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Can Technology Cure Stupidity?

By Peter A. Hancock
HFES President

My title and theme for the present column comes from a provocative question I was asked recently – can technology cure stupidity? I think my questioner was primarily concerned for human error in technical systems, but the outcome of discussion was more a focus on the impact of human factors and ergonomics in the process of learning, and it is this I would like to consider.

For most of human existence, the vast majority of human beings lived their lives in ignorance of our accumulated wisdom. Access to the summed store of formal knowledge was mediated by a controlling few because most people were unable to read or write. Despite any level of natural intelligence or degree of native wit, one's position in the social hierarchy was traditionally contingent upon such access. As access to knowledge has broadened, the fluidity and structure of society has changed. In today's world, more people know more than ever before. Collectively, as a species, we now express our highest level of understanding. Soon, we (and certainly our children) will have essentially instantaneous access to virtually all human information conveyed via any medium of choice.

So if this is true, why is it that we as individuals have grown more informed but not appreciably more intelligent? This is not simply an academic problem of the fixity of IQ level. Rather, the question is one that promises to mediate our whole future. A sequence of reports on global futures has contained predictions of global disaster occurring well before the present time. Although such prognostications were replete with caveats and cautions, the major reason for their failure as predictions was the inability to capture and incorporate human ingenuity into models and thus integrate the technical solutions such ingenuity has provided.

Leaders of HFES and IEA have spoken about the role of human factors and ergonomics in world problems. In particular, outstanding thinkers have challenged us to consider the role of our discipline in solving such fundamental problems as population levels, water resources, and pollution control. It was Malthus who critically pointed to the instability and incompatibility of continued population growth versus limited resource depletion. Yet each time that equation threatened global consequences, we managed to stave off disaster through technical innovation. There is no Nobel prize for committee work, and we rely most

frequently on inspired individuals for our collective advances. They rely on an integrated scientific infrastructure that supports continued technological development.


Such an infrastructure requires many educated individuals. So, what is it that we in human factors and ergonomics can do about the process of education? In this realm, I think we have some firm foundations upon which to build. We already have groups that focus on training and the education of human factors and ergonomics professionals. Further, a number of recent initiatives within the Society have advocated for an "ergonomics of education." I wish to support that direction for our Society.

If Thomas Arnold, one of the founders of modern education, walked into today's average classroom, he would have little problem recognizing the environment. A chalkboard and a teacher facing a group of students stacked in lines and columns would be a familiar sight. But this is not such an indictment as it might seem. Surely Gallileo would know that the main Mt. Palomar facility was a telescope and Goddard would recognize the space shuttle. However, the similarities end there. Gallileo and Goddard would be stunned by what is now known and possible. I have the sense that Dr. Arnold would find the classroom, its members, and their learning process depressingly and distressingly familiar. True, the curriculum content may well have changed, but would the fundamental level of learning be any different?

continued on page 4



Graduate Program Directory Available

The 2000 *Directory of Human Factors Graduate Programs* is now available at the HFES Web site. The directory has 96 pages and includes 84 programs (an increase over the last edition). You may access the directory in PDF format free of charge at <http://hfes.org/Publications>. 

Fed-OSHA Proposes Ergo Rule

On November 23, 1999, the federal Occupational Safety and Health Administration (OSHA) released a draft of its ergonomics regulation. The long-awaited regulation applies to manufacturing, manual handling jobs, and jobs with reported musculoskeletal disorders.

Under the Fed-OSHA standard, manufacturing and manual handling job employers would be required to implement a basic program involving two elements: management leadership and employee participation, and hazard information and reporting. The first element requires employers to set up and manage an ergonomics program that encourages regular communication between workers and employers regarding the program. The second element requires employers to provide workers with resources and information on injury risks, signs, and symptoms.

General industry employers with one or more employees who experience work-related musculoskeletal disorders must implement a full ergonomics program. In addition to the two elements listed in the basic program, the full program also requires job hazard analysis and control, training, "MSD management," and program evaluation. However, employers would have the option of implementing a "Quick Fix" instead of establishing a full program. This would give the employer 90 days to identify and eliminate a hazard.

Public hearings are scheduled in February, March, and April. A postmark and fax deadline of February 1, 2000, has been set for written comments, e-comments and written testimony to be received by OSHA.

The HFES president and Executive Council are in the process of empaneling a group of Society members with expertise in this area to review the regulation and advise the Council on the need for the development of a Society position.

For the complete text of the proposed federal regulation or more information, visit the OSHA Web site, <http://www.osha-slc.gov>.

Washington State Proposes Ergo Rule

On November 15, 1999, the Washington Department of Labor and Industries proposed a new regulation designed to help employers reduce injuries caused by ergonomic hazards. The rule (WAC 296-62-051) resulted from the department's discussions with the medical community, business, labor, and others concerned about the health of working people. Comments from public meetings and input from advisory committees further shaped the proposal.

The rule is aimed at preventing work-related musculoskeletal disorders such as tendinitis, carpal tunnel syndrome, and low-back disorders, which cost Washington businesses millions of dollars a year. Larger employers (those with 50 or more employees) that have the highest risk of ergonomic injury would be the primary focus. These employers would be required to evaluate high-risk jobs and make changes to reduce the risk of injury.

The proposal is set for discussion at public hearings throughout January. Comments will be accepted by the Washington Department of Labor and Industries until February 14, 2000. ☒

INSIDE HFES

HFES International Book Drive

Starting in 2000, the University of Central Florida Student Chapter of HFES, with assistance from the HFES staff, will be leading the volunteer efforts of the HFES International Book Drive. The purpose of the book drive is to provide human factors and ergonomics publications to countries that are severely lacking in such library sources.

The book drive was initiated by the SUNY-Buffalo Student Chapter of HFES. Under its aegis, more than 1380 books and 500 journal volumes, donated by HFES members, were delivered to libraries in India, China, Ecuador, Lithuania, Thailand, Sri Lanka, and Colombia. The 2000 drive is being launched with generous donations from Alphonse Chapanis and Walter Arnell.

If you have any books, journals, or reference materials to donate to this cause, please send them to Jim Hitt, Team Performance Lab, Suite 301, 12424 Research Parkway, Orlando, FL 32826-0650.

Undergraduate Program List Available

A new list of undergraduate human factors programs is now available. Contact the central office for information.

Also, we welcome information regarding undergraduate human factors programs. Please contact the central office to place your program on the list. ☒

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Student Members Recognized

By *Kristen Gilbert, Chair*
Student Affairs Committee

In March 1999 the Executive Council and the Student Affairs Committee developed initiatives to support outstanding students and student chapters. As chair of the Student Affairs Committee, I had the pleasure of honoring several of our exceptional student members at the Student Reception during the 43rd Annual Meeting in Houston. The first three recipients of the Student Member with Honors designation were acknowledged along with the first two student chapters to receive the award of Outstanding Student Chapter. We are fortunate to have such talented, upcoming professionals as colleagues. The noteworthy accomplishments of these individuals and student chapters demonstrate the impressive activities of our student members.

Student Member with Honors

This is a special status to acknowledge students who have made an outstanding contribution to the discipline or to HFES during their tenure as a student. This year's honorees were Gregory Jamieson, Jacob Seagull, and Michelle Yeh.

Gregory A. Jamieson is a Ph.D. student at the University of Toronto under the supervision of Kim Vicente. Greg received bachelor's degrees in both mechanical engineering and psychology from the University of Illinois at Urbana-Champaign in 1996. Greg maintains a 4.0 GPA while working for Honeywell Technology Center as a research scientist. He has been a member of HFES since 1994 and has served as vice president and president of his student chapter. Greg's many accomplishments include several HFES presentations and proceedings publications, design of an advanced user interface that enables petrochemical operators to visualize the complex relationships of an advanced multivariate controller algorithm, and creation of a 16-month internship program at Honeywell Technology Center that provides applied human factors experiences for undergraduate students.

Jacob Seagull is a Ph.D. student at the University of Illinois at Urbana-Champaign with a GPA of 4.0. He received his M.S. in industrial psychology and behavioral sciences from Technion-Israel Institute of Technology in 1994. Jake has worked in the human factors field since 1991 and has been a student member of HFES since 1992. His research focuses on error analysis in medical settings, particularly in the operating room. He has published six articles and proceedings papers and has also coauthored two papers in *Ergonomics in Design*, including one that describes some of the significant contributions he made to product design while acting as a student-consultant to the Oregon Scientific company in redesigning the instructions for a hand-held electronic organizer.

Michelle Yeh is a graduate student with a 4.0 GPA studying under the guidance of Christopher Wickens at the University of Illinois Urbana-Champaign. She received her bachelor's degree in cognitive science and computational and applied mathematics

in 1994 from Rice University. Michelle serves on the review board for the *Journal of Human Performance in Extreme Environments* and has published several papers, most notably coauthoring an *EID* article with Jacob Seagull describing contributions she made to the rewriting of instructions for a hand-held electronic organizer. She has served as vice president and secretary/treasurer of her student chapter.

Outstanding Student Chapter

The Outstanding Student Chapter Award acknowledges student chapters that have made significant contributions to the discipline, HFES, their campus, or their community in a particular year. Up to three student chapters may be honored each year.

The first chapter recognized in 1999 is the University at Buffalo – State University of New York (Younho Seong, president). This chapter has 24 active members under the supervision of Victor Pacquet. The jewel in the crown of the SUNY Buffalo chapter was the HFES Book Drive. During the drive, donated books and journals were collected from researchers and educators and sent to other researchers and educators around the world. Students volunteered their time to organize, pack, and mail the materials to professionals who would otherwise not have access to them. The chapter has received thousands of books and journals and reports a 90% success rate. SUNY Buffalo has worked hard not only to be a good chapter but to reach out to others in kindness, charity, and collegiality.

The second recipient is the University of Toronto Student Chapter, Caroline Cao, president; Paul Milgram, faculty adviser. This group's primary objective is outreach. Members strive to inform those within and outside the University of Toronto community of the importance of human factors. To this end they hold an ongoing forum for the debate and exchange of human factors ideas, which enables students to establish contacts with human factors practitioners. The chapter also hosts an impressive International Speaker series, in which speakers share their knowledge in formal and informal settings and spend a day meeting students, visiting the lab, commenting on student research, and socializing with the students. Past speakers include Jens Rasmussen, Thomas Sheridan, Earl Wiener, Christopher Wickens, and David Woods. Another impressive feature of this chapter is its Web presence (gypsy.rose.utoronto.ca/hfig/). Chapter members use the Web site to post activities and invite the community at large to participate.

I would like to thank the members of the Student Affairs Committee – Arnie Lund and Mark Sanders – for their assistance. For more information about the 1999 awards or to apply for next year, please contact me at kgilbert@montevallo.edu. ☉

Placement Is On-Line!

The HFES Placement Service is now on-line at the HFES Web site, <http://hfes.org>. The service, which is free to job seekers, is platform-independent and can be accessed 24 hours a day, 7 days a week.

In my own university we are digitally committed. Essentially, all courses are on the Web, and multimedia abounds. But is it the amount of information that is the problem? My students all use the Web as a support facility for their assignments, but more and more there is a signal-to-noise problem, as egregiously incorrect information passes from differing Web sites into their submitted work. I do not think that the present generation of students is any more or less able than its predecessors – although I now take an ominously greater pleasure in beginning most pedagogical sentences with the words ‘Well, when I was a student...’ But with the overwhelming amounts of information, how are we fostering the ability to think and then select relevant and factually correct knowledge that subsequent generations will so desperately need?

Why is this fundamentally a human factors and ergonomics problem? I think that it is clearly an issue of human interaction with advanced technology, where the form of the display is crucial. What are the dimensions of displays that capture and hold attention? What are the dimensions of displays that lose it? How do we prevent our interfaces degrading from user-friendly to user-lazy to user-insensible? What is the dynamic of the traditional classroom when all materials can be accessed electronically? Such media can be highly visual and highly interactive compared with the traditionally passive circumstance of the familiar lecture. When technology changes so quickly, teachers can well be intimidated by systems with which their pupils appear to have a greater degree of comfort and familiarity. We need, therefore, to reconsider what pedagogy is in a technically replete environment. Future education promises to be much more interactive, with greater collaboration and hands-on experiences, and the criteria of success may well be measured by the engagement in the process. We need to be developing both the formal ergonomics of education – the design of the learning environment – and the human factors of understanding – the design of the learning process.

I return in the end to the initial question. Can technology cure stupidity? I’m not sure it is the right question. Rather, I think that the purpose of technology is to aid each individual to his or her highest level of personal achievement. But in incanting this homily, I think *one* (but of course not the only) critical development for our collective future must concern the way in which we facilitate the skills of our highest-achieving individuals. After all, it may well be these persons who represent our collective salvation. Regardless of the distribution of intelligence, human factors and ergonomics advances that support the process of learning are liable to prove of critical value to our future. I hope we all have the chance to ponder such innovations as the new year approaches.

This will be the first presidential column of the new millennium, leading me to ponder what the millennium’s final presidential communication might be. I am sure by the time this reaches our membership there will be stories aplenty of Y2K failures. However, I hope in addition to relating negative outcomes, we can take a few moments to recount the positive situations to show human factors and ergonomics successes to the broader world. I have come to the opinion that the greatest privilege of the presidency is to be able to address the membership of the Society unfettered by many of the usual constraints of academic communication.

Thus I am very grateful that so many individuals took the time to write to me concerning my previous column. Their words and stories inspired me immensely. I hope I can pass a small part of that inspiration on. ☒

IEA/HFES 2000

IEA/Liberty Mutual Prize

Applications are now being accepted for the 2000 International Ergonomics Association (IEA)/Liberty Mutual Prize in Ergonomics and Occupational Safety. This \$5,000 award recognizes individuals who have made significant contributions to the reduction or prevention of work-related injuries and/or to the advancement of theory, understanding, and development of occupational safety research.

In addition, the Liberty Mutual Medal in Ergonomics and Occupational Safety (awarded every three years) will be given in 2000. This honor is given to the best of three Liberty Mutual Prize awardees from the previous three years and consists of a medal and \$15,000.

To be considered for the Liberty Mutual Prize, candidates must submit a letter of application and five copies of an original, previously unpublished research paper relevant to the field of occupational safety and ergonomics. An international review committee will select the winning contribution. The prize and medal will be presented at the IEA/HFES 2000 Congress in San Diego. The deadline for submission is *March 1, 2000*. For further information, contact Martin Helander, School of Mechanical and Production Engineering, Nanyang Technological University, Singapore 639798; +65-790-6398, fax +65-791-1859; mahel@ntu.edu.sg. Applicants will be notified by June 2000.

Call for Student Volunteers

The HFES 44th Annual Meeting Host Committee invites all students who are planning to attend the joint meeting of the 14th Triennial Congress of the International Ergonomics Association and the 44th Annual Meeting of the Human Factors and Ergonomics Society to serve as volunteers.

More than 2500 people are expected to attend the combined congress, which will make it the largest human factors/ergonomics professional gathering held anywhere in the world. IEA/HFES 2000 will be held in San Diego from July 30 to August 4, 2000. Volunteer for one day, and your registration fees for the entire meeting will be reimbursed.

Serving as a volunteer affords you the opportunity to work closely with other students and presenters to help make the congress a success. To volunteer, or for more information, contact Suzanne Dawes, The Aerospace Corporation, P.O. Box 92957, M1/112, Los Angeles CA 90009-2957; 310/336-5643, fax 310/336-4070; suzanne.m.dawes@aero.org. ☒

Off-Highway and Powerplant Congress

The 2000 SAE International Off-Highway and Powerplant Congress will be held September 11–13, 2000, in Milwaukee, Wisconsin. Abstracts are invited in 14 categories, including engineering process and systems concepts, manufacturing, and integrated product development. Abstracts are due *February 7, 2000*. Contact Melissa Jena, SAE, 400 Commonwealth Dr., Warrendale, PA 15096; 724/776-4841, fax 724/776-1830; mjena@sae.org, <http://www.sae.org>.

Special Issue on HCI

Papers are invited for a special issue of the *International Journal of Human-Computer Interaction on Ubiquitous Computing* to be published in 2000. Case studies, empirical research studies, and theoretical treatise are welcome. Papers are due *May 31, 2000*. Contact Neville A. Stanton, Department of Design, Brunel University, Runnymede Campus, Coopers Hill Lane, Egham, Surrey, England TW20 OJZ; +44 0 1784 431341, ext. 234, fax +44 0 1784 472879; neville.stanton@brunel.ac.uk, <http://www.brunel.ac.uk/depts/des/design/design.html>.


Special Issue on Aviation Psychology

Papers are invited for a special issue of the *International Journal of Aviation Psychology*, focusing on training instructors to evaluate aircrew performance. Papers that will further the understanding of how instructors and evaluators can be most effectively trained to evaluate crew performance are welcome. Submissions are due *April 1, 2000*. Contact David P. Baker, American Institutes for Research, 3333 K St. NW, Washington, D.C. 20007; 202/342-5036, fax 202/342-5033; dbaker@air.org.

International Congress on Work Injuries

Abstracts are now being accepted for the 5th International Congress on Work Injuries to be held March 14–20, 2001 in Melbourne, Australia. Papers focusing on work injury prevention, rehabilitation, and other health issues are welcome. *Submissions are due March 3, 2000*. Contact Kim Tolotta, Congress Secretariat, +61 8 8233 2173, fax +61 8 8233 2000; ktolotta@workcover.sa.gov.au, <http://www.workcongress5.org>.

World Congress on Intelligent Transport Systems

The 7th World Congress on Intelligent Transport Systems will be held November 6–9, 2000, in Turin, Italy. Papers are invited in numerous categories, including traffic management, public transport management, and traveler information. *Papers are due February 1, 2000*. Contact Mrs. Kip Stacy-Protts, 400 Virginia Ave., SW, Ste. 800, Washington, DC 20024-2730. 202/484-4542, fax 202/484-3483; k.stacy@itsa.org, <http://www.itsa.org>. 

Announcement deadlines: 1st day of the month prior to the desired issue; for events or deadlines within the first 3 weeks of a month, send information at least 2 months in advance. Items are published according to space availability.

25th Annual National Hearing Conservation Association Conference, February 17–19, 2000, Denver, CO. NHCA, 9101 E. Kenyon Ave., Ste. 3000, Denver, CO 80237; 303/224-9022, fax 303/770-1812; nhca@gwami.com, <http://www.hearingconservation.org>.

★ **4th European Int. Conference on Design Management**, February 20–22, 2000, Amsterdam, The Netherlands. Design Management Institute, 29 Temple Pl., Boston, MA 02111-1350; 617/338-6380, fax 617/338-6570; dmistaff@dmii.org, <http://www.dmi.org>.

40th Israel Annual Conference on Aerospace Sciences, February 23–24, 2000, Tel-Aviv and Haifa, Israel. Dan Givoli, c/o Faculty of Aerospace Engineering, Technion-Israel Inst. of Technology, Haifa 32000, Israel; 972-4-8292713, fax 972-4-8231848; alice@aerodyne.technion.ac.il, <http://www.aero.technion.ac.il/aeroconf.html>.

SAE 2000 World Congress, March 6–9, 2000, Detroit, MI. Society of Automotive Engineers, Inc., 400 Commonwealth Dr., Warrendale, PA 15096-4841; 724/776-4841, fax 724/772-1851; <http://www.sae.org>.

★ **3rd Annual Applied Ergonomics Conference**, March 14–16, 2000, Los Angeles, CA. Ellen Vagner, Dir. of Professional Education, Institute of Industrial Engineers, 25 Technology Park, Norcross, GA 30092; 800/494-0460 or 770/449-0461; evagner@iienet.org, www.iienet.org/conted/ergoconf.htm.

★ **4th International Conference on Managing Fatigue in Transportation**, March 19–22, 2000, Fremantle, Western Australia. Conference Convenor, Prof. Laurence Hartley, Psychology, Murdoch University, Western Australia, 6150 or Congress West Party Ltd., P.O. Box 1248, West Perth, Western Australia, 6872; 618 9360 2398, fax 618 9360 6492; conwes@congresswest.com.au.

★ **Smart Graphics AAAI 2000 Spring Symposium**, March 20–22, 2000, Stanford, CA. Patrick Olivier, Computer Science, University of York, Heslington, York, YO10 5DD, UK; +44 1904 432781, fax +44 1904 432767; patrick@cs.york.ac.uk, <http://www.cs.york.ac.uk/~patrick/SG2000>.

★ **CHI 2000 Conference on Human Factors in Computing Systems**, April 1–6, 2000. CHI 2000 Office, 703 Giddings Ave., Ste. U-3, Annapolis, MN 21401; 410/263-5382, fax 410/267-0332; CHI2000-office@acm.org, <http://www.acm.org/chi2000>.

★ **Facility Forum 2000**, April 3–5, 2000, Atlanta, GA. Dara Mansur, c/o WPC Expositions, 84 Park Ave., Flemington, NJ 08822; 908/788-0343, ext. 154, fax 908/788-9381; <http://www.FacilityForum.com>.

★ **Ergonomics Society 2000 Annual Conference**, April 4–6, 2000, Grantham, Lincolnshire, UK. Annual Conference Programme Secretary, Ergonomics Society, Devonshire House, Devonshire Sq., Loughborough, Leics LE11 3DW, UK; +44 1509 234904, fax +44 1509 234904; ergosoc@ergonomics.org.uk.

★ **47th Annual Conference of the Society for Technical Communication**, May 21–24, 2000, Orlando, FL. STC, 901 N. Stuart St., Ste. 904, Arlington, VA 22203-1822. 703/522-4114, ext. 200, fax 703/522-2075; <http://www.stc-va.org>.

★ **Digital Human Modeling for Design and Engineering Conference and Exposition**, June 6–8, Dearborn, MI. Society of Automotive Engineers, 400 Commonwealth Dr., Warrendale, PA 15096-0001; 724/776-4841, fax 724/772-1851; <http://www.sae.org>.

★ **IEA-2000/HFES-2000**, July 30–August 4, 2000, San Diego, CA. HFES, P.O. Box 1369, Santa Monica, CA 90406-1369; 310/394-1811, fax 310/394-2410; <http://iea2000.hfes.org>; hfes@compuserve.com, <http://hfes.org>.

★ *new listing.*

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Opinions expressed in BULLETIN articles are those of the authors and should not be considered as expressions of official policy by the Human Factors and Ergonomics Society.

FLASH!

- **IEA/HFES 2000 – Author kits have been mailed. The paper deadline has been extended to February 8, 2000.**

Reminders:

- **Deadline for Fellow status nominations is February 1, 2000.**
- **Full Members: Watch the mail for nomination packets.**



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