tems (or policies or political posturing or legal issues, or ethical ones) and suggest how they could be better, or how they work—in essence, relating them to the work that they are seeing on the whiteboards and in the lecture handouts. And naturally, many of these come back to usability issues, or design problems, or some such aspect, and the role of HCI in mediating between the technical and the social, the computational and the comprehensible, the user and the system, comes into play. My only hope is that these students will ask sufficient difficult questions of my colleagues that they too will start to understand the broad impact of HCI issues, and work more closely with me in presenting them in the first place.

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Recognizing Student Designers: ACM CHI's Student Design Competition

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WE LIVE IN A WORLD where design as a discipline is no longer resigned to the back room. Richard Buchanan wrote in 1990, "...in the 20th century, we have seen design grow from a trade activity to a segmented profession to a field for technical research and to what now should be recognized as a new liberal art of technological culture" [1].

Within the CHI community, "user-centered" design has always been our challenge, but in recent years interest has moved from simple usability and efficiency models to a broader notion of usability and usefulness and an acknowledgment of qualitative, intangible elements, such as aesthetic appeal, fun, and enjoyment. This shift has in turn led to new approaches and methods such as empathic design and experience design. The interdisciplinary nature of design, the need to maintain awareness of the user experience of the product throughout the design and development cycle, and the power of simulations and prototypes to focus collaboration and spur innovation [6] have also been increasingly emphasized.

Perhaps a driver for this broadening design sensibility is the increase in interactive technologies that are available; Bob Goodman stated in the May-June issue of *<interactions>*, "breakthrough products such as the iPod are creating a UX (user experience) friendly business climate" [5]. Or perhaps open innovation, open-source development, increasingly tailorable interfaces (for games, personal information management, and online presence, for example) are increasing awareness of the role of information, interface, and interaction design for attracting—and retaining—"users." Credit should also go to outspoken proponents of this broader vision of design activity within the technology arena—people like Joy Mountford (the founder of Apple's International Interface Design Project), Terry Winograd (a longtime educator and spokesman for human-centered design practices currently at Stanford University), Gillian Crampton Smith (who, in 1983, established one of the first postgraduate courses in graphic design and computers for practicing designers at St. Martin's School of Art), and David Kelly (an educator at Stanford, currently building a new design school, the "d-school," and one of the founders of IDEO).

The Competition: Aims and Rules. In the spirit of encouraging a broader design sensibility at CHI, for the past two years we have run a student design competition. International teams, consisting of up to five undergraduate and/or postgraduate students have been invited to respond to "real world" design challenges. Like other academic and industry-sponsored design competitions, the intention has always been to provide an opportunity for students with a variety of design backgrounds (such as HCI, industrial design, visual and graphic design) to demonstrate their problem-solving and design skills.

However, being at CHI, the event also aims clearly to encourage those skills most appreciated by the HCI community. Student teams are invited to design a solution to a problem, and in the process demonstrate their analytic skills and academic acumen offering a clear reflection on their (perhaps novel) design methods and activities. The solution must demonstrate the team's design decisions are backed by human-centered design processes and the solution must be cost-efficient, usable, and accessible to an international audience. Illustrations, simulations and prototypes in the form of poster demonstrations, storyboards, and/or mock-ups are required in order to bring the design solutions to life.

The competