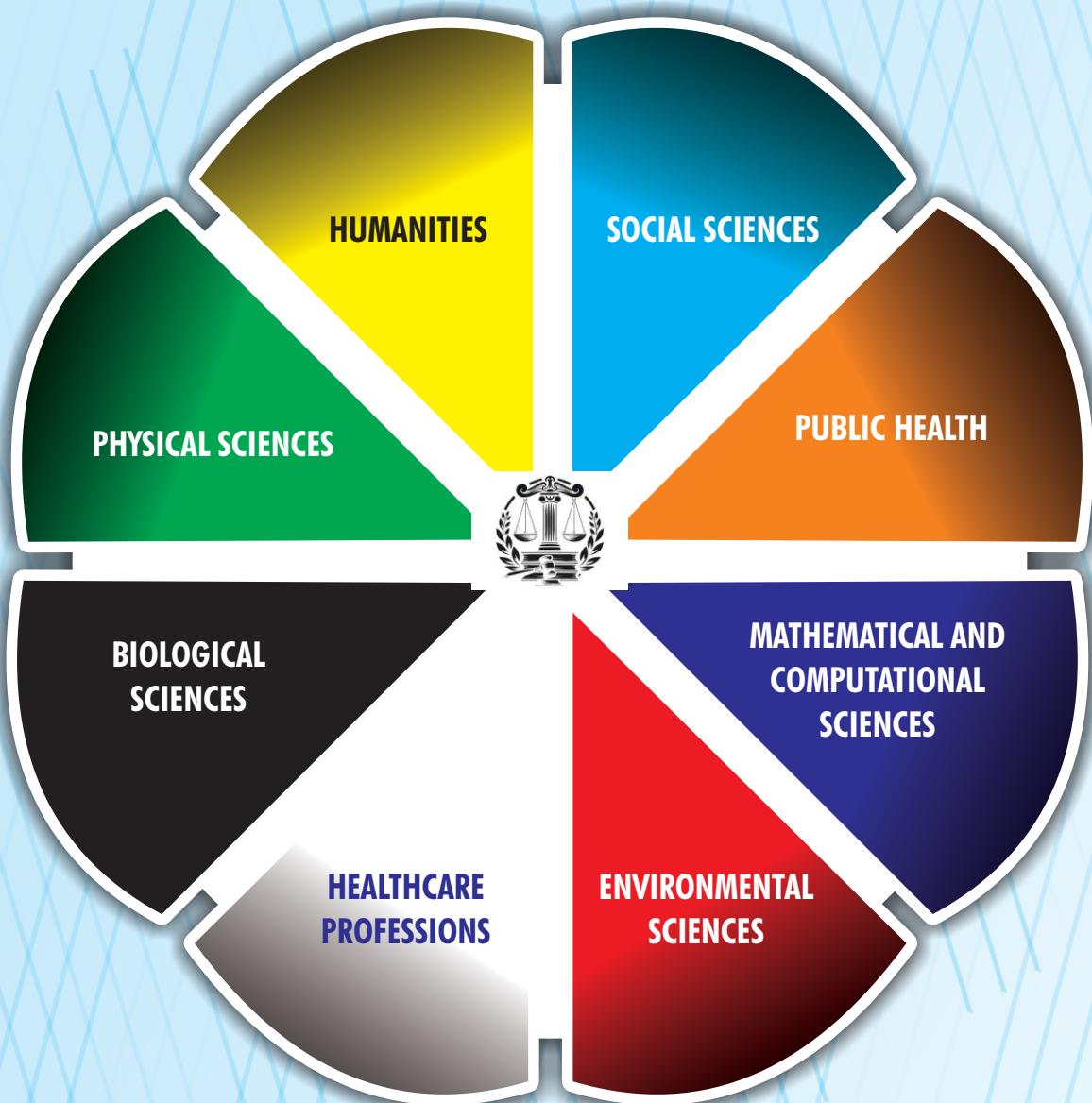


INTERNATIONAL RESEARCH JOURNAL OF MULTIDISCIPLINARY-PRACTICES, PUBLIC AND COMMUNITY HEALTH (IRJMPCH)

VOL. 1 NO.2
JUNE, 2024



MAIDEN EDITION

A PUBLICATION OF

NIC MAURICE COLLEGE OF HEALTH, MANAGEMENT, SCIENCE AND TECHNOLOGY

P.M.B 1006 Okobo, Akwa Ibom State, Nigeria

+234 815 114 4603; +234 906 552 6881; +234 802 311 3691; +234 706 909 4904

info@nicmauricecolleges.org | nicmauricecollege@gmail.com | irjmpch@gmail.com | www.nicmauricecolleges.org



Broadcast

Ladies and gentlemen, esteemed guests, and global audience,

It is my honor to welcome you to the official launch of the International Research Journal of Multidisciplinary Practices, Public and Community Health. Today, June 1st, 2024, marks a significant milestone in our journey to advance knowledge, promote collaboration, and improve health outcomes worldwide.

As we gather here today, we acknowledge the complexity of health challenges that transcend borders, cultures, and disciplines. We recognize the urgent need for innovative solutions, evidence-based practices, and collective action. Our journal is born out of this conviction, with a vision to bridge the gaps between research, practice, and policy.

We aim to create a platform where diverse voices and perspectives converge, where interdisciplinary approaches are fostered, and where knowledge is shared to address the most pressing health issues of our time. Our scope is broad, encompassing healthcare professions, social sciences, environmental sciences, biological sciences, physical sciences, mathematical and computational sciences, and humanities.

Expected key features of our journal include:

- High-quality, peer-reviewed research articles, reviews, and case studies
- Interdisciplinary approaches to public and community health
- Global perspectives and experiences
- Innovative methodologies and frameworks
- Best practices in healthcare delivery, education, and community engagement
- Critical perspectives and analyses
- Open access and online publication
- Rapid publication process
- Rigorous peer-review process
- Indexing in major databases
- Wide dissemination and visibility

Our editorial board, reviewers, and authors come from diverse backgrounds and disciplines, united by a shared passion for improving public and community health. We are committed to maintaining the highest ethical standards, transparency, and inclusivity in our publication process.

We believe that health is a fundamental right, not a privilege. We recognize that health is influenced by social determinants, environmental factors, and economic conditions. We acknowledge the disproportionate burden of health challenges on marginalized communities and vulnerable populations.

Our journal is dedicated to addressing these challenges through a multidisciplinary approach. We will publish research that explores the intersections of health with social sciences, environmental sciences, and humanities. We will showcase innovative practices that bridge the gaps between healthcare, education, and community engagement.

We invite you to join us on this journey. Share your research, your stories, and your ideas. Engage with us through social media, webinars, and conferences. Let us work together to create a world where health is a fundamental right, not a privilege.

Thank you for your attention, and let us embark on this exciting journey together!

- Nic Maurice

...i

FROM THE *Publishers*

Dear esteemed Editorial Board Members, Reviewers, and Authors,

Representing diverse disciplines and expertise, you are the pillars of our journal's success. As we embark on this new venture, we acknowledge the vast scope of multidisciplinary practices in public and community health, encompassing:

- Healthcare professions (medicine, nursing, allied health)
- Social sciences (sociology, psychology, anthropology)
- Public health (epidemiology, health policy, health education)
- Environmental sciences (environmental health, ecology, conservation)
- Biological sciences (biology, microbiology, genetics)
- Physical sciences (physics, chemistry, engineering)
- Mathematical and computational sciences (biostatistics, data science)
- Humanities (ethics, philosophy, history)

Our mission is to create a platform where researchers, practitioners, and policymakers can converge, share ideas, and learn from each other's perspectives, fostering:

- Interdisciplinary collaboration and knowledge sharing
- Innovative research and methodologies
- Best practices in healthcare delivery, education, and community engagement
- Global collaboration and knowledge exchange

As Editorial Board Members, your guidance and expertise will help us:

- Shape the journal's direction and scope
- Ensure the quality and relevance of published articles
- Identify emerging trends and topics in multidisciplinary practices
- Develop strategic partnerships and collaborations

As Reviewers, your input is crucial in:

- Evaluating manuscripts through a rigorous and constructive peer-review process
- Providing feedback that enhances the quality and impact of published research
- Ensuring that our journal maintains the highest standards of scientific integrity and excellence

As Authors, your contributions are vital in:

- Sharing innovative research and ideas
- Showcasing best practices and case studies
- Exploring new methodologies and frameworks
- Addressing complex health issues and challenges
- Presenting theoretical and conceptual frameworks
- Sharing empirical research and data-driven findings
- Offering critical perspectives and analyses

Together, we can create a journal that:

- Breaks down disciplinary silos and fosters interdisciplinary collaboration
- Showcases cutting-edge research and innovation in public and community health
- Provides a platform for underrepresented voices and perspectives
- Informs policy and practice with evidence-based research
- Contributes to improving health equity, access, and outcomes globally
- Fosters a culture of inclusivity, diversity, and equity

We are committed to maintaining the highest ethical standards, transparency, and inclusiveness in our publication process. We will work tirelessly to ensure that our journal is:

- Indexed in major databases
- Widely disseminated and accessible to diverse audiences
- Compliant with international publication ethics and standards

Thank you for your dedication, expertise, and time. Let us work together to create a journal that makes a meaningful impact in the field of public and community health.

Please feel free to contact us with any questions, suggestions, or ideas. We look forward to collaborating with you and producing a journal that we can all be proud of.

Best regards,

Publishers

International Research Journal of Multidisciplinary Practices, Public and Community Health

About IRJMPCH

Publishers: Nic Maurice College Of Health, Management, Sciences And Technology.

