current APA Manual for the details they may need.

5. Figures and Tables

Figures, charts and diagrams should be kept to a minimum, they must be numbered consecutively with roman numerals and a brief title. When submitting electronically, figures should be prepared separately, numbered consecutively and submitted in one of JPEG File interchange (jpg), CompuServe GIF (gif), and PC Paintbrush (pcx). Images should not exceed width of 450 pixels.

6. References

The author should ensure that the references given are complete. References to personal letters, papers presented at meetings and other unpublished material may be included. Where such materials may help in the evaluation of the paper, copies should be made available to the Managing - Editor. Papers that are part of a series should include a citation of the previous papers, and explanatory materials may be appended to the manuscript to avoid footnotes. Citation of an author's work in the text should follow the author / date method of citation; the surname of the author (s) and year of publication should appear in text. Generally, the format for citations in the Manuscript for references is that of the latest edition of the American Psychological Association (APA) format. At the end of the article, a reference list in alphabetical order must be given.

7. Disclaimer

The views and styles expressed in the articles in this publication are those of the individual authors and are not necessarily shared by the reviewers, the editors, the editorial consulting board, the Department of Science Education, or the Federal University of Technology, Minna.

Prof. Gambari, A. I.

The Managing Editor, (JOSTMED), Department of Educational Technology, Federal University of Technology, PMB. 65, Minna, Nigeria **E-mail:** <u>gambarii@yahoo.com</u>; <u>gambari@futminna.edu.ng</u> **Website:** <u>www.gambariamosaisiaka.com.ng</u> **Mobile Phone:** +234-816-680-7534; +234-803-689-7955

EDITORIAL BOARD

Editor-in-Chief	-	Prof. (Mrs.) V. I. Ezenwa
Managing Editor	-	Prof. A. I. Gambari
Assistant Managing Editor	-	Dr. A. A. Yaki
Senior Associate Editor	-	Dr. O. C. Falode
Associate Editor	-	Dr. T. O. Alabi
Account Editor	-	Dr. (Mrs.) R. G. Wodu
Associate Editor	-	Mr. U. S. B. Idris

EDITORIAL ADVISERS

NAME Prof. Afolabi Ayo Samuel Prof. M. O. Yusuf	SPECIALIZATION Civil & Chemical Engineering, Educational Technology	University of Ilorin
Prof. (Mrs.) R. Uyanga	Science Education	University of Uyo
Prof. P. A. O. Okebukola Prof. I. O. Inekwe	Biology Mathematics Education	L. A. S. U., Lagos Michael Opara University of
		Agriculture, Umudike
Prof. Sanjay Mistra	Computer Cyber Security,	Covenant University, anaanland, Ota
Prof. C. Ugodulunwa Prof. (Mrs.) U.N.V. Agwagah	Test and Measurement Science Education	University of Jos University of Nigeria Nsukka

SUSCRIPTION RATES

Nigeria Rate (Personal)	₦1,000.00
Rate (Institutions)	₦2,000.00
Other Countries Rate (Personal)	\$25.00 / £15.00
Rate (Institutions)	\$35.00 / £22.00

All Cheques should be made payable to:

The Managing Editor, JOSTMED, Department of Educational Technology, Federal University of Technology, Minna, Nigeria. Subscription must be pre-paid and must include 10% handling charges

Contact

Phone No: +234-816-680-7534, +234-803-689-7955, +234-706-707-4366, +234-806-962-6979 **E-mail:** jostmed@futminna.edu.ng, jostmedscience@yahoo.com **Website:** jostmed.futminna.edu.ng

> Copyright © Journal of Science, Technology, Mathematics and Education All Rights Reserved

ISSN 0748-4710

CONTRIBUTORS TO THE ISSUE

1. **OLUBADEWO-JOSHUA, OLUWASEUN**

Department of Geography, Ibrahim Badamasi Babangida University, Lapai, Nigeria E-mail: oluwaseuno@ibbu.edu.ng Phone No: +234-803-220-2204

2. DANKAWU, U. M^{1*}; G. D. ADAMU¹; M. N. MAHARAZ¹; F. M. USMAN¹; H. Y. SHUAIBU¹; T. ZANGINA¹; F. M. LARISKI²; M. AHMADU⁴; M. UZAIR³; A. YAKUBU; & S. S. ZARMA¹,

¹Department of Physics, Federal University Dutse, P.M.B, 7156, Jigawa State, Nigeria. ²Department of Physics Yobe State University, Damaturu ³Department of Physics Sule Lamido University Kafin Hausa, Jigawa State Nigeria. ³Department of Chemistry, Federal University Dutse, P.M.B, 7156, Jigawa State, Nigeria. **Email:** umdankawu@gmail.com Phone No: +234-703-836-4338, +234-802-725-4363

3. HASSAN KEHINDE BELLO¹; RAFIU MOPE ISIAKA²; & **KAZEEM ALAGBE GBOLAGADE³**

¹Department of Computer Science, Federal Polytechnic, Offa ²Department of Computer Science, Kwara State University, Malete ³Department of Computer Science, Kwara State University, Malete **E-mail:** hassanbello@fedpoffaonline.edu.ng **Phone No:** +234-806-765-1314

4. ¹SIMON OLONKWOH SALIHU; ²NOR KARTINI ABU BAKAR; ³ABIDEM IYEWUMI DEMEHIN; & ⁴MATTHEW TIKPANGI KOLO

¹Department of Chemistry, Federal University of Technology, Minna. Nigeria ² Department of Chemistry, University of Malaya, 50603 Kuala Lumpur ³Department of Chemistry, Adevemi College of Education, Ondo. Ondo Nigeria ⁴Department of Physics, Federal University of Technology, Minna. Nigeria Email: simono.salihu@gmail.com, kartini@um.edu.my, demehinai@gmail.com matthewkolo@futminna.edu.ng, simono.salihu@gmail.com

Phone No: +234-808-084-4522, +603-7967 4263, +234-902-055-3702, 234-810-516-8992

5. NMADU, H. G¹; OGUNBODE, E. B¹; WUNA, M. A^{1,2}; ADAMU, B.²; SANI, M.³; & MUDASHIRU, S. H.¹

¹Department of Building, Federal University of Technology Minna ²Department of Building Technology, Niger state Polytechnic, Zungeru. Niger State. Nigeria. ³Department of Quantity Surveying, Niger state Polytechnic, Zungeru. Niger State. Nigeria. E-mail: ezekiel@futminna.edu.ng

AMAO, P. A.¹; IBRAHIM, H.¹; ABDULAHI, B².; & SAIDU. A¹. 6.

¹Department of Crop Production, School of Agriculture and Agricultural Technology, Federal University of Technology, Minna, Niger State, Nigeria. ²Department of Soil Science and Land Management, School of Agriculture and Agricultural

Technology, Federal University of Technology, Minna. **Phone No:** +234-803-231-0478

E-mail: peteramaofut87@gmail.com

7. MURITALA, F.; OLAYIWOLA, R. O.; OYEDEJI A. A.; & AKANDE, S. O.

Department of Mathematics, Federal University of Technology, Minna, Nigeria **E-mail:** faruk.muritala@st.futminna.edu.ng, olayiwola.rasag@futminna.edu.ng **Phone No:** +234-803-792-0825

8. O. B. SAEED¹; ABUBAKAR, U. Y¹; LAWAL ADAMU¹; & USMAN ABUBAKAR² ¹Department of Mathematics, Federal University of Technology Minna, Nigeria ²Department of Statistics, Federal University of Technology Minna, Nigeria E-mail: belaneetech@yahoo.com, lawal.adamu@futminna.edu.ng

9. ¹ADAWA, PAIKO FLORENCE; ²ALABI, THOMAS OMOTAYO; ³FALODE, OLUWOLE CALEB & ⁴ADEBOLA, MATHEW OMONIYI ^{1,2&3}Department of Educational Technology Federal University of Technology Minna, Nigeria ⁴Department of Plant Biology

Federal University of Technology Minna, Nigeria **E-mail:** <u>florenceadawa001@gmail.com</u> **Phone No:** +234-805-535-3957

BELLO, M. B., Ph.D Department of Social Sciences Education Faculty of Education University of Ilorin, Kwara State, Nigeria E-mail: <u>muhinat4islam@yahoo.com</u>

