

## Bringing the World into Our Math Classrooms

By Randy Schwartz, Dept. of Mathematics

The extent to which “mathematics is the same everywhere”, regardless of nation, was starkly illustrated to me a few months ago. My twin brother Rick, returning from a Sierra Club trek through Nepal, mailed me some of his photos. One showed a remote little schoolhouse in the Himalayas, built out of flagstones and corrugated tin. Inside, amidst the exotic Nepalese script on a slate chalkboard before sparse wooden benches, I could recognize a familiar equation

$$(a+b+c)(a-b+c) = (a+c)^2 - b^2$$

But while algebra and the other *languages* of mathematics might be inherently international, the *human enterprises* from which mathematics arises or to which it is directed are rich in national texture, i.e., they vary from country to country. There is, then, a sense in which mathematics educators face a choice as to whether to bring “the rest of the world” into their classrooms. Here, I hope to provide a brief glimpse at what this might mean.

### Where on Earth Does Mathematics Come From?

Mathematics is rooted in the culture and creativity of people involved in productive efforts all over the world. Our students are often surprised to learn, for instance, that:

- The “Pythagorean Theorem” was proven and put to work in surveying and astronomy in ancient China, before Pythagoras was even born.
- A papyrus manuscript contains evidence that the pyramid-builders of ancient Egypt used the same method of calculating the volume of a truncated pyramid that Archimedes used hundreds of years later.
- What we call Pascal’s Triangle was used by Chinese mathematicians to solve high-order equations some 350 years before it was “discovered” by Blaise Pascal in 17th Century France.

Two of the best sources for such information are books by Marcia Ascher, *Ethnomathematics: A Multicultural View of Mathematical Ideas* (Brooks/Cole 1991) and by George Gheverghese Joseph, *The Crest of the Peacock: Non-European Roots of Mathematics* (Penguin Books, 1991). Such works challenge the *Eurocentric* tradition, which holds that most noteworthy mathematics developed historically in Greece and other European nations.

I wrote to George Gheverghese Joseph this past January when a Schoolcraft student was using my copy of his book to write an article on Egyptian mathematics. Dr. Joseph, originally from the state of Kerala in India, is Senior Lecturer in Economics and Social Statistics at the University of Manchester, UK. I observed that his book was not widely available in college libraries. He wrote back to me, in part:

"It is good to hear that students are being exposed to alternative versions of math history. I must confess that it does not surprise me that the book is not to be found at campus libraries. Some of the points made in the book have not met with universal acclaim! However, I would prefer lively debate to silence! It has been a source of great satisfaction that in a small way my book helps contribute to the excavation of history that has been neglected for so long."

On the Internet, there is an Ethnomathematic Bibliography (<http://cs.beloit.edu/>-

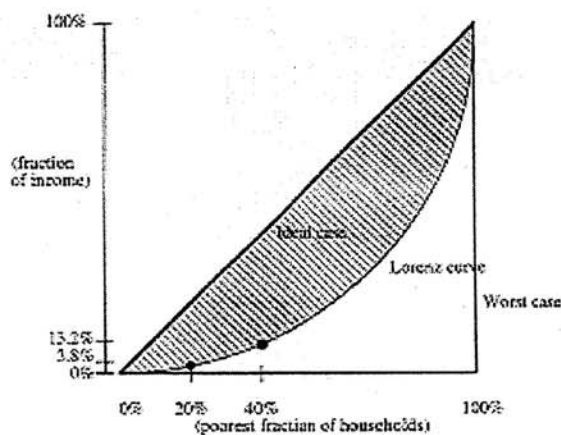
[havey/M103/EthnoMath%20Bibliography.html](http://havey/M103/EthnoMath%20Bibliography.html)) which currently lists over 500 scholarly books and articles.

### A Universal Measure of Inequality

Can mathematics be used to compare different countries and peoples? Here is an example taught by at least three Schoolcraft instructors: by myself in Linear Algebra, by Ed Segowski in Calculus, and by Cedric Howie in Economics.

In the United States, according to 1992 census figures, the poorest 20% of households in the country earn, all together, only 3.8% of the country's yearly aggregate income. The poorest 40% earn 13.2% of the income, etc.

We can plot such figures as a



series of points on a graph, with the population fraction indicated on the horizontal scale, and the corresponding income fraction on the vertical scale.

Linear algebra and/or statistical regression can be used to find a smooth curve that fits these points well. Such a curve, the **Lorenz curve**, varies from country to country and from year to year.