RC: 1449965

Address: No. 1 Farm Road, Mbawa Avenue,
Amamong, Okobo LGA,
Akwa Ibom State,
Nigeria.

Liaison Office: 7, Cat Street, Mbiabong Ikot Essien , off Oron Road,
Uyo, Akwa Ibom State, Nigeria.

Contacts/Phones: +234 802 311 3691, +234 815 114 4603
+234 906 552 6881, +234 706 909 4904

Website: www.nicmauricecolleges.org

Email:
- irjmpch@gmail.com
- info@nicmauricecolleges.org
- nicmauricecollege@gmail.com

Edition: VOL. 1 NO.2 June, 2024

Editor-in-Chief: Dr. Efegbere Henry Akpojubaro

Managing Editor: Dr. Akaninyene Mark

Contributors:
- Enemuo Emeka Hyacinth
- Iheanacho Ijeoma
- Enemchukwu Onyinye Victory
- Enemchukwu Ebube Favor
- Enemuo Ijeoma Chidili.

EDITORIAL Comments

FROM THE DESK OF EDITOR-IN-CHIEF

It is with gratitude and excitement that I welcome everyone to this maiden edition of International Research Journal of Multidisciplinary Practices, public and Community health IRJMPCH. The Research Journal is a first of its kind and a single largest gathering of intellect, great minds, experts and specialists in various aspects of Public/Community Health, Sciences, Management, Humanities, Computer, Social and Environment health.

In this maiden edition of IRJMPCH, we are afforded the luxury of hardworking and cerebral minds working in academia, ministries, Non-Governmental Organization, allied bodies and international community providing various services to the public. This journal is currently enjoying affiliations with various Ministries Departments and Agencies including tertiary institutions in and outside Nigeria like Federal University Otuoke, Bayelsa State, Nigeria , Adoka University Benue State, Nigeria , Global Community Health Foundation, Cashville Development Foundation, International center of Inter-professional Team Building, Professionals for Humanity International, Caprecon Development Foundation international in USA, UK, Europe ,Asia just to mention but a few.

The Journal has a public health terrain with numerous opportunities to Young researchers, publication services, writing assistance, research/business proposal Writing, co-authorship, article modification and formatting, Data analysis and training on SPSS, STATA etc, Grantsmanship and manuscripts writing to mention but a few.

I want to assure you, we have selected, tested, trusted and renounced experts to review your Manuscripts (papers and book/book chapter) with shortest period of time and get them published immediately! Our season experts in various Fields are working round the clock to deliver, assist, mentor with their vast years of experience and mentorship.

I will like to recommend this epoch making up-to-date research journal worldwide and I will like to pay public tribute and express our deepest gratitude to founder, administrator of IRJMPCH, Mr. Anso NicMaurice, Editorial team members, Managing Editors and all staff, whose useful contributions have made this maiden edition of IRJMPCH possible and a reality.

Finally, may I state, unequivocally that, we have put everything in place to help our scholars benefits maximally from this Internationally recognized journal.

Thank you .

Dr. Efegbere Henry Akpojubaro

Associate Professor and Consultant Physician in Community Medicine and Public Health and Multi-Disciplinary Specialist and Serial Entrepreneur

Editor in Chief

IRJMPCH.

From The **MANAGING EDITOR'S DESK**

It is indeed an honor and a privilege to welcome you all to this Maiden edition of International Research Journal of Multidisciplinary Practices, public and Community health IRJMPCH. The IRJMPCH is a unique Journal, first ever, put together by highly recognized national and international developers, innovators, experts and specialists of various field of human endeavor.

We feel highly honored as Managing Editors of IRJMPCH to have enjoyed tremendous cooperation and support for scholars

On behalf of myself, I express profound gratitude to the Administrator of IRJMPCH and his team who are working round the clock to deliver.

The IRJMPCH is affiliated with Federal University Otuoke, Bayelsa State, Nigeria and Adoke University, Benue State, Nigeria, a giant step and great achievements of this top tier internationally recognized Journal.

In this maiden edition of IRJMPCH, we are poised with luxury of hardworking and cerebral minds working in academia, business and international community to provide various services to the public.

Our services are not limited to the following: publication services within 7-14 days, journal acceptance, peer reviewed process, research proposal, Dissertation assistance, Co-authorship, Grantsmanship, article modification) formatting among others.

We are top notch in accepting research/ review papers and short communication journals for our Q3 and Q4 Journal indexed.

This journal is highly recommended to our scholars including international community to publish, build and strengthen networks with the view to working collectively to collaborate much more effectively and efficiently to advancing their careers.

I wish you a fruitful, rewarding and exciting experience!
Bravo!!

Dr. Akaninyene Mark
Consultant physician Community Medicine and Public Health
Managing Editor, IRJMPCH

Contents

<i>The Broadcast:</i>	<i>i</i>
<i>From the Publishers:</i>	<i>ii</i>
<i>About IRJMPCH:</i>	<i>iii</i>
<i>Editorial Comments:</i>	
<i>From the Desk of Editor-in-Chief:</i>	<i>iv</i>
<i>From the Managing Editor's Desk:</i>	<i>v</i>
<i>Contents:</i>	<i>vi</i>
<i>Call for Papers:</i>	<i>vii</i>
<i>Article Guideline for Authors:</i>	<i>viii</i>
<i>Editorial Team:</i>	<i>xii</i>

Correlation Between Cranial Capacity On Academic Performance Among Secondary School Students In Nnewi by: **Enemuo Emeka Hyacinth; Iheanacho Ijeoma; Enemchukwu Onyinye Victory; Enemchukwu Ebube Favor; Enemuo Ijeoma Chidili.** 1

Call FOR Papers

International Research Journal of Multidisciplinary Practices, Public and Community health (IRJMPCH) Affiliated with 1. Federal University Otuoke, Bayelsa State, Nigeria 2. Ado-Kwata University Benue State, Nigeria. Other Universities affiliations in progress!

- Acceptance: 1-3 days
- Publication: 7-14 days
- Journals' acceptance
- Peer review process
- Fast publication

Our services include:

- | | |
|--|---|
| <ul style="list-style-type: none">- Publication services- Research proposal/ Dissertation assistance- Article modification | <ul style="list-style-type: none">- Writing assistance- Co-authorship opportunities- Article formatting |
|--|---|

1. Assistance on Research proposals writing/ Dissertation writing
2. Assistance on Business proposals writing

Other services to include to ours:

Book Publishing Services. This includes:

- | | |
|---------------------------------------|--|
| 1. Traditional Book Publishing | 2. Book Chapter Publishing . |
| 3. Manuscript review and publishing . | 4. Data Analysis and training on SPSS, STATA, R, etc |
| 5. Manuscripts writing | 6. Grantsmanship |

NB: Please scholar herein to signify areas of interest and share CV to support their areas of service subscription.

We are accepting research/review papers and short communications for our Q3, and Q4 journal indexed. We guarantee publication and fast acceptance in our top-tier journal (International Research Journal of Multidisciplinary Practice, public and Community Health)

Journal subjects include:

- Education
- Business management
- Sciences
- Computer science
- Finance and accounting
- Economics
- Medical/ Medicine
- Engineering
- And many more!

Contact us:

+2348035984104, +2347086662115
www.nicmauricecolleges.org

Dr. Efegbere Henry Akpojubaro

Associate Professor and Consultant physician in Community Medicine and Public Health
Editor-in-Chief,
IRJMPCH.

Article Guideline

FOR AUTHORS

Guideline on Short Communication

Short Communications- Manuscript Preparation

- Short Communication presents a brief observation that does not warrant a full-length paper.
- Short Communications should be limited to a total of 3000 words.
- The manuscript should be formatted without section headings in the body of the text and contain no more than 3 figures or tables, combined.

Required Sections in Short Communication

Authors, affiliations and correspondence should be provided as in full research write up.

1. Title

2. Abstract

The abstract should be limited to 100 words or fewer.

Abbreviations, diagrams and references are not allowed here.

3. Keywords

Five keywords or less should be given below the abstract.

4. Main body or Literature

-All required parts (Introduction, Materials & Methods, Results and Discussion) should be given in this single section titled "Literature", no section headings.

5. References

Preparation of original research manuscripts

Writing Style

All submitted manuscripts should be written in British English with correct syntax, grammar and punctuations. Authors are to use Times New Romans & font size 11

The Manuscripts Structure

Original manuscripts should follow this order where applicable:

Title

Name(s) of Author(s)

Address of Author(s)

Abstract

Introduction

Materials & Methods

Results

Tables, figures, etc

Discussion

Conclusion

Recommendation(s)

Limitation(s)

Acknowledgment

Reference

Conflict of interests

The authors should please comply strictly with this format for original manuscripts.

Maximum length

Text of original research articles should not exceed 4,550 words (including abstract, references, legends, tables and figures).

Unit of Measurement

The authors are to express all measurements & quantities in SI Units.

Title

The title should be concise and reflect the nature of the research and findings. The title should not be more than 155 characters.

Authors

The author(s) should provide their email addresses, full names and institutional affiliations. The corresponding author's contact details especially e-mail address and telephone number, should also be provided. (Email addresses of other Co-Authors should be provided in the cover letter).

Abstract

The abstract should have a maximum word count of 250. There should be no paragraphing of the abstract (unstructured abstract).

Keywords

A maximum of relevant 7 keywords, in alphabetical order, should be provided for indexing and coding.

