

RESEARCH STATEMENT

Original Creative Work

Citation: Noel Patson, Recorded or Rendered Work, Web Exhibition, *The Relationship of Sine and Cosine to the Unit Circle*, Wolfram Mathematica.

<http://demonstrations.wolfram.com/RelationshipOfSineAndCosineToTheUnitCircle/>

Research Background

The demonstration is an interactive learning tool to help students understand the connection between the sine and cosine ratios and the circumference of a unit circle. This method of teaching trigonometry has been validated in the following study:

<http://staff.edfac.unimelb.edu.au/~kayecs/publications/1997/KendalStacey-Trig.pdf>

Research Contribution

- Innovation – Previously teaching trigonometry using the unit circle approach required the use of a mechanical device called a trigmaster*. The mathematica demonstration simulates this device on a computer. In addition, the demonstration shows the functional representations of the trigonometric functions.

* Willis, G. (1966). Trigonometry, a new approach and trigmaster dial calculator. *Vinculum*, 3(2), 4-8.

Research Significance

The demonstration has been through a rigorous review process†.

† <http://demonstrations.wolfram.com/FAQ.html>

The demonstration has been referenced in the following 9 websites from these countries; USA, China, Taiwan, Czech Republic and Brazil.

<http://www.hippasus.com/rrpweblog/archives/000031.html>

<http://jennyyau.org/calculus.html>

<http://www.seymour.k12.wi.us/faculty/tswan/Notes%20Friday%20December%2011%201st%20hour.pdf>

<http://www.mathematica.ch/dmug-archive/2007/msg00119.html>

<http://www.simpv.com/user/alfonsoreyes/tag/trigonometry>

<http://openeducationalresourcesandanalysis.blogspot.com/2008/02/signals-and-systems-references.html>

<http://www.bgv.cz/predmety/matematika/>

<http://blog.tpsh.tp.edu.tw/blog/resource/68/1184>

<http://portal.doprofessor.mec.gov.br/fichaTecnica.html?id=13911>

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ACQUIRE - Central Queensland University Institutional Repository <http://acquire.cqu.edu.au>