In the ideal case of uniform income distribution (all households equally wealthy), the Lorenz curve would be a straight line, as indicated in the figure. To measure how far a given Lorenz curve is from this ideal, geometry or calculus can be used to estimate the area of the region (shaded in the figure) that separates the two curves. The ratio of this area to that of the entire triangle of which it is a part is called the **Gini Index of Inequality**. The Gini index is always some fraction between 0, representing the ideal, and 1, representing the worst case, in which all income goes to one household!

The Gini Index can be used, to compare the equitability with which various national economies distribute their resources. The Gini Index in the U.S. stands at about 0.41, while in Nepal and other Third World countries, it tends to

be much worse. By studying the Gini Index, we learn that *a typical characteristic of impoverished nations is that they exhibit gaping extremes of wealth and poverty*. In fact, it was from the impoverished villages of Nepal, outside the capital of Katmandu, that a revolutionary war was launched in February 1996 that continues today.

Students are often intrigued by these international comparisons. It isn't hard to use this topic to spark lively classroom discussion. A challenging question to pose is, "How would you predict that the Gini Index for the world as a whole compares with that for a single country (like the U.S. or Nepal)?" And, "What is it about the global economy that makes the nations of the West so much wealthier than those of Asia, Africa and Latin America?"

For other ways to use math to compare different nations and economies, see the book *Multicultural Mathematics* (Oxford, 1993) by David Nelson, George Gheverghese Joseph, and Julian Williams.

## A Passport to Understand the World

Mathematics has ways of opening a window to a country, even one that lies on the other side of the globe. That can be captivating if the country happens to be in the news.

To get a feel for this, consider a few questions that I have written in years past and used in my classes, either in presentations or on exams:

- On the Chiling Peoples' Commune, a huge rice crop must be harvested quickly before it spoils in the fields. One production brigade can harvest the rice in 15 days. A second, larger production

brigade working alone can harvest the crop in 10 days. How long would the harvest take if the two brigades worked together? (Disregard the increased enthusiasm resulting from cooperation.)

- In May 1983, the South African government reported that the average monthly wage paid to mineworkers in various ethnic groups was \$260 (African), \$1395 (White), \$430 (Coloured), and \$690 (Indian). The number of mineworkers employed from these groups was 613,452 (African), 78,020 (White), 9,581 (Coloured), and 659 (Indian). Calculate the weighted mean monthly wage for the mineworkers. How much higher is the White wage than the mean wage?
- Some observers claim that the Palestinian uprising (Intifada) is led by militant Islamic sheiks who, in their Friday sermons rouse the people to pour into the streets and confront Israeli soldiers. According to this hypothesis there should, for example, be significantly higher than average casualty rates on Fridays. The number of Palestinians killed by Israeli forces, by day of the week, between Dec. 1987 and Oct. 1988 is as follows: Monday, 39; Tuesday, 33; Wednesday, 52; Thursday, 34; Friday, 39; Saturday, 37; and Sunday, 35. Determine whether we can be 95% confident that the distribution in number of deaths is non-uniform across the days of the week.

Reading these questions, I hope you get the sense that bringing the world into our classrooms can make our teaching more interesting and exciting, but also that it keeps us on our toes! The international situation, and our own views toward it, are in a state of constant flux.



*"An investment group from Tokyo is here. To me it looks like a hostile takeover."*

# NUR 111 – Fundamentals of Nursing

N. Palmer

Cultural diversity and/or cultural assimilation are ongoing realities in our world. Nurses must be prepared to work with colleagues and clients of many diverse cultural and ethnic backgrounds.

The holistic approach to client care demands awareness of the impact of both the caregiver's and the recipient's cultural and ethnic biases as they interface in the care setting. Nurses address universal spiritual care needs. Cultural values and ethical expectations vary and are explored for impact on an individual's health care. The understanding of communication patterns is critical to the nurse-client professional relationship. Nurses must be aware of genetic tendencies of various ethnic groups. Cultural dietary preferences must be understood as they relate to health care. Cultural expectations vary greatly with respect to care of the elderly.

The health care industry is undergoing its own Cultural Revolution. The nursing profession is changing to meet both current and future health care needs. Nursing students must be socialized into the nursing subculture of medicine. Further subculturation is explored in the obstetrics, pediatric, psychiatric, or medical-surgical sub-specialty rotations.

Health care is a universal concept implemented with cultural influences.

## International Marketing Humor

Marji Czajka

Here are some mistakes made by marketers who tried to promote and sell their products internationally.