The main body of article text

This should consist of a maximum of 4,250 words and sectioned into the introduction or background, materials and methods, results, discussions, conclusion, recommendation and limitation.

Introduction

This section should contain concise background information to the research, justification, hypotheses and objectives with citation of the relevant references.

Materials and Methods

The authors should provide details of the research design, materials and equipment used, and any other details which will permit reproduction of similar results by other researchers. An explicit description of interventions (or treatments) should be given. Subjects, inclusion and exclusion criteria must be stated. Statistical tests or tools for the analysis of data including the version of software employed must be provided. There must be a clear demonstration that ethical clearance was obtained before commencement of the study and all relevant regulations were followed for both human and animal studies. The anonymity of patients or diagnostic materials must be preserved.

Results

This section must be explicit, concise and free from any form of ambiguity or unnecessary repetition. Tables and figures should be placed as much as possible, in proximity to the part of the text referring to them. Pictures must be of very good quality. All illustrative items must have an in-text reference, annotated and should contain clear descriptive legends.

Discussion

The results of the research should be discussed with particular attention to interpretation. A well-structured discussion will state the main findings, the strength and weakness of the study in comparison with similar studies, unanswered questions and future directions.

Conclusion

A brief summary of key findings, implications and future research

Acknowledgement

Significant contributors, if any, to the research who does not qualify as authors may be acknowledged.

Conflict of interest

The author(s) must issue a statement concerning conflict of interest in performing or reporting the research.

Check here for Guideline on how to prepare Short Communication

Referencing Style

The journal adopts the Vancouver referencing style recommended at the International Committee of Medical Journal Editors conference in Vancouver, 1978.

Text Citations

References numbers within the text should be in superscript at the end of a sentence, placed after the full stop. it should also be placed after a comma as the case may be. All et al should be in italics followed by either a full stop or a coma, as the case may be. The actual authors can also be referred to, but the reference number must always be given.

Reference List:

-General Guide

The reference list comes at the end of your document. Number the references in the list in the order in which they appeared in the text. List the authors' names, starting with surnames, followed by a maximum of two initials. The initials should NOT be separated with a full stop or a comma. The authors' names should be separated with a comma and Full stop should follow the final name. Where there are more than six (6) authors the first 6 should be listed followed by 'et al. and a full stop.

Specific Reference Examples

Print journal article reference

7. Denning PJ, Campbell RT, John HT. Computational thinking in science. Am Sci 2017;105(2):13-17.

Online journal article reference

8. Kistner S, Vollmer R, Burns BD, Kortenkamp U. Model development in scientific discovery learning with a computer-based physics task. Comput Human Behav [Internet]. 2016 Feb 20 [cited ...ix

2017 ,.Feb 13]; 59: 446-455. Available from <http://www.sciencedirect.com/science/article/pii/S0747563216300930>

Referencing a Print Book

3. Susskind L, Hrabovsky G. The theoretical minimum: what you need to know to start doing physics. London: Allen Lane; 2013. 256p.

Referencing an e-book:

4. Bonitz M, Lopez J, Becker K, Thomsen H, editors. Complex plasmas: scientific challenges and technological opportunities [Internet]. New York: Springer; 2014. 491 p. Available from: <http://link.springer.com/book/10.1007%2F978-3-319-05437-7>

Referencing a chapter in an edited book

5. Kelsey S. Aristotle on interpreting nature. In: Leunissen M, editor. Aristotle's physics: a critical guide. Cambridge: Cambridge University Press; 2015. 31-45 p.

Referencing a chapter in an E-book

6. Watermann T, Scherrer A, Sebastiani D. Linear response methods in quantum chemistry. In: Bach V, Delle Site L, editors. Many-electron approaches in physics, chemistry and mathematics: a multidisciplinary approach [Internet]. New York: Springer; 2014. 97-110 p. Available from http://link.springer.com/chapter/10.1007/978-3-319-06379-9_5

Citation from unpublished work

5. Eke B. Evaluation of frequency of abdominal surgeries at Benue State University Teaching Hospital Makurdi Nigeria. Ph.D. Thesis, 2017, Benue State University Makurdi Nigeria. 253pp.

Cover Letter

Each submission should be accompanied by a cover letter in a Microsoft Word file. The content of the letter should include, a statement that:

1. The research is original and has not been submitted or accepted for publication elsewhere;
2. Potential conflict(s) of interest(s) do or do not exist;
3. The manuscript has been read and approved by all the authors.
4. E-mail addresses of all Co-Authors should be included.

Article submitted to the journal should not have been submitted for peer-review in another journal simultaneously, nor previously published.

A research report submitted simultaneously to two journals or submitted twice for publication will attract appropriate sanctions.

The manuscript should be formatted without section headings in the body of the text and contain no more than 3 figures or tables, combined.

Required Sections in Short Communication
Authors, affiliations and correspondence should be provided as in full research write up.

1. Title

2. Abstract

The abstract should be limited to 100 words or fewer.

Abbreviations, diagrams and references are not allowed here.

3. Keywords

Five keywords or less should be given below the abstract.

4. Main body or literature

-All required parts (Introduction, Materials & Methods, Results and Discussion) should be given in this single section titled "Literature", no section headings.

5. References,

Preparation of original research manuscripts

Online journal article reference

8. Kistner S, Vollmer R, Burns BD, Kortenkamp U. Model development in scientific discovery learning with a computer-based physics task. Comput Human Behav [Internet]. 2016 Feb 20 [cited 2017Feb 13]; 59: 446-455. Available from <http://www.sciencedirect.com/science/article/pii/S0747563216300930>

Referencing a Print Book

3. Susskind L, Hrabovsky G. The theoretical minimum: what you need to know to start doing physics. London: Allen Lane; 2013. 256p.

Referencing an e-book:

4. Bonitz M, Lopez J, Becker K, Thomsen H,

editors. Complex plasmas: scientific challenges and technological opportunities [Internet]. New York: Springer; 2014. 491 p. Available from : <http://link.springer.com/book/10.1007%2F978-3-319-05437-7>

Referencing a chapter in an edited book

5. Kelsey S. Aristotle on interpreting nature. In: Leunissen M, editor. Aristotle's physics: a critical guide. Cambridge: Cambridge University Press; 2015. 31-45 p.

Referencing a chapter in an E-book

6. Watermann T, Scherrer A, Sebastiani D. Linear response methods in quantum chemistry. In: Bach V, Delle Site L, editors. Many-electron approaches in physics, chemistry and mathematics: a multidisciplinary approach [Internet]. New York: Springer; 2014. 97-110 p. Available from : http://link.springer.com/chapter/10.1007/978-3-319-06379-9_5

Citation from unpublished work

5. Eke B. Evaluation of frequency of abdominal surgeries at Benue State University Teaching Hospital Makurdi Nigeria. Ph.D. Thesis, 2017, Benue State University Makurdi Nigeria. 253pp.

Article submitted to the journal should not have been submitted for peer-review in another journal simultaneously, nor previously published.

A research report submitted simultaneously to two journals or submitted twice for publication will attract appropriate sanctions.

Cover Letter

Each submission should be accompanied by a cover letter in a Microsoft Word file. The content of the letter should include, a statement that:

1. The research is original and has not been submitted or accepted for publication elsewhere;
2. Potential conflict(s) of interest(s) do or do not exist;
3. The manuscript has been read and approved by all the authors.
4. E-mail addresses of all Co-Authors should be included.

Article submission

Articles may be submitted online here

<http://Info@nicmauricecolleges.org> ,
www.info@nicmauricecolleges.org
whatsapp 234 8151144603, 234 7069094904
or the Editor-in-Chief or as an email attachment to submit

Journal Account Details:

All payments are made through:

Account Name: Nic Maurice College

Account Number: 011 395 2031.

Bank: Union bank plc.

or

Sterling bank plc.

Ac. No. 0075 099 800

Article Processing/Publication Fee

The journal requires authors to pay a publication fee of fourty thousand Nigerian naira (40,000), or one hundred and fifteen (115.00) USD only for international Authors. Authors may be requested to pay cash, by bank draft, or by transfer into the journal account after the manuscript has been accepted for publication.

Editorial Team

EDITOR-IN-CHIEF

Dr. Efegbere Henry Akpojubaro

Associate Professor and Consultant Physician in Community Medicine/ Public Health,

Department of Community Health
Edo State University Uzairue and Teaching Hospital Auchi, Nigeria

Email: henryefegbere@gmail.com

Telephone: +2348035984104

MANAGING EDITORS

Nic Maurice

Dr. Akaninyene Mark

ASSISTANT EDITORS

Mr Ubong Bernard

Mrs Emem Proweb

EDITORIAL BOARD MEMBERS

Prof. Dr Ashok Kumar Gupta

BE (MANIT-Bhopal, M Tech (MANIT) PGDM, DMS, LLB, PhD

CMD Research Foundation of India,
Provost World Innovators University.

Dr. Enemuo Hycent Emeka

Department of Medicine,
Nnamdi Azikiwe University Nnewi Campus

Email: emekeanenemuo@yahoo.com

Telephone: +2348034713533, 090133537923

Dr. Mohit Maheshwarkar

Department of Mechanical Engineering,
Affiliate of Oriental University, Indore Bharat

Email: mohitmaheshwarkar.ou@gmail.com

Telephone: +91-7024142854

Prof. P. O. U Adogu

Department of Community Medicine,
Nnamdi Azikiwe University Nnewi Campus

Telephone: +2348037058459

The above mentioned Editorial team of IRJMPCH is vested with the responsibility as contained in the terms of reference to be served them. Please accept assurances of the Administrator highest regards.

Global Invitation

A. Global invitation for nomination recommendation of self /others to the prestigious position of:

1. Editorial board of the journal and
2. Reviewer of disciplinary specialties/courses membership (specify your interest... 1 or 2)

B. Invitation to submit your endearing manuscripts in any/all specializations of the global sectors for possible publication in volume 1(edition 1) of our journal.

Seasoned, internationally acclaimed reviewers available for qualitative peer review/publication

(submit recommendations and manuscripts to:

henryefegbere@gmail.com , Whatsapp on +2348035984104, official website and email

www.nicmauricecolleges.org, Info@nicmauricecolleges.org

CORRELATION BETWEEN CRANIAL CAPACITY ON ACADEMIC PERFORMANCE AMONG SECONDARY SCHOOL STUDENTS IN NNEWI

Lead Author: **Enemuo Emeka Hyacinth**¹

Corresponding Author: **Enemuo Ijeoma Chidili**²

Others: **Iheanacho Ijeoma, Enemchukwu Onyinye Victory,
Enemchukwu Ebube Favor**

Department of Community Medicine, Nnamdi Azikiwe University Awka Nnewi Campus^{1,2}

Department of Anatomy, Faculty of Basic Medical Sciences College of Health Sciences, Nnamdi Azikiwe University, Nnewi Campus^{1,2}

Abstract

Background: Cranial capacity is the volume of the interior of the cranium of vertebrates that possess a cranium and a brain. Cranial volume is used to approximate the size of the brain, which is also suggestive of the intelligence of the organism.¹ Cranial capacity is a measure of the volume of the interior of the cranium which is sometimes used as a rough indicator of the size of the brain and are affected by environmental ecological biological geographical racial gender and age factors.² Medically various methods of measuring cranial capacity have been known for some time.³) cranial capacity which is in close relation with brain volume, reflects racial characteristics and thus has been thought to be one of the commonest items in physical Anthropological studies.^{2,3} Psychologist Louis L. Thurstone (1887-1995) offered a differing Theory of academic performance, instead of viewing it as single, general ability, Thurstone's theory focused on seven different primary mental abilities. The abilities that he described include: Verbal comprehension, Reasoning, Perceptual speed, Numerical ability, Word fluency, Associative Memory, Spatial visualization. This study was carried out amongst secondary school students within Okofia Nnewi town, Anambra state. The study is limited to students from Junior secondary (JSS1) to Senior secondary (SSS3). The expected age bracket for this study is students between 10 years and 19 years. The time frame for this study has been between March - June 2021. This study was put-fore to assess the impact of cranial capacity on academic performance of secondary school students in Nnewi. **Material and Methods=** The following materials were employed in this study namely Digital vernier caliper, Inelastic measuring Tape, Pen, Weighting scale, Data collection sheets. Nnewi is a local government in Anambra state, it is made of many towns which includes; Otodo, Uruagu, Umudim and Nnewi-ichi. Otodo Nnewi was picked for this study by a simple sampling technique (multistage sampling). Furthermore, Otodo Nnewi is divided into different villages including: Okpuno, Indiakwu, Indingbu, Amiliba, Umuanuka, Umuenem, Okofia, Mbanagu, Ekwuru, Umuzu, Ezekwuagbo, Umuzumbana, Umuzungo and Okofia was picked for the study. First a letter was collect from the supervisor to the principal of the secondary schools. Simple random sampling technique was used to recruit participants into this study. The academic record of each student was also collected. Simple random sampling (ballotting without replacement) were used, from these two schools were selected. Ethical approval for this study was obtained from the ethical committee of the Faculty of Basic Medical Sciences, college of Health sciences Nnamdi Azikiwe. The subjects that participated in this study were randomly selected healthy secondary school students from Okofia Nnewi North, Anambra State with ages ranging from 10-19 years. The sample size was calculated using the formula of Yamene (2016). $n=N/[1+N(e)^2]$ Where n=sample size to be estimated. 1=constant. e=level of significance or limit of tolerable error which is set at 0.05. N=Total population in Okofia. $n=193,987/[1+193,987(0.05)^2] = 399.18$ which is approximately 400. **Results:** First a letter was collected from the supervisor to the principal of the secondary schools. Subject bio data was first obtained including their: Name or initial, age,

sex, class, CH, CL, CB, H, W. Measurement of weight: The body weight of the subjects used were taken twice with the aid of a weighing scale with an accuracy of 1kg and documented in kg after calculating the average, the participant was measured bare footed and with minimal clothing as they stand on the center of the scale with their weight evenly distributed across both feet, the scale was placed on a hard floor and not a floor covered with soft materials. Measurement of height: The height of the students were measured with manual stadiometer and recorded in centimeters. The participants were barefooted standing in an erect position looking horizontally and the measurement being read from the vertex of the scalp, for taller students I climbed on a stool to avoid error. After the height and weight was has been measured, body max index (BMI) was derived as mass in Kg/height in meters squared. $BMI = \text{body Mass (Kg)} / \text{height (m}^2\text{)}$. Measurement of cranial dimensions: Maximum anterior-posterior cranial length (CL) in centimeters: measured between glabella and inion. (2) Maximum cranial breadth (CB) in centimeter measured between the two parietal eminences. (3) Maximum cranial height (CH) in centimeters: measured between the vertex and the external acoustic meatus. (4) Using the following formulae derived by Lee-pearson, the cranial capacity (cc) (mm^3) was computed as follows: Males: $0.000337(L-11)(B-11)(H-11) + 406.01\text{cc}$. Female: $0.000400(L-11)(B-11)(H-11) + 206.60\text{cc}$. (5) Brain weight in grams and cerebral index (CI) were determined by the following formulae: Brain weight=cranial capacity 1.035. Where 1.035 is the mass density of the brain cerebral index=brain weight/ body weight. Conclusion: The study showed that there was sexual dimorphism in craniometric parameters such as cranial breadth, cranial height, cranial length, cranial capacity and also body weight and height. There was therefore no sexual dimorphism in academic performance. Cranial capacity had a positive significant relationship with academic performance in both males and females and there also exist strong positive correlations between cranial capacity and cranial length, cranial breadth, and cranial height.

Keyword: Cranium capacity impact, academic performance, secondary schools students

Introduction

Academic performance is considered an intellectual competence indicator.¹ Since research on academic achievement began to emerge as a field in the 1960s, it has guided educational policies on admissions and dropout prevention. Although much of the literature has focused on higher education, the knowledge obtained on behavioral phenomena observed in colleges and universities can potentially guide research on student behavior in primary and secondary schools. A number of behavioral patterns have been linked to academic performance, such as time allocation active social ties sleep duration and sleep quality or participation in sport activity. Most of the existing studies, however, suffer from biases and limitations often associated with surveys and self-reports particularly when measuring social networks.¹

Cranial capacity is the volume of the interior of the cranium of vertebrates that possess a cranium and a brain. Cranial volume is used to approximate the size of the brain, which is also suggestive of the intelligence of the organism.¹ Craniometric study is an important part of anthropometry that is used to determine the cranial capacity of an individual. Cranial capacity is a measure of the volume of the interior of the cranium which is sometimes used as

a rough indicator of the size of the brain and are affected by environmental ecological biological geographical racial gender and age factors.² The capacity of the cranium has in many studies been used to indirectly reflect the volume of the brain and predict mental ability³ medically various methods of measuring cranial capacity have been known for some time.⁴ Some investigators have estimated the cranial capacity in the past and indirectly reflects the brain volume.⁵ Most of these available studies have been made on discuss using linear dimensions, that are the valuable stories.

Medically various methods of measuring cranial capacity have been known for some time.⁶

Man has always prided himself on his intellectual capabilities and has often pondered to explain the reason why he alone is able, unlike the rest of the animals Kingdom, to contemplate and communicate with others. Since man's brain is larger than other animals^{6,7} it is natural for man to conclude that the brain is the hallmark of the man and the measurement of it must be the key to the understanding of his unique intellectual capacity.⁸ Since research on academic achievement began to emerge as a field in the 1960s, it has guided educational policies on admissions and dropout prevention.⁹ The capacity of the cranium has been

shown in many studies to directly or indirectly reflect the volume of the brain and to predict academic performance.¹⁰ In other words, this has been a major problem especially among teens and growing up children due what has been fed them by either parents or guardian, so this approach is designed to explore the optimum relationship between cranial capacity and academic performance. Some investigators have investigated cranial capacity in the past which indirectly reflects the brain volume.¹¹ Most of those available studies have been made on dry skulls using linear dimensions, packing methods or occasionally radiological methods. It is also an indirect approach to evaluate the size of the brain.¹² cranial capacity which is in close relation with brain volume, reflects racial characteristics and thus has been thought to be one of the commonest items in physical Anthropological studies.¹³ The gradual brain developments which take place during the adolescent period show themselves in behavioral, cognitive, and emotional changes. This critical period for brain development enables adolescents to negotiate their trial and error journey towards independence.^{12,13}

The head is the superior part of the body that is attached to the Trunk by the neck. It is the control center and communications center as well as the "loading dock" for the body. It houses the brain; therefore, it is the site for consciousness: ideas, creativity, imagination, response, decision making and memory. It includes special sensory receivers (ears, eyes, nose and mouth), broadcast devices exhaust for carbon dioxide (Moore et al., 2014). The head consists of the brain and its protective coverings (cranial vault and meninges), the ears and the face.

The Cranium

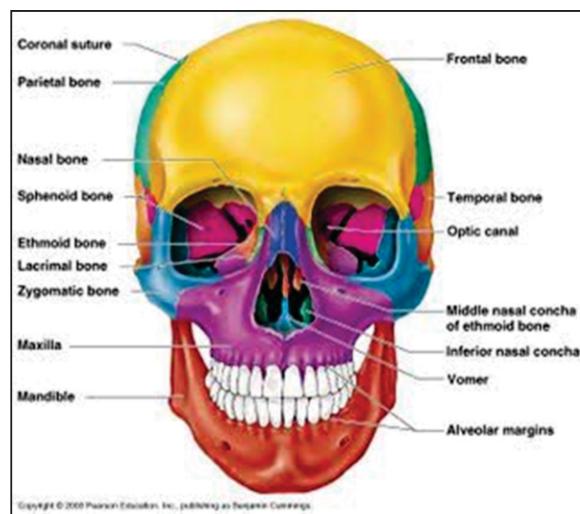


Fig.1: Diagram showing the anterior view of the skull Moore2014.

The study aimed to assess the impact of craniometric variables on academic performance of secondary school students in Nnewi.

Materials and Methods

Material employed were Digital vernier caliper, Inelastic measuring Tape, Pen, Weighting scale, Data collection sheets. The subjects that participated in this study were randomly selected healthy secondary school students from Okofia Nnewi North, Anambra State with ages ranging from 10-19 years.

Study Location

The study was conducted in Okofia Nnewi Anabara State. In each of the schools, terminal results of the students were collected from their form masters/mistress and also their cranial length, breadth and height was taken.



Fig 3.1: Map of Nigeria showing Anambra State (GIS, 2022)

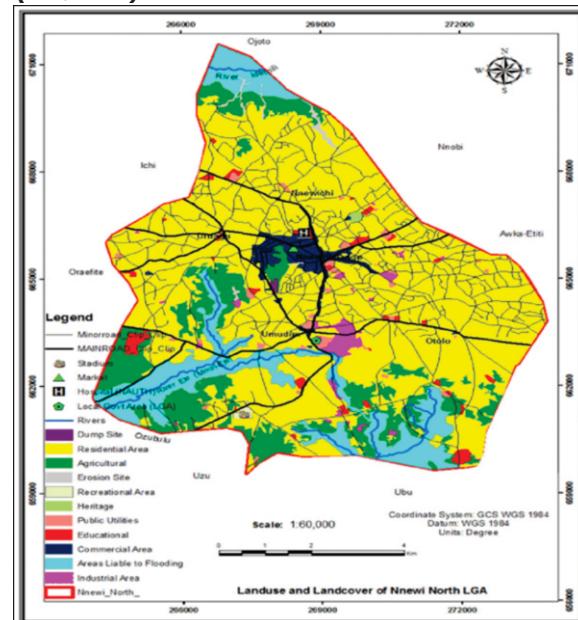


Fig 2: Map of Anambra showing Nnewi North.

Sampling Technique

Nnewi is a local government in Anambra state, it is made of many towns which includes; Otoho, Uruagu, Umudim and Nnewi-ichi. Otoho Nnewi was picked for this study by a simple sampling technique (multistage sampling). Furthermore, Otoho Nnewi is divided into different villages including: Okpuno, Indiakwu, Indingbu, Amiliba, Umuanuka, Umuenem, Okofia, Mbanagu, Ekwuru, Umuzu, Ezekwugbo, Umuzumbana, Umuzungo and Okofia was picked for the study.

First a letter was collect from the supervisor to the principal of the secondary schools. Simple random sampling technique was used to recruit participants into this study. The student cranial length, breadth and height included with their standing height and weight was taken using a venier caliper and weighing scale and inelastic measuring tape respectively. The academic record of each student was also collected. Therefore, Simple random sampling (balloting without replacement), were used. From these two schools were selected.

Sampling Size Determination

The sample size was calculated using the formula of Yamene (2016).

$$n = N / [1 + N(e)^2]$$

Where n=sample size to be estimated

1=constant

e= level of significance or limit of tolerable error which is set at 0.05

N=Total population in Okofia.

$$n = 193,987 / [1 + 193,987(0.05)^2] \\ = 399.18 \text{ which is approximately } 400.$$

Inclusion Criteria

Strictly students from Prof. Sam secondary school, Chukwujekwu memorial grammar school Otoho Nnewi, and Saint Joseph Catholic school Otoho Nnewi. All subjects should be mentally and physically fit, between 10 and 19 years and must have full academic records with the school management

Exclusion Criteria

Any subject with cranial deformity or history of trauma or in the body areas targeted for anthropological assessment that could hinder accurate measurement. Females with obstructive hair styles, Subjects with incomplete academic records.

Ethical clearance

Ethical clearance was obtained from the ethical committee of the Faculty of Basic Medical Sciences, college of Health sciences Nnamdi Azikiwe.

Measurement of Variables

First a letter was collected from the supervisor to the principal of the secondary schools. Subject bio data was first obtained including their: Name or initial, age, sex, class, CH, CL, CB, H, W.

a. Measurement of weight

The body weight of the subjects used were taken twice with the aid of a weighing scale with an accuracy of 1kg and documented in kg after calculating the average, the participant was measured bare footed and with minimal clothing as they stand on the center of the scale with their weight evenly distributed across both feet, the scale was placed on a hard floor and not a floor covered with soft materials.

b. Measurement of height

The height of the students where measured with manual stadiometer and recorded in centimeters. The participants were barefooted standing in an erect position looking horizontally and the measurement being read from the vertex of the scalp, for taller students I climbed on a stool to avoid error

After the height and weight was has been measured, body max index (BMI) was derived as mass in Kg/height in meters squared.

BMI=body Mass (Kg)/height (m^2).

c. Measurement of cranial dimensions

(1) Maximum anterior-posterior cranial length (CL) in centimeters: measured between glabella and inion.

(2) Maximum cranial breadth (CB) in centimeter measured between the two parietal eminences.

(3) Maximum cranial height (CH) in centimeters: measured between the vertex and the external acoustic meatus.

(4) Using the following formulae derived by Lee-pearson, the cranial capacity (cc) (mm^3) was computed as follows:

$$\text{Males: } 0.000337(L-11)(B-11)(H-11) \\ + 406.01cc$$

$$\text{Female: } 0.000400(L-11)(B-11)(H-11) \\ + 206.60cc$$

(5) Brain weight in grams and cerebral index (CI) were determined by the following formulae:

$$\text{Brain weight} = \text{cranial capacity } 1.035$$

Where 1.035 is the mass density of the brain
cerebral index = brain weight / body weight.

Grading of Student's Academic Performance

Score	Grade	Score	Remark
75 & above	A	91-100	Excellent
		85-90	Excellent
		80-84	Excellent
		75-79	Very good
65-74	B	70-74	Good
		65-69	Fairly good
60-64	C	60-64	Above average
50-59	D	55-59	Average
		50-54	Pass
40-49	E	0-49	Fail
39 & below	F		

Limitations

Inability to trace academic records of some students who had already participated in the study, Lack of complete academic records of some students, Lack of co-operation by some school authority, Different subject's combinations of some students, as some students who participated in the studies do not offer some of the general subjects under the consideration.

Results

Table 1 shows the summary statistics of all the evaluated parameters.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Age	800	10	19	15.49	1.793
Weight	800	30	72	51.05	10.420
Height	800	64	186	160.43	9.801
Cranial length	800	11.88	17.65	15.1471	1.10200
Cranial Height	800	4.00	12.56	9.2558	1.49163
Cranial Breadth	800	10.10	17.75	13.9969	1.46617
First term result	800	33.8	89.5	57.670	11.9191
Second term result	800	35.8	88.5	59.446	22.9794
Cranial capacity	800	561.53	1588.13	1050.2707	180.90355

N= Sample size

Table 2 compares the parameters between male and female participants. Result shows that male participants have significantly higher weight, height, cranial length, and cranial capacity than their female counterpart. Result also showed that the average age of the male participants (16.19) was significantly higher than that of the female participants (15.21). There was no significant difference in the first and second term performance of both male and female students.

	Group	Mean ± SEM	t-value	p-value
Weight	Female	49.78±0.415		
	Male	54.32±0.728	-5.420	0.000*
Height	Female	159.97±0.402		
	Male	161.60±0.675	-2.115	0.035*
Cranial length	Female	14.98±0.045		
	Male	15.57±0.066	-6.975	0.000*
Cranial Height	Female	9.25±0.060		
	Male	9.26±0.107	-0.065	0.948
Cranial Breadth	Female	13.97±0.057		
	Male	14.05±0.111	-0.755	0.450
Age	Female	15.21±0.072		
	Male	16.19±0.117	-7.107	0.000*

