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Humanistic Mathematics and the Internet: the Ugly, the Bad, and the Good

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INTRODUCTION - THE INTERNET AND THE WORLD WIDE WEB

When we connect to the World Wide Web (WWW) and search for Isaac Newton, we find, among many items, "Sasha's List of Great Thinkers and Visionaries" (http://linuxl uwc.edu/~sasha/thinkers.html). The home page is Sasha's tribute to influential minds. A picture of Isaac Newton is posted, and with the click of a button on his face, we display interesting information about Isaac Newton. Andrei Kolmogorov is also listed. Connecting to his information by clicking on his name reveals to us his remarkable contributions to probability and physics, and his interest in the form and structure of Pushkin's poetry. As it turns out, we are browsing an electronic archive of famous mathematicians (http://www-groups.dcs.st-and.ac.uk/~history/index.html) developed by a school in Great Britain. We could find out which famous mathematicians were born or died on this date—March 1: Charles de La Faille born 1597; Kiyoshi Oka died 1978. Enough! Let us search again, supposing we really desire to collect materials for a course, a differential equations course.

The numerous items here include several electronic publications. We access the Electronic Journal of Differential Equations (EJDE). To get a subscription we must identify ourselves, but the subscription is tree. Perhaps students could subscribe for the duration of the course. An advertisement for Differential Equations and Introduction with Mathematica by Clay Ross is also on-line. We can look at his home page, see his picture, read that he works at Sewanee University, find out what courses he has taught, and use his own electronic links to mathematical resources.

Next, we access the Math Archives home page, organized by topic. Scrolling down to differential equations, we see:

Differential Equations
Boston University Differential Equations Project
C*ODE*E-Consortium of ODE Experiments
Dynamical Systems and Technology Project
Interactive Learning in Calculus and Differential Equations with Applications

A plethora of materials for this course exists on-line. What does all this easily accessible information mean to the field of mathematics? How can it be used to broaden our thinking about mathematics and stimulate students to learn? What is the potential impact of Internet technology on the culture and humanism of mathematics?

THE UGLY—THE PLETHORA

The sheer numbers of data, books and software on-line may cause significant quality problems since giving and taking—data, books, software, and opinions—electronically is so easy. Perhaps high quality information will be obtained by subscription fees only, or only be available to an "in" group. It is possible that educators desiring to show the humanistic side of mathematics in the classroom will opt to keep students on task, avoiding a medium which is large, complex, and growing, and which could bring too many disparate problems to the classroom.

THE BAD—DISCONNECTION & DEHUMANIZATION

We recognize three kinds of disconnections. One is the disconnection of those who have no access, or who access vicariously. Another is the disconnection of having the technology and having it work so that the ease of a click and print bring numerous impersonal, discursive discoveries to the classroom. The third is the disconnection of persons drawing diagrams in the sand or those counting and arranging pebbles and imaginaries in layers above the concretes. Technology here would encumber.

In a beginning calculus and computers course, students may plot parabolas with computer assistance and never really understand that the formula with x^2

indicates "u-shaped, two solutions, crosses the axis twice." They are more concerned with "Did I key in the proper lower-case password, how do I get the laser printer to work, and when does this miserable lab end?" Not mathematics!

Dehumanization: Users of the WWW can easily get overwhelmed and lost, forgetting why they came in the first place. In startling contrast, consider an ancient village. Denizens experienced birth and death, floods and harvests—highs and lows dispersed by time. On the WWW, high and low experiences arrive every nanosecond. Events which once held such excitement are not common place if you live in a global cyber-village. Perhaps when one mathematics student accesses the mind of another mathematics student, one will merely lurk and another will put forth opinions and solutions.

THE GOOD—THE HUMANIST
The Internet gives the student—lurker or participant—a bond with a community they had no access to before. The community includes students, faculty, professors and Nobel laureates. Hopefully, it gives them a sense of awe and purpose and the sense that mathematics is a living, vital study that has great rewards and a need to collaborate with past, present, and future.

The Internet assists a mathematician by providing access to resources and research quickly and easily, worldwide. It also can link a mathematician into a global network of the mathematics community that has not existed till now. The Internet assists a flexible mathematics educator by bringing subways around the planet and recycling ventures into the classroom.

The Internet can serve as a communication tool between scholars, can facilitate group work and can add facts, personality, and flavor to the mathematicians behind the theorems. Tools of the collaborative endeavor are the following: e-mail, list-serve lists, resources, journals, faces behind work, collaboration, group work, and argument.

CONCLUSION
The technology is here and will assuredly be integrated into our lives. The Internet, specifically the WWW, gives us resources to explore and treasures to find. The true beauty of mathematics will be experienced by students with and without computers, with or without the information superhighway. Mathematical beauty is a human experience that perhaps can be assisted by machines, but not experienced or created by them.

Mentalism

Lee Goldstein

Spiral of the belike,
Hoping of a like to be at the spiral center,
Where the avoidant dislike is the reality principle
And is typically assumed to be from outside,
But where a disike might, too, be about the center,
And there is the reality within,
And of that spiral wish,
When the dislike, he or she might convert it,
At least, as the spiral, into the neither like nor dislike.