From "American Demographics" magazine:

Here is a look at how shrewd American business people translate their slogans in to foreign languages:

When Braniff translated a slogan touting its upholstery, "Fly in Leather," it came out in Spanish as "Fly Naked."

Coors put its slogan, "Turn it Loose," into Spanish, where it was read as "Suffer From Diarrhea."

The Chevy Nova never sold well in Spanish speaking countries. "No Va" means "It Does Not Go" in Spanish.

When Pepsi started marketing its products in China a few years back, it translated its slogan, "Pepsi Brings You Back to Life" pretty literally. The slogan in Chinese really meant, "Pepsi Brings Your Ancestors Back From the Grave."

When Coca-Cola first shipped to China, it named the product something that when pronounced sounded like Coca-Cola." The only problem was that the characters used meant, "Bite The Wax Tadpole." It later changed to a set of characters that mean "Happiness In The Mouth."

When Gerber first started selling baby food in Africa, they used the same packaging as here in the USA – with the cute baby on the label. Later it was found that in Africa companies routinely put pictures on the label of what is inside since most people cannot read.

## Celebrating Black History Month

By Yolanda Tremble-Matthews

Have you heard about the new and exciting accomplishments that the Schoolcraft African-American Club (AAC) has been achieving? If not, then you should follow Oprah's advice and "Get with the Program".

On February 26, 1997 the AAC inaugurated the first Black History Month Celebration: Past, Present, and Future at Schoolcraft College. The distinguished guest speakers were WGPR 107.5 Radio Personality Dawn Moore and History Professor DeWitt Dykes from Oakland University. Among the many topics discussed at the celebration, were Mentoring and Careers and the Origin of the Human Race, both of which enlightened and broadened the minds of all that attended.

Dawn Moore's presentation focused on the importance of having a mentor in determining a career path and how she has kept her 19 year longevity in the broadcast industry. She attributed her success to her spiritual foundation, her education and the strong teaching of her grandmother.

Professor Dykes presented a program on African-American history leading back to 6000 BC. He spoke about Africa being the birthplace of the human race and how according to historians, the scientific methods of modern technology such as DNA testing and the most recent burial findings located in Africa, suggest that all mankind are descendants of the African Continent. Keeping this in mind, Dykes stated that we should all look at each other as brothers and sisters – different nationalities, but all one race.

This event and many other upcoming lectures and social gatherings are just a taste of what the African-American Club can contribute to the learning process at Schoolcraft College.

The executive board for 1997/98 will be electing new officers in the fall for the upcoming school year. If you want to polish your leadership skills and become a well-rounded individual, then take that first step and "Get with the program" – join the African-American Club. The African-American Club is open to everyone.

# English 243 – Introduction to Literature: Short fiction

Sumita M. Chaudhery

In this course, the global agenda, is dispersed randomly through the study of various elements of fiction as well as through a historical perspective. For example, students understand the definition and evolution of the modern short story form by reading a Panchatantra tale from India, followed by one of Aesop's fables. Likewise, the Spanish picaresque tale is discussed to understand an aspect of characterization. Through a historical perspective students become aware of the meaning of the modern short story and gain an understanding of the styles and cultural context of authors such as Guy de Maupassant (France), James Joyce (Ireland), Anton Chekhov and Leo Tolstoy (Russia), Franz Kafka (Germany), Yasunari Kawabata (Japan), V. S. Naipaul (Trinidad), Nadine Gordimer and Chinua Achebe (Africa) among others.

By the end of the course, students have enhanced awareness of global literature in general and of literary authors who hail from and write about specific regions or cultures.



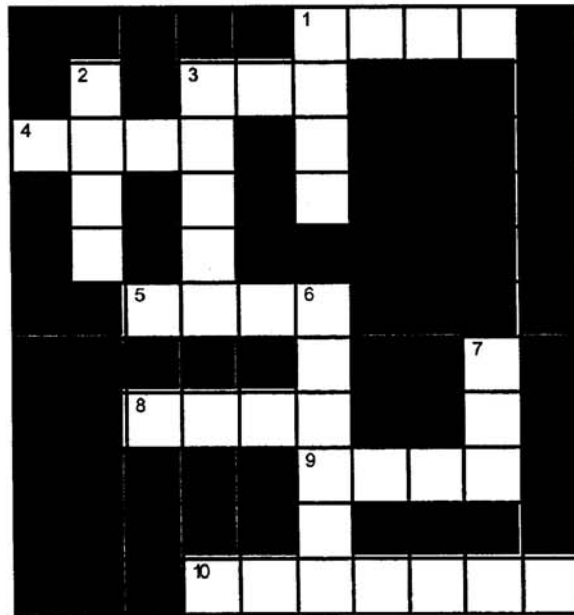
International Focus  
 Editor, The International Agenda