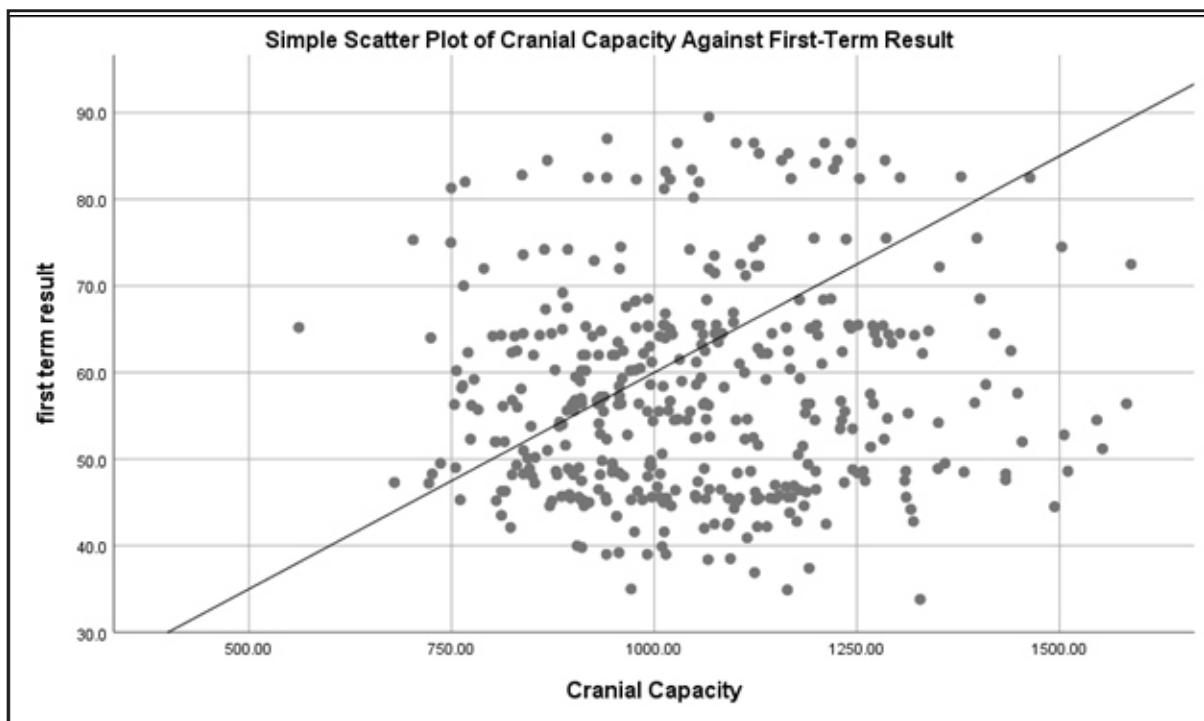
First term result	Female	57.59 ± 0.490		
	Male	57.87 ± 0.823	- .298	0.765
Second term results	Female	60.16 ± 1.099		
	Male	57.59 ± 0.640	1.423	0.155
Cranial capacity	Female	1027.22 ± 6.949		
	Male	1109.53 ± 13.466	-5.899	0.000*

Data was analyzed using student's T-test and result was considered significant at $p < 0.05^*$

Table 3 shows the relationship between cranial capacity and performance in both first and second term. There was a positive significant correlation between the cranial capacity and student's performance in both the first and second term. Meaning that students with higher cranial performance appear to have higher result in both first and second term.

		First term result	Second term result
Cranial capacity	Pearson Correlation	0.079	0.070
	P value	0.026*	0.047*
	N	800	800

Data was analyzed using Pearson correlation and result was considered significant at $P < 0.05^*$. N = sample size



Discussion

Craniotherapy is a branch of anthropometry through which cranial dimensions can be estimated.¹⁴ Cranial capacity is a measure of the volume of the interior of the cranium (skull) of vertebrates.¹⁵ The capacity of the cranium has been shown in many studies to indirectly reflect the volume of the brain and to predict academic performance.¹⁶ These authors stated that increase in brain size is associated with more sophisticated cognitive functions and that larger cranial capacity can be an indicator of larger brain and higher intelligence. Hence, the aim of this study is to find out the correlation between cranial capacity and

academic performance among secondary schools in Nnewi.

Cranial capacity is one of the most important characters for determining the racial difference.¹⁷ It is a measure of cranial volume and an indirect approach to evaluate the size of the brain, thus human populations differ in brain size. In this study it is observed that cranial capacity has a positive correlation with academic performance, this disagrees with the research carried out by¹⁸ who stated that it is predictable that correlation between academic performance and brain size will be modest, because the brain is not involved in

what we call academic performance and thus variations in mass/size of that tissue will lower the magnitude of correlation. The cranial capacity of the students in this study was $1109.53 \pm 13.466\text{cm}^3$ in males and $1027.22 \pm 6.949\text{cm}^3$ in females, which indicates that the males had a higher value than the females. Generally, males and females differ from each other genotypically and phenotypically and these differences are more pronounced during puberty.¹⁹ This result from the present study is in line with Swamy *et al.* who reported that males had significantly larger cranial capacity than females.

There was a positive significant correlation between the cranial capacity and student's performance in both the first and second term. Meaning that students with higher cranial performance appear to have higher result in both first and second term. This is contrary to a study done by Augustine *et al.* who reported no significant correlation between the cranial capacity of his participants and their academic performances. Also, according to²⁰ individual brain size is affected by nutrition, and could also be attributed to genetic and environmental influences and food habits as reported by²¹ It has been suggested that size would not be expected to increase cognitive competence more than modestly because larger brains have larger neurons and more myelinated axons connecting them as reported by Deacon (1990). It is because of this reason that people with larger than normal brains are not necessarily brighter.²²

It has been argued that there is important aspect of human intelligence that academic performance fails to measure, such as creativity, practical intelligence, social intelligence and emotional intelligence which are involved in cognitive development. Some of these constructs are more securely grounded than others and not all of them are wholly dependent on academic performance.²³ This is because psychometrically measured academic performance leave out much cognitive reliance to academically performed behaviors.

This study also revealed that academic performance has no relationship with gender but shows a sexual dimorphism in craniometric parameters between the male and female participants. This disagrees with the study reported²⁵ which stated that academic performance shows a statistical significance between males and females, with females scoring higher than males and according to their study, it might be because of differences in eye-hand motor coordination. Kimura *et al.*, (2000) also reported that women excelled higher than men in eye-hand coordination. Also, accordingly to²⁶ individual brain size is affected by nutrition and early

experience, this can be due to males are more subjected to physical activities than the females and attention is given more to females. However, in the view of Fagboungbe (2016) concluded that performance level of a student depends on the quality of the brain cells and not about the sex of the individual. He noted females tends to be better than males in certain areas while males tend to be better than women in certain areas. He documented that academic performance is determined by the quality of the brain cells in the individuals. So, it is the function of the quality of those cells of the individuals that is why young ones are not meant to lack nutritious food so that it can lead to qualitative brain cells and when the brain cells are of high quality, the processor is bound to be intelligent and have high academic scores.

Result shows that male participants have significantly higher weight, height, than their female counterpart. This observation is in agreement with previous works by²⁷⁻³¹ This could be because of the bigger body frame of growing-up males than the females Xu also mentioned in his research that the brain plays a very high role in the body weight of adolescence causing differences in their sex chromosomes, he found out that female POMC neurons express higher levels of TAP63 which make the female neurons fire faster than the male and causing much expenditure of energy, this will in turn cause highly reduced or less appetite, therefore the females are more protected in gaining weight than the male. Moreover, the male cranial capacity was also higher than that of the female, which has been shown that the gender differences in brain weight could be attributed to activities in which the specific sex excelled³² Another possible reasons for this difference could be differences in the number of cortical neurons. Pakkenberg and Gunderson (1997) reported that men had about 4 billion more for cortical neurons than women.

Also, study in Hawaii (Nakashima, 1986) suggested that environmental and ecological conditions could cause changes in head dimensions such as cranial capacity and head shape. There is also a significant factor that enables man adapt to life adverse environmental factor which is the fact that environmental pressures produce noticeable difference between people with respect to their Cranial capacity³³ Also, Rushton (1994) indicated that genetic factors are accounted for phenotypic variance in cranial capacity. Result also showed that the average age of the male participants (16.19) was significantly higher than that of the female participants (15.21) These differences mean that girls more readily 'engage' with school and show intrinsic motivation for academic tasks, factors strongly associated with readiness early school activities. Boys, however, are more likely to find schoolwork unfamiliar and

difficult also girls show a serious and high quest for knowledge and enthusiasm in exploring new knowledge than the males because of this reason parents will force be forced to enroll the female students to school earlier before the expected age for school.

Brain size and cranial capacity are receiving attention because of technologies available to scan the brain and' because a significant relationship has been established between academic performance and brain size.³⁴ They reported that the correlation between academic performance and brain size estimated from magnetic and resonance imaging (MRI) ranges from 0.35 to 0.47 with an average of about 0.40³⁵. Other studies have corroborated that there is a positive correlation between brain size, cranial capacity and one's intelligence and most general mental ability³⁶⁻³⁸. Rushton and Ankney (1996) reported that Galton (1888) was the first one to quantify the relationship between brain-size and cognitive ability in humans. His subjects were Cambridge undergraduate males who were divided into two: those who achieved first-class honors degree and those who did not. He computed head volume by multiplying head length by breadth and height and plotted the results against age (15 to 19 years) and class of degree (A, B, C). He reported that cranial capacity continued to grow massively after the age of 8 and those who obtained high honors degree had a brain size of 2 to 5% greater than those who did not. Rushton and Ankney (1996) also reported that Pearson (1906) re-examined Galton's data using his correlation coefficient and noted a weak positive relationship between head size and academic performance.

They noted that cognitive abilities and academic performance were correlated with brain size, age, sex, social class and race but Passingham reported a correlation of $r = .14$ between brain weight and academic performance in his study. However, Passingham also reported that when height was partialled out, the correlation coefficient became $r = .03$ (ns). In discussing his findings, Passingham commented that other studies had not partialled out factors like height, weight and age when relating academic performance and brain size. In addition, socio-economic class, which enters the equation both in terms of nutrition and environmental influences, had not been taken into consideration. Like others, Passingham was also concerned with the problem of being able to measure either academic performance or brain weight directly, but not both in the same sample. For instance, in his living sample, academic performance of the students was measured directly and brain weight was estimated through external cranial measurements. In Passingham's sample, brain weight was measured directly, and

academic performance was estimated on the basis of the socio-economic status of the individuals.

Conclusion

Findings from this study showed that there was sexual dimorphism in craniometric parameters such as cranial breadth, cranial height, cranial length, cranial capacity and also body weight and height. There was therefore no sexual dimorphism in academic performance. Cranial capacity had a positive significant relationship with academic performance in both males and females and there also exist strong positive correlations between cranial capacity and cranial length, cranial br eadth, and cranial height.

Recommendations

1. More detailed examination with better assessments of brain size such as magnetic resonance imaging should be used to improve on accuracy.
2. More work should be done to provide more data on craniometric variables.
3. Other methods of testing academic performance should be in related study.

References

- Abele AB. Stimmung und Leistung: allgemein- und sozialpsychologische Perspektive. Hogrefe, Göttingen, Germany, 1995
- Adigwe, JC. Misconception in chemical Kinetics: the case of Nigerian Chemistry teachers. 2010 *A journal of science teachers Association of Nigeria*; (28):77-85
- Agu AU., Emeka A. (2019). Impact of Cranial Capacity on the Academic Performance of the Students of Igbos of Nigeria Middle East. *Journal of Scientific Research*; 27(1):1-5
- Aiello, L. and Dean, C An introduction to human revolutionary anatomy. London: Academic Press, 1990 vol 4, Pp. 427-428.
- Augustine UA., Emmanuel AE., Emeka GA., Emmanuel ON.,Impact of cranial capacity on the Academic Performance of the Students of Igbos of Nigeria 2019 *Journal of Scientific Research*; 49 (6):554-556
- Bartels M., Saviouk V., deMoor MHM., Willemsen GV., Hottenga A E., Heritability and genome-wide linkage scan of subjective happiness, 2010, 10(13):135-142.
- Becker PT., Abele AB., Theories of impairment and Diagnostic Juvenile Weinheim, Germany, 1994, pp 13-49
- Berndt, T., "Friends' influence on students' adjustment to school"1990. *Educational Psychologist*, 34(1); pp. 15-28.
- Beyazkurk, D., Kesner, JE., "Teacher-child relationships in Turkish and United States schools: a cross-cultural study", 2005

- International Education Journal.* 6. pp. 547-554.
- Boon, H.J., "Low-and high-achieving Australian secondary school students: Their parenting, motivations and academic achievement"2007. *Australian Psychologist*, 42(3), pp. 2012-225.
- Botting N., A. Powls., R.W. Cooke NM... Cognitive and educational outcome of very low-birth weight children in early adolescence.1998. *Developmental Medicine and Child Neurology*,22 40: 652-660.
- Buote, CA., "Relations of autonomy and relatedness to school functioning and psychological adjustment during adolescence".2000 *Dissertation Abstracts International Section A.:Humanities and Social Sciences*, 62(1).234-235
- Caplan, S. et al., "Socio-emotional factor contributing to adjustment among Early entrance college students".2002. *Gifted Child Quarterly*, 46(2), pp. 124-134.
- Castejon, J.L. & Perez, AM., A causal-explicative model of psycho-social variables in academic performance. *Revista Bordon*;1998, 50(2):pp. 171-185
- Deary IJ., Thorpe G., Wilson JM., Whalley LJ., Whalley, Population sex difference in IQ at age 11:1998 the Scottish mental survey 1932 intelligence, (31):533-542.
- Decaban A. Tables of cranny and orbit measurements, cranial volume and derived indices in male and female from 7 days to 20 yrs of age.2011. *Annals of neurology*; Pp. 321-328
- Dehaene, S. The psychophysics of numerical comparison: a reexamination of apparently incompatible data. 1989. *Percept. Psychophysiology*. 45; 557-566.
- Dehaene, S., Piazza, M., Pinel, P. and Cohen, L. Three parietal circuits for number processing. *Cognitive*. 2003 *Neuropsychology*, 20; 487-504
- Drake RL., Wayne V, Adam WM.. (2005). Gray's Anatomy for students; International edition by Elsevier Inc. Philadelphia, USA; pp 708-728
- DeMeyer W. Megalencephaly: Types, Clinical syndromes, and management. *Pediatric Neurology*.1989. 2, pp. 321-328.
- Desch, JW., Anderson SK., and Snow JH., relationship between the cranial capacity and academic school performance.1990 *Clinical Pediatrics*, 29 (8): 389-392.
- Diaz, A.L., "Personal, family, and academic factors affecting low achievement in secondary school. Teacher, Psychopegagogy expert".2003. *Electronic Journal of Research in Educational Psychology and Psychopedagogy*, 1(1), pp. 43-66.
- Diener EE., (2000). Subjective well-being: The science of happiness and a proposal for a national index; 55(10):34-43.
- Diener E, Oishi S, Lucas RE., Subjective well-being: the science of happiness and life satisfaction. In: Oxford handbook of positive psychology.2009. Oxford University Press, New York; 86(8) pp 187-194
- Douglas NJ., Rushton JP.. Males have greater g: Sex differences in general mental ability from 17-18 year-olds on the scholastic assessment test academic performance. 2016. *Journal of Scientific Research*; 4(5):479-486.
- Douglas SJ. (2016). Cranial capacity and endocranial cast. *Journal of Traumatology*; 4 (1):56-65.
- Dryfoos, J. G., "Adolescents at risk". NY: Oxford University Press,1990
- Dukmak, S., "Ability Grouping and Teacher-Students Interaction among High and Low Achieving Students in Middle Preparatory Schools in the United Arab Emirates".2009. *Journal of Faculty of Education of UAE University*; 26 (8) pp.68-70
- Eisenberg D., Golberstein E., Hunt JB., Mental health and academic success in college.2009. *B E J Econ Anal Policy*;17 (9):1-35
- Eysenck HJ., Race and intelligence: an alternative hypothesis. *Mankind Quarterly*; 2011. 32:133-136.
- Ezejindu DN., Chinweife KC., Ihentuge CJ., Uoleme GC. Studies of cranial capacity between the ages of 14-20 be years of Ogidi people of Anambra State ,2013 Nigeria, *journal of Dental and medical sciences*. 8(1). Pp. 54.
- Fagbonge O., (2016) punch Saturday breeze; who is more intelligent man or woman, published march5, 2016 retrieved on 20th September 2016.
- Fiedle E., Lange R., and Winebrenne S., (2002). "In search of reality: unraveling the myths about tracking, ability grouping, and the gifted." *Roeper Review*, 24 (3):pp.108-112
- Field T., Diego M., Sanders C Adolescent depression and risk factors.2001. *Journal Adolescence Science* 36.(3):491-498.
- Ford F., (2011). The effect of family poverty on children's academic achievement: Parental discussion and neighbourhood poverty as mediating variables, (M.A thesis, The State University of New Jersey). *Rutgers University Community Repository*; 22:56-58.
- Furnham A., Fong G, and Martin M. Sex and cross-cultural differences in the estimated multi-faceted intelligent quotient score for self, parents and siblings.1990. *Journal of Personality Individual Differences*; 26:1025-1034.
- Ganiyu M. (2015). Study of cranial capacity in relation to intelligence and other anthropometric parameters among students of Ahmadu Bello University, Zaria.

