# The Future of Integrating ICT in Mathematics

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**Abstract**

*This paper showcases two Intel Teach portfolios entitled* ***Maranao Craft and Mathematics*** *and* ***Math Meets Music.*** *Computers and graphics calculators are the tools used in designing interactive activities in the class. With technology, the students expand their creativity in applying content in mathematics. Under the project, students (1) made generalizations on the effects of the graph and applied translation concepts in graphing functions such as linear, polynomial, exponential, logarithmic and trigonometric functions; (2) wrote journals on their learning experiences and on how to relate mathematics to the real world; and (3) worked collaboratively to present results of research work through a multimedia presentation. Their journals and multimedia presentations were evaluated using rubrics. In Math Meets Music unit plan, students realized mathematics concepts behind different musical instruments as shown in their journals and multimedia projects.*

*Technology-enhanced unit plans connect mathematics to other disciplines such as arts, research, history, culture, and music. Integrating technology in the classroom then ensures the best teaching and learning experience.*

Keywords: Maranao Craft, Mathematics, Intel Teach Portfolio, Math and Music

AMELIA T. BUAN is presently an Assistant Professor at the Mindanao State University-Iligan Institute of Technology. She obtained her Master of Arts in Mathematics Education degree from the same university. She was a RECSAM scholar for Computer-based Learning Course in Malaysia in 1997. Ms. Buan has actively served as a resource speaker in various forums and conferences, including the National Forum for School Heads on Technology Use in the Classroom; SEAMEO-UNESCO Education Congress and Expo in Thailand; Intel Teach to the Future National Conference on Best Practices in Teaching and Learning Science and Mathematics; and National Forum on Teaching with ICT. She is involved in the development of Enhancement Modules in Secondary Mathematics I-IV for Mindanao. This paper was presented during the 9th SEAMEO INNOTECH INTERNATIONAL CONFERENCE at UP Diliman, Quezon City, December 8-10, 2004.

## Introduction

The Intel Teach to the Future Program is a worldwide initiative designed to help in-service and pre-service teachers integrate technology into their classrooms and enhance student learning. It is intended to move teachers beyond the task of learning how to use computers and help them think about how technology can be used to support student-centered, inquiry-driven teaching and learning activities.

This paper showcases Intel Teach portfolios entitled ***Maranao Craft and Mathematics*** and ***Math Meets Music***. Computers and graphics calculators were used in designing interactive activities in class. With technology, the students expanded their creativity in applying content in mathematics. The students made generalizations on the effects of the graph and applied translation concepts in graphing linear, polynomial, exponential, logarithmic and trigonometric functions. Students wrote journals on their learning experiences and on how they related mathematics to the real world. Students worked collaboratively in groups of five and presented their research work through a multimedia presentation. Their journals and multimedia presentations were evaluated using rubrics.

## Results and Discussion

### *A. Maranao Craft and Mathematics*

This unit covers the topic on geometric transformations. Transformation concepts were discussed in graphing functions. In this unit and after students learned basic transformation concepts they related these to real life situations by filling out a journal and doing research on the mathematical transformations used in Maranao crafts. Their work included famous Muslim mathematicians and their contributions to mathematics.

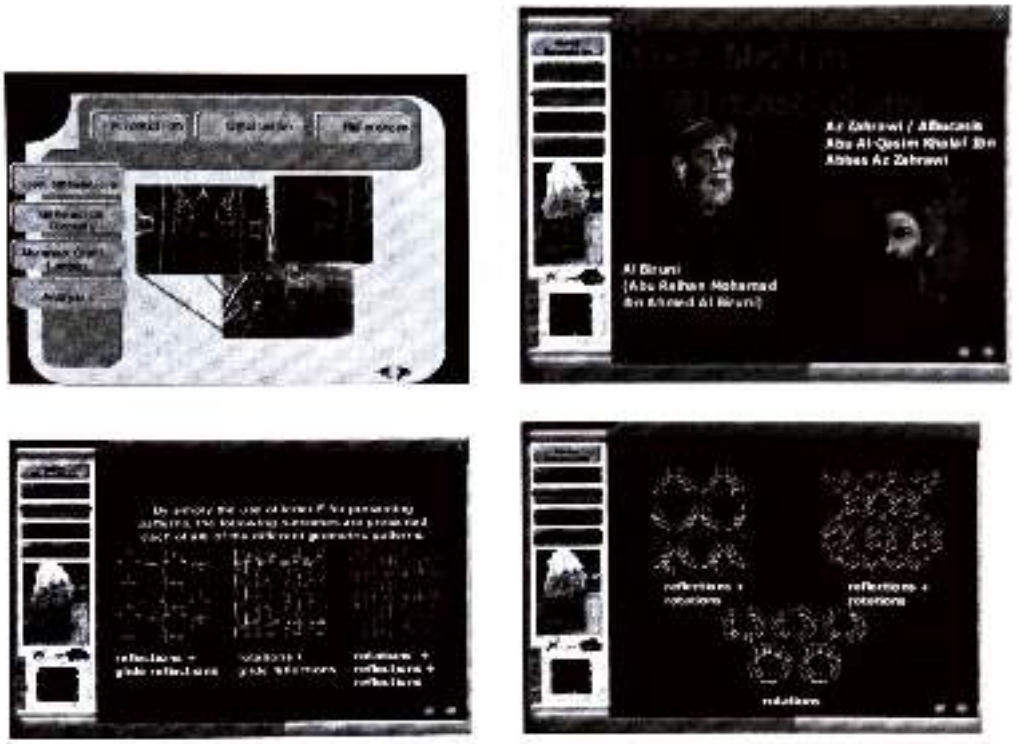
This plan connects mathematics to Maranao culture and history to improve students' appreciation of the local craft in Lanao del Norte, specifically the Maranao Craft. The presentation of the students also

shows suggested variations of the Maranao design as application of the transformation concepts they learned.

