WEST VISAYAS STATE UNIVERSITY COLLEGE OF EDUCATION GRADUATE SCHOOL

Iloilo City

BRAIN-BASED STRATEGIC INTERVENTION MATERIAL (BSIM) FOR INTEGERS

A Thesis Presented to the
Faculty of the Graduate School
College of Education
West Visayas State University
La Paz, Iloilo City

In Partial Fulfilment
of the Requirements for the Degree
Master of Arts in Education
(Mathematics)

by

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Abstract

This design research aimed to develop a Brain-Based Strategic Intervention Material (BSIM) for Integers as a tool for remediation, particularly in Numbers and Number Sense. The respondents of this study were one section of 36 grade seven learners of Lezo Integrated School, four grade seven learners for the interview, and four experts for the evaluation of the acceptability of the BSIM. The data gathering instruments were the pilot testing tool, evaluation rating sheets for the quality assurance of print learning materials, and interview guide. Data analysis techniques employed were frequency count, percentage, mean, and thematic analysis. From a survey that was conducted by the Schools Division of Aklan on the identification of the least learned competencies in grade seven mathematics, from a total of fifteen learning competencies, six of those were considered least learned competency. From this, the topmost least learned competency which is to perform fundamental operations on integers was considered in the study. Reasons for such difficulty included the confusion of learners with the signs and grouping symbols. In response to this concern, a BSIM integrating the distinct features of Tom Lavella's Brain-based Learning and Teaching Strategies composed of title card, guide card, activity card, assessment card, enrichment card, reference card and answer card was developed. As to the overall

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acceptability of the strategic intervention material in terms of its content, language and layout and format, the experts agreed that the BSIM is highly acceptable. The BSIM met and complied with the standards set by DepEd on Locally Developed Material. The learners and teachers find the BSIM as unique and innovative, simple and direct, and effective for remediation making it a great remediating tool for learners experiencing difficulties in performing operation of integers. It is recommended that BSIM be used in Grade 7 mathematics as an alternative material for remediation.

Keywords: 21st century, brain-based, strategic intervention material, least learned competency, integers.

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References

- Ahmed, K.(2022). *The Importance of Music in School: Why Music Education Matters.*https://stagemusiccenter.com/music-school-blog-winchester-acton-ma/2022/8/7/the-importance-of-music-in-school-why-music-education-matters
- Ali, B. H. I., & Bardaie, N. I. (2023). Utilization of humor and application of learning theory: Perspective of nursing students. *Nurse education today, 126,* 105837. https://doi.org/10.1016/j.nedt.2023.105837
- Alova, C. & ALova, I. (2022). Performance of Grade 8 Students in Mathematics

 Intervention Program. *International Journal of Multidisciplinary Applied Business*and Education Research, 9(9):1742-1748. DOI:10.11594/ijmaber.03.09.14.

 https://www.researchgate.net/publication/363562393_Performance_of_Grade_8

 _Students_in_Mathematics_Intervention_Program
- Amarilla, Junnel B. (2020). How spiral is the spiral progression in mathematics?

 https://www.researchgate.net/profile/JunnelAmarilla/publication/363566254_How_spiral_is_the_spiral_progression_in_mathematics/links/6322c74f071ea12e363490ab/How-spiral-is-the-spiral-progression-in-mathematics.pdf
- An, Song, Capraro, M., & Tillman, D. (2013). Elementary Teachers Integrate Music

 Activities into Regular Mathematics Lessons: Effects on Students' Mathematical

 Abilities. *Journal for Learning through the Arts, 9.*https://files.eric.ed.gov/fulltext/EJ1018326.pdf

GRADUATE SCHOOL

Iloilo City

- Anglia, N. (2020). *The Importance of Music in Education*.

 https://www.nordangliaeducation.com/news/2020/07/06/the-importance-of-music-in-education
- Arpilleda, A. J. (2021). Strategic Intervention Material: A Tool in Enhancing Grade Nine

 Students' Mathematical Performance. *International Journal of Research Studies in Education 10(*5). DOI:10.5861/ijrse.2021.5051.

 https://www.researchgate.net/publication/348815824_Strategic_intervention_ma

 terial_A tool in enhancing grade nine students' mathematical performance
- Arun, M., & Singarevelu, M (2018). Brain-based Learning: A Tool for Meaningful

 Learning in the Classroom. *International Journal of Research*, 7(9).

 https://www.brain-based-learning-theories-tool-meaningful/ Budiyono
- Bundang, M. (2022). *Teacher-made Strategic Intervention Materials for Students with Learning Diificulties in Mathematics 8 in the Philippines.*https://uijir.com/teacher-made-strategic-intervention-materials-for-students-with-learning-difficulties-in-mathematics-8-in-the-philippines/
- Brawner, F. G. (2011). *Mathematics Framework for Philippine Basic Education*. https://www.sei.dost.gov.ph/images/downloads/publ/sei_mathbasic.pdf
- Cepeda, M. E. B. (2023). An Instructional Package in Estruktura ng Wikang Filipino:

 Development and Evaluation. *International Journal of Innovation Scientific*Research and Review, 05(1), 3965-3971.
 - http://www.journalijisr.com/sites/default/files/issues-pdf/IJISRR-1132.pdf

GRADUATE SCHOOL

Iloilo City

- Cordova, R. C., Medina, J., Ramos, T., & Alejo, A. (2019). Effectiveness of

 Competency-Based Strategic Intervention Materials in English 7. *DLSU Research Congress 2019* De La Salle University, Manila, Philippines.

 https://www.dlsu.edu.ph/wp-content/uploads/pdf/conferences/research
 congress-proceedings/2019/lli-II-019.pdf
- Duman, B. (2010). The Effects of Brain-Based Learning on the Academic Achievement of Students with Different Learning Styles. *Educational Sciences Theory & Practice,*10(4). https://files.eric.ed.gov/fulltext/EJ919873.pdf
- Ereño, R. E. (2022) Reflections on the Least Learned Competencies in Mathematics. https://uijrt.com/articles/v3/i8/UIJRTV3I80023.pdf
- Hariyanto, B. (2022) 4D Model Learning Device Development Method of the Physical

 Geography Field Work Guidance Book. https://www.matec
 conferences.org/articles/matecconf/pdf/2022/19/matecconf_icst2022_05008.pdf
- Hernandez, C., Guiang, E., & Jornales, L. (2019). Effectiveness Using Strategic

 Intervention Material (SIM) in Teaching Mathematics for the Selected Grade Five

 Pupils of David P. Jimenez Elementary School. *Ascendens Asia Journal of Multidisciplinary Research, 3*(2B).
- Jazeel, A. M. (2016). Brain Based Learning Strategy: A New Paradigm in Learning

 Teaching Process. *Conference: Interantional Conference on Health Indicators for Physical and Cognitive Fitness EducationAt: Alagappa university, India, 11.*https://www.researchgate.net/publication/310111730_BRAIN_BASED_LEARNING

 _STRATEGY_A_NEW_PARADIGM_IN_LEARNING_TEACHING_PROCESS

GRADUATE SCHOOL

Iloilo City

- Kane, T. M. (2013). *Brain-based Learning Theories*. https://www.pearsoned.com/brain-based-learning-theories-from-the-journal-of-dynamic-teaching/
- Kleinjan, D. (2020). Movement Matters: The Importance of Incorporating Movement in the Classroom. *Northwestern College Master's Theses and Capstone Projects*. https://nwcommons.nwciowa.edu/cgi/viewcontent.cgi?article=1209&context=education_masters
- Lai, E. R. (2011). Critical Thinking: A Literature Review. *Pearson's Research Reports*.

 https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=b42cffa5a2ad
 63a31fcf99869e7cb8ef72b44374
- Manlangit, Pierce (2020). Nanay, Handa Na Ba Kayong Maging Tagapagdaloy?

 Supercharging Filipino Parents is Key for Successful Modular Distance Learning.

 https://www.flipscience.ph/news/features-news/tagapagdaloy-modular-distance-learning/
- Mario, M. (2022 August 23). *Five Ways to Create a Stimulating Classroom Environment.*https://blog.pearsoninternationalschools.com/five-ways-to-create-a-stimulating-classroom-environment/
- Martin, A. (2020, August 21). *The Importance of Music Education in Schools*.

 https://www.graduateprogram.org/2020/08/the-importance-of-music-education-in-schools/

GRADUATE SCHOOL

Iloilo City

- Martinez, E. (2020, March 19). *Pandemic Shakes Up World's Education Systems*.

 https://www.hrw.org/news/2020/03/19/pandemic-shakes-worlds-education-systems
- Nabayra, J. N. (2019). E-Module as a Tool for Flipped Classroom. *Journal of Science Teachers and Educators, 2020.* https://nosteonline.org/wp-content/uploads/2020/10/01-Nabayra-For-Final-Publication.pdf
- Noureen, G., Awan, R., & Fatima, H. (2018). Effect of Brain-based Learning on Academic Achievement of VII Graders in Mathematics. *Journal of Elementary Education,* 27(2) 85-97.
- Quigley, E. (2019). *ADDIE: 5 Steps to Effective Training.*https://www.learnupon.com/blog/addie-5-steps/
- Shukla, A. (2020). *Brain-Based Learning: Theory, Strategies, And Concepts.*https://cognitiontoday.com/brain-based-learning-theory-strategies-and-concepts/
- Rahmatsyah, S., & Dwiningsih, K. (2021). Development of Interactive E-Module on The Periodic System Materials as an Online Learning Media. *Jurnal Penelitian Pendidikan IPA, 7(2),* 255-261.
 - https://www.researchgate.net/publication/351026926_Development_of_Interactive_EModule_on_The_Periodic_System_Materials_as_an_Online_Learning_Media
- Resurreccion, J., Taala, W., & Adanza, J. (2015). Spiral Progression Approach in