- Journal of Anatomical sciences*; 3:35-38.
- Gašević D, Zouaq A, Janzen R (2013) "Choose your classmates, your GPA is at stake!" The association of cross-class social ties and academic performance. *Am Behav Sci* 57(10):1460-1479
- Gault, D., Brielle, F., Renier, D. Marchac, D. (2013). The calculation of intercranial volume using CT scans. *Child's Nervous system*; 4:217-3.
- Gentry M., Rizza MG., and Owen SV., 2002. "Examining perceptions of challenge and choice in classrooms: The relationship between teachers and their students and comparisons between gifted students and other students". *Gifted Students Quarterly*; 46, pp. 145-155.
- Giedd, J.N., M. Stockman, C. Weddle, M. Liverpool, A. Alexander-Bloch, G.L. Wallace, NR. Lee F. Lalonde and R.K. Lenroot, 2010. Anatomic magnetic resonance imaging of the developing child and adolescent brain and effects of genetic variation. *saNeuropsychology Review*; 20: 349-361
- Glaser, R. (1976). Components of a psychological instruction: Toward a science of design. *Review of Educational Research*, 46, 1-24.
- Good, T. L., & Brophy, J. E. (1987). Looking in classrooms. New York: Harper & Row.
- Golalipour MJ., Haisarik JM., Farrakhan RM. (2003). The shapes of head and face in normal male newborns in South- East of Caspian Sea (Iran-Gorgan). *Journal of Anatomical Society of India*; 52:28-31.
- Golalipour, M. J., Jahanshahi, M. and Haidari, K. (2005). Estimation of cranial capacity in 17- 20 years old in East of Caspian Sea Border (North of Iran). *International journal of morphology*; 14:21-36.81
- Greene TR, Noice H (1988) Influence of positive affect upon creative thinking and problem solving in children. *Psychol Rep* 63:895-898. doi:10.2466/pr0.1988.63.3.895
- Grossen, B., 1996. "How should we group to achieve excellence with equity"? Unpublished work
- Hagenauer G. *Lernfreude in der Schule*. Waxmann, Münster,
- Halpern DF., LaMay ML (2000). The smarter sex a crucial review of sex different in intelligence, 16 (3-4), 415-426.
- Hascher T Emotionen im Schulalltag: Wirkungen u n d Regulationsformen.2005. *ZfPaed* 51:610-625
- Hawkins, A.; Graham, C.R.; Sudweeks, R.R. & Barbour, M. K., 2013. "Academic performance, course completion rates, and student perception of the quality and frequency of interaction in a virtual high school". *Distance Education*, 34(1), pp. 64-83.
- Heidari, Z., Mahmoudzadeh, sagheb, H. R. and NooriMugahi, M.H.(2006). morphological evaluation of head and face in 18-25 years old women in Southeast of Iran. *Medical Sciences*; 6:400-4.
- Hollified, J. "Ability Grouping in elementary schools". *Clearinghouse on Elementary and Childhood Education Urban IL*, ERIC Identifier: Ed290542
- Hwang Y., Lee K H., Choi B., Lee KS., LeeHY., SirWS., Kim HJ., Koh KS., Han SH., Chung MS. (2010). Study on the Korean adult Cranial Capacity.
- Hyde JS.(2005). The gender similarities hypothesis. *Am psychology*; 60:581-592.
- Ikpi, Enya & Johnny, 2014 *Journal of Korean Medical Sciences*; 10:239-42
- Isen AM (2008) Some ways in which positive affect influences decision making and problem solving. In: Lewis M, Haviland-Jones JM, Feldmann Barrett L (eds) *Handbook of emotions*. Guilford, New York, pp 548-573.
- Ivanovic, R., H. Forno, C.G. Castro and D. Ivanovic, 2000 Intellectual ability and nutritional status assessed through anthropometric measurement of Chilean school-age children from different socioeconomic status. *Ecology of Food and Nutrition*, 39: 35-59.
- January 2014IOSR Journal of Humanities and Social Science 19(3):12-19 (Augustus Johnny UmohBassey Enya David Emmanuel Ikpi Eyong)
- Jones, M.G. & Gerig, T.M., 1994. "Silent sixth-grade students: characteristics, achievement and teacher expectations", *Elementary School Journal*, 95, pp. 169-181
- Kimura D. (2000) sex and cognition. Cambridge; MA: MIT press
- Kleine D, Schmitz B (1999) *Stimmung im Kontext von Schule: Rahmenbedingungen und Korrelate*. In: Jerusalem M, Pekrun R (eds) *Emotion, motivation und Leistung*. Hogrefe, Göttingen, Germany, pp 205-221
- Kumbasar E, A. Kimball Rommey, A. Kimball Rommey (1994) *American Journal of Sociology* Editor: Elisabeth S. Clemens Volume 128, Number 1July 2022.
- Laeque M., Nirmale VK., Diwan CV.(2013) Derivation of Demarcating points for sex determination from skull. *International Journal of Recent Trends in science and technology*, 6,pp.56-9.
- Lavin DE, (1965) The prediction of academic performance. Russell Sage Foundation, New York
- Lynn R., Irving p., Cammock T. (2002). Sex different in general knowledge. *Intelligence*, 30:27-39.
- Macan TH, Shahani C, Dipboye RL, Phillips AP (1990) College students' time management: correlations with academic performance and stress. *J Educ Psychol* 82(4):760
- Maccoby, E., & Jacklin, C., (1974) *The Psychology of sex differences*. Stanford, CA: Stanford

- University Press.
- Mackinnon IL. (2005). The relation of the cranial capacity of human skull to its roentgenological length. American journal of Roentgenology; 14. Pp. 10369.
- Manjunath KY. (2012) Estimation of cranial volume-an overview methodologies. Journal of Anatomy society India; 51:85-91.
- Marchesi, A. & Martin, E. (eds). (2002). "Evaluacion de la educacion secundaria. Fotografia de una tesis polemica." [Evaluation in secondary education. Snapshot from a controversial era]. Instituto IDEA, Madrid: SM.
- Merritt, E.G., Wanless, S.B., Rimm-Kaufman, S.E., Cameron, C., & Peugh, J.L., 2012. "The contribution of teachers' emotional support to children's social behaviors and self-regulatory skill in first grade". School Psychology Review, 41(2), pp. 141-159.
- Miller, D., 1980. "Family maladaptation reflected in drug abuse and delinquency". In M. Sugar (Ed.), Responding to adolescent needs. NY: S Medical & Scientific Books 15:632-638.
- Montero, M.C., 1990. Predicting academic performance. A study of intervening variables in a sample of 8th grade students with follow-up in 10th grade]. Tesis. Universidad Pontificia de Salamanca.
- Moore KL. and Dalley AF. (2014). Clinically Oriented Anatomy. 7th Edition, Lippincott Williams and Wilkins, Philadelphia.
- Needham BL., Crosnoe R., Muller C., (2004). Academic failure in secondary school: the inter-related role of health problems and educational context. Journal of Sociological Problems 51(4):569-586.
- Nell SC., (2000). Male and female differences in academic performance. Personality and individual differences; 12: pp.764-768
- Page E., and Keith, T., (1986). "The elephant in the classroom", Intellectual Talent, Johns Hopkins University Press; 10(2):34-35.
- Pekrun RJ., Goetz TA., Titz IW., Perry RP., (2002). Academic emotions in students' self-regulated learning and achievement: a program of qualitative and quantitative research. Educational Psychology; 37 (4):91-105.
- Rafiq HMW., Fatima T., Sohail, MM., Saleem M., and Khan, MA., (2013). "Parental involvement and academic achievement"; A study on secondary school students of Lahore, Pakistan. International Journal of Humanities and Social Science; 3(8), pp. 209-223.
- Reiss AR., Abrams MT., Singer HS., Ross JR., and Denkla MB., (1996). Brain development, gender and IQ in children: a volumetric study. Brain Scientific Study; 119: 1763-1774.
- Reynolds A J., Temple JA., Robertson DL., & Mann EA. (2001). Long term effect of an early childhood intervention on educational achievement and juvenile arrest: A 15- year follow-up of low-income children in public schools. Journal of the American medical Association; 285(18): 2339-2346.
- Reynolds AJ., Temple JA., Robertson DL., and Mann EA (2001). Long term effects of any childhood intervention on educational achievements and juvenile arrest: a 15 year-old follow-up of low-income children in public schools. Journal of the American medical association, 285 (18), 2339-2346
- Rivera SM., Reiss AL., Eckert MA., and Menon V. (2005). Developmental changes in mental arithmetic: Evidence for increased specialization in the left inferior parietal cortex. Cerebral Cortex, 15;1779-1790.
- Roeser RW., Eccles JS., Freedman-Doan C (1999). Academic functioning and mental health in adolescence: patterns, progressions, and routes from childhood. A Journal of Adolescence Research; 14 (10):135-174.
- Romerhausen, NJ., (2013). Strategies to enhance student success: A discourse analysis of academic advice in international student handbooks. Journal of International Students; 3(2), 129-139.
- Rushton JP., and Ankney CD., (1996). Brain size and cognitive ability: Correlations with age, sex, social class, and race. Psychonomic Bulletin and Review; 24 (3): 26
- Samir Dukmak, (2015) European Journal of Social Sciences (2), pp.132-148
- Secada, W., (1992). "Race, ethnicity, social class, language, and achievement in Mathematics". Handbook of research on mathematics teaching and learning; 23, (2) pp42-45.
- Singh A, Uijtdewilligen L, Twisk JW, Van Mechelen W, Chinapaw MJ (2012) Physical activity and performance at school: A systematic review of the literature including a methodological quality assessment; 8(1):23-2
- Slavin, R., 1987. "Grouping for Instruction in the elementary School." Educational Psychologist; 21 (2), pp. 109-127.
- Tyagi, V. & Pandey, N. (2016). A Study of Relationship between Achievement Motivation, Self-concept and Achievement in English and Mathematics at Secondary Level. International Education Studies, 4(3),72-78
- Tyagi, V. and Pandey, N. (2016). Inter-Relation Between Well-Being and Adjustment: Among Adolescents. Indian Journal of Psychological Science; 6(1), 141-146.
- Van de Mortel TF et al. (2008) Faking it: social desirability response bias in self-report research. Journal on Advancing Nursing; 25 (4):40-41
- Van-Valen I., (1974). Brain size and intelligence in man. American Journal of physical Anthropology. 40 (1). Pp. 417- 424.
- Walberg, H.J., (2007). A psychological theory of

- educational productivity. *Psychological and Education Chicago: National Society for the Study of Education.* 48 (2) Pp 81-110.
- Walberg, H. J., Fraser, B. J., & Welch, W. W. (1986). A test of a model of educational productivity among senior high school students. *Journal of Educational Research,* 79, 133-139.
- Wang MC., Haertel, GD., Walberg, HJ., (2004). Toward a knowledge base for school learning. *Review of Educational Research;* 63: pp. 249-294.
- Weiss A, Bates TC., Luciano M (2008). Happiness is a personal(ity) thing: the genetics of personality and well-being in a representative sample. *Journal of Psychological Science;* 19 (1):205–210.
- Willson, J., (1999). "High and low achievers' classroom interaction patterns in an upper preparatory classroom". Paper presented at the AARE Conference, Melbourne, Australia, 1999 (12): 29–2
- WolfH., Kruger F., Hansel A., Wahlund LO., Aren't T., and Gert HJ. (2018). The relationship between head size and intracranial volume in elderly subjects. *Brain Reser;* 973:pp 74-80.
- Zorzi M. et al. Nature. 2012. Brain damage: neglect disrupts the mental number line