## Students' Sample Outputs

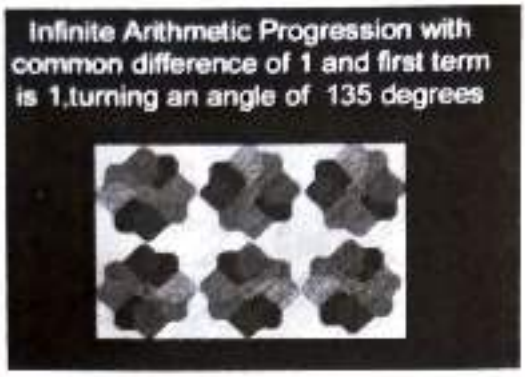
### Multimedia Presentations

The students submitted multimedia presentations on their research. The content discussed the different transformation concepts found in their craft and presented a famous mathematician and his/her contribution to mathematics. The students also made suggestions on design using geometric transformation.

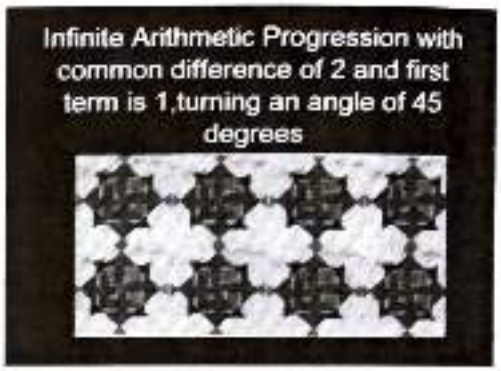


Sample slides on the outputs of the students

A student submitted a multimedia presentation on the result of her investigation on the use of arithmetic sequence in creating designs






Sample Design Using Arithmetic Sequence by Nova Xelina Guerrero

Journals

The students wrote journals on the topic "Is there Math in Maranao Craft?"

***Journal Written by Princess Pundogar***

*Here in Mindanao, the native Muslims called Maranao create a special kind of cloth distinguished by its rectangular shape. This craft is called "landap". It is made of interlaced threads called "sutra" and embroidered with the colorful designs called "langkit." The* **landap** *design shows a lot of mathematical concepts such as the concept of*

*transformation, which is described as a change of mode or position of an object. There are four types of transformation inscribed in the design of* ***landap****, namely reflection, translation, dilation and rotation. In reflection, the design is reflected from an original design in reverse orientation. In translation, the design is repeated vertically or horizontally, with no changes in size and shape. As for dilation, the design is transformed to a design similar to the original, but is enlarged. And finally for the rotation, the design is turned in quarter (90°), half (180°) and complete (360°) rotation.*

*Mathematics is therefore not only a fundamental knowledge in itself but also the basis of works of art.*

**Journal Written by Karen Kirsty Villamor**

*Anybody looking at a Muslim craft would easily understand the design if he/she thinks mathematically, and thus realize that a simple drawing could be a huge product of creativity. There is surely Math in Muslim craft whose styles and patterns may look uniform but in fact are unique in every portion of the pattern.*

*Symmetry, tessellation, reflection and repetition -- each has a different meaning that would explain the art in these crafts. Principles of geometry are especially at work here. The patterns have an organization that makes them very distinctive.*

*I believe Mathematics is the language of creativity, explaining every wonderful creation.*

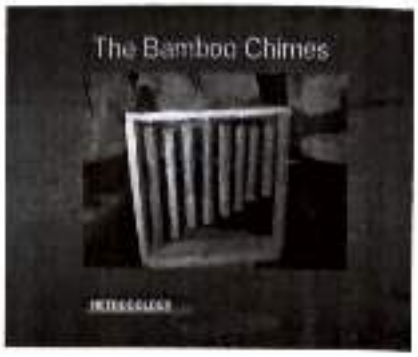
***B.*** **Math Meets Music**

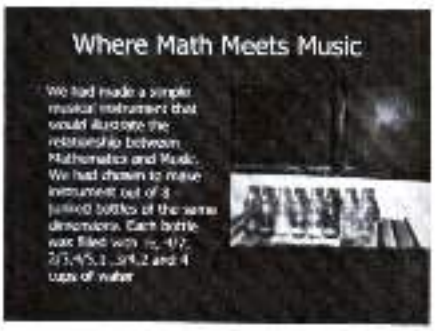
This unit covers the topic on trigonometric function, its graph and application. An interactive activity on Trigonometry Walk was conducted to relate the trigonometric function to the real- world. Graphing calculators were used to explore the graphs of the trigonometric functions. In graphing, applications of the sine and cosine curves were considered. To have an appreciation of mathematics, the students were asked to innovate musical instruments and look for the connection of mathematics to the instruments. Rubrics were used in evaluating their musical instrument and multimedia presentation.

*Students' Sample Outputs:*

Multimedia Presentations

With the use of Internet resources, the students realized the importance of mathematics concepts in music. The students submitted a multimedia presentation on the instruments they created. They played the instrument and discussed the math concept found.



## Conclusion

Students realized that geometric transformations were used in Maranao craft and that behind different music instruments lay mathematics concepts, as shown in their journals and multimedia projects.

With the use of technology in the math classroom, I was convinced that my students were more engaged and active in the learning process, produced very creative work and enjoyed working collaboratively.

Technology-enhanced unit plans connect mathematics to other disciplines such as arts, research, history, culture, and music. Integrating technology in the classroom then ensures the best teaching and learning experience.

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