ACROSS

1. Ireland, poetically
3. America's "Uncle"
4. Title for Agatha Christie
5. Norwegian city
8. Breton or Highland Scot
9. Prince Charles's sister
10. Ancient Egyptian title

DOWN

1. Islamic prince
2. Hindu gentleman
3. Slaves in the Middle Ages
6. Canadian city
7. Pub drink



Apr 8, 1997

## International Teaching Experiences

By Steve Schewe

My wife, Nancy, teaches ESL (English as a Second language). She was offered a job teaching in Kuala Lumpur, Malaysia for the academic year 1985-6 with a consortium of Big Ten universities called MUSCIA. The government of Malaysia has the ambitious plan of educating all Malay nationals with a 4-year degree at taxpayer expense. It has the strange(?) idea that a highly educated population will be able to compete in this complex, technological world in which we live. It spends more money on education than it does on national defense! Almost the same as the USA, right? MUSCIA paid for storing our furniture, flying the four of us to and from

Malaysia (our kids were 12 and 14 at the time), our housing in Malaysia, our kids' school costs (at the International School of Kuala Lumpur-ISKL) plus a good salary. We rented our house in Ann Arbor to three female nurses who took good care of it. One got married and one got engaged while living there and said their friends wanted to rent such a good luck house, too.

I was teaching Automechanics at the time, so I could only find a part time job teaching technical drawing at ISKL. We did OK on our salaries, but if I were teaching Physics for MUSCIA, as I am here today, we would have been well off.



We enjoyed the year in warm, sunny Malaysia. The people were easy to live with and made good neighbors. We ate out often and our kids were exposed to Malay, Chinese and Indian foods, as these are the three major ethnic groups. Our kids can handle spicy food and chopsticks like pros.

Nancy enjoyed teaching the Malay students English and had a very positive experience with her colleagues. I had a good year at ISKL, and had plenty of time for tennis, squash and swimming at a sports club that we joined. Our kids were homesick for friends and complained as teenagers do, but I suspect that they would have complained in Ann Arbor, also.

We went to Bali for a week, and loved it. It is most exotic. We also visited Thailand for a week, and loved it, too. We rode for two hours through the jungles on steep, muddy trails on the backs of elephants, took water taxis through the canal streets of Bangkok, and enjoyed great food and sightseeing. When our daughter was back in school in Ann Arbor, her teacher was talking about silk and how it was produced. The teacher asked if any of the students knew how silk was made, and my daughter reluctantly raised her hand, and described the worms, mulberry trees, etc. The teacher was surprised and asked if she had seen this at Greenfield Village, and Michelle told her about Thailand.

Her teacher was really impressed now and our daughter realized that she had spent a year in places that most kids only read about. Conrad and Michelle have the wanderlust now, and I think that's a great gift to give to your kids.

Nancy took a trip with some of her colleagues to Borneo, and traveled by small outboard powered boat to some exotic villages and stayed as guests in longhouses. They also did some caving where only a handful of people has been. She loved it even though she was intimate with bat guano more than she wanted.

Our family also saw a great deal of Malaysia by car, as I had bought a very decrepit car for the year that took all my mechanics skills to keep in one piece. I had the entire gear-shift come off in my hand in crowded Kuala Lumpur traffic! I jammed the whole thing back into the hole in the floor and kept driving. I sold the car for what I paid for it at the end of the year.

**Would I go to another country to teach again?** In a minute! You only live once. There is a big exotic world out there, and you really can't savor it fully until you've lived there. There is a big difference between living in a country for a year and visiting a country for a week or a month. Nancy and I had also been teachers in Ethiopia in the US Peace Corps in 1969-70. It was the most exciting two years of our lives.

# Upcoming Events

Submitted by Sumita Chaudhery

MIDEON International Development Summer Institute will sponsor "Development in the Age of Globalization: One World or Worlds Apart?" on May 11 – 16,1997, at Michigan State University.

**Contact:** Gail Campana, Educational Program Coordinator  
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East Lansing, Michigan 48824-1111  
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## New Resources

1. "Overseas Study Programs in Nursing: A Resource Guide," published by Michigan State University, Office of outreach & College of Nursing lists summer programs abroad available through various universities in the United States. The Guide is available at the SCII Office.
2. A new research journal title "International Journal of Service Industry Management" is available for subscription through Tel. +44-1274-777700.

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