 Teaching Science in Selected Private and Public Schools in Cavite. *International Conference on Research in Social Sciences, Humanities and Education (SSHE-*

GRADUATE SCHOOL

Iloilo City

- 2016). https://www.dlsu.edu.ph/wp-content/uploads/pdf/conferences/research-congress-proceedings/2015
- Schmelzer, Gretchen (2015). *Understanding Learning and Memory: The Neuroscience of Repetition*. Retrieved August 11, 2023, from http://gretchenschmelzer.com/blog-1/2015/1/11/understanding-learning-and-memory-the-neuroscience-of-repetition
- Sinco, Marian Grace M. (2018) Strategic Intervention Materials: A Tool in
- Improving Students' Academic Performance. Retrieved July 28, 2023, from https://www.researchgate.net/publication/341778627_Strategic_Intervention_Materials_A_Tool_in_Improving_Students' Academic Performance
- Slamet, Isnandar (2021). *Development of Mathematics Module Based on Meaningful Learning.* Retrieved January 30, 2023, from https://aip.scitation.org/doi/10.1063/5.0043239
- Solvberg, A. & Rismark, M. (2023). Student Collaboration in Student Active Learning.

 *Proceedings of The International Conference on Future of Teaching and Education 2(1):74-8. DOI:10.33422/icfte.v2i1.73
- Strean, William B. (2011). *C*reating Student Engagement? HMM: Teaching and Learning with Humor, Music, and Movement. *Creative Education 2(3):189-192*.

 DOI:10.4236/ce.2011.23026
- Sumaoang, J. D. (2020). *The Implementation of Modular Distance Learning in the Philippine Secondary Public Schools*. https://www.dpublication.com/wp-content/uploads/2020/11/27-427.pdf

GRADUATE SCHOOL

Iloilo City

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- Swan, M. (2019). What is Brain-Based Learning?
 - https://www.classcraft.com/resources/blog/what-is-brain-based-learning/
- Tambong, C. F. (2023). Remediating Strategic Intervention Material (RSIM) for Statistics and Probability.
- Tazkiya, F. (2023). The Importance of Mastering Mathematical Concepts in Solving

 Mathematical Problems in Elementary Schools.

https://www.researchgate.net/publication/372507370_THE_IMPORTANCE_OF_M
ASTERING_MATHEMATICAL_CONCEPTS_IN_SOLVING_MATHEMATICAL_PROBLE
MS_IN_ELEMENTARY_SCHOOLS

the digiteachers.com (n.d.) Brain-Based Learning & Cognitive Development – How can it be used in the classroom? https://www.thedigiteachers.com/brain-based-learning-cognitive-development-in-the-classroom/

- Tibon, J. P. (2020). *The New Normal in Basic Education*.

 https://www.conventuslaw.com/report/philippines-the-new-normal-in-basic-education/
- Torres, R. C. (2020). Teaching Mathematics through Game-Play: Elementary Teachers'

 Pedagogical Practices and Perceptions of Integrating Computer Games in the

 Classroom.https://www.researchgate.net/publication/359402219_Teaching_Math

 ematics_through_GamePlay_Elementary_Teachers'_Pedagogical_Practices_and_

 Perceptions_of_Integrating_Computer_Games_in_the_Classroom

GRADUATE SCHOOL

Iloilo City

- Torio, Von Anthony Gayas (2015). Whole Brain Teaching in The Philippines: Teaching

 Strategy for Addressing Motivation and Academic Performance.

 https://www.researchgate.net/publication/283619226_Whole_brain_teacahing_in

 _the_Philippines_Teaching_strategy_for_addressing_motivation_and_academic_

 performance
- Tompkins, A. W. (2007). *Brain-Based Learning Theory: An Online Course Design Model*. https://core.ac.uk/download/pdf/58825022.pdf
- Vergara, A. (2017). Development, Effectiveness and Acceptability of Module for the

 Problem Solving and Critical Thinking Skills of Alternative Learning System In

 District Of Tanay II.

 https://www.researchgate.net/publication/329771095_DEVELOPMENT_OF_MOD

 ULE
- Wolken, Aleen S. (2017). *Brain-Based Learning and Whole Brain Teaching Methods*.

 https://nwcommons.nwciowa.edu/cgi/viewcontent.cgi?article=1046&context=education_masters