11. IMAM, BASHIRAT TITILOPE, Ph.D; SULAIMAN, MUSA MUHAMMED, Ph.D; & ALABI, HAFSAT IMAM, Ph.D

Science Education Department, Faculty of Education University of Ilorin, Ilorin, Nigeria **E-mail:** <u>alabi.hi@unilorin.edu.ng</u>, <u>titibash1006@yahoo.com</u> **Phone No:** +234-803-764-5104

12. OHADUGHA, R. O¹.; NSOFOR C. C., Ph.D¹; TUKURA C. S., Ph.D¹; & ALHASSAN, J. K., Ph.D²

¹Department of Educational Technology ²Department of Cyber Security Federal University of Technology Minna, Niger State, Nigeria **Email:** <u>ohadugharosemary@gmail.com</u> **Phone No:** +2348063541441

13. ONI, LEAH OLUBUNMI, Ph.D

National Open University of Nigeria, Faculty of Education Department of Educational Foundations **E-mail:** <u>Oni.leah@yahoo.com</u> **Phone No:** 08131392355

14. ABDULRAZAK MOHAMMED¹; Dr. R. I. ADAMU, & Dr. A. J. HARUNA²

¹Department of Vocational and Technology Education, Faculty of Technology Education, Abubakar Tafawa Balewa University, Bauchi ²Department of Vocational and Technical Education, Faculty of Education, Federal University Lafia, Nasarawa State **E-mail:** <u>abhabiba086@gmail.com</u> **Phone No:** +234-806-044-6401

15. ¹SANTALI RHODA., ¹ALABI, T. O., ¹FALODE, O. C., & ²OLAYIWOLA, R. O.

¹Department of Educational Technology, Federal University of Technology, Minna, Niger State ²Department of Mathematics, Federal University of Technology, Minna, Niger State **E-mail:** santalirhoda@gmail.com **Phone No:** +234-803-609-0217

16. ABIODUN EZEKIEL ADESINA, Ph.D¹; & BLESSING DUYILEMI BAMIKOLE²

¹General Studies Education Curriculum and Instruction, School of Education, ²Emmanuel Alayande College of Education, Oyo, Oyo State **E-mail:** <u>Draeadesina2015@gmail.com</u>; <u>Blessingduyi@gmail.com</u> **Phone No:** +234-803-074-5843, 234-703-673-7795

17. ¹DANGANA MUSA; & ²ABUBAKAR KASSIM AUWAL

¹Science Education Department, Ahmadu Bello University, Zaria ²Science Education Department, Sule Lamido University, kafin Hausa, Jigawa State **E-mail:** <u>danganalukmus@gmail.com</u>, <u>Phone No: 07032811177</u> <u>auwalkar00@gmail.com</u>

Phone No: +234-703-588-2148

18. JONATHAN A. ANGYAK¹.; HABILA E. ZUYA, Ph.D².; & BALA G. ATTAH, Ph.D²

¹Faculty of Management Sciences, Department of Actuarial Science University of Jos, Nigeria. ²Faculty of Education, Department of Science and Technology Education University of Jos, Nigeria. **E-mail:** <u>angyakjonathan@gmail.com</u>

19. GOWON, KERTER ERIC

Department of Vocational and Technical Education, Faculty of Education, Benue State University Makurdi, Benue State. Nigeria. **E-mail:** gowonke@mautech.edu.ng ericgowon@gmail.com **Phone No:** +234-803-792-0825

20. OLUGBEMI PATRICIA O., Ph.D; & AJILEYE MOSUMOLA. A., Ph.D

Department of Curriculum and Instruction, School of Education, FCT College of Education, Zuba, Nigeria **E-mail:** <u>patsegun1988@gmail.com</u>, <u>mosunajike@gmail.com</u> **Phone No:** +234-805-530-1413

TABLE OF CONTENTS

- 1. Impact of Population Growth on Transport Facilities in Ilorin Metropolis, Kwara State, Nigeria. **Olubadewo-Joshua, Oluwaseun** 1

- Influence of Different Nutrient Sources on Growth and Yield of Tomato (*Lycopersicon Esculentum* Mill.) in Minna, Nigeria. Amao, P. A., Ibrahim, H., Abdulahi, B. & Saidu. A.
 63

- An Investigation on Junior Secondary Two Students' Use of Bar-Model Approach in Solving Word Problems Involving Percentage. Jonathan A. Angyak, Habila E. Zuya., Bala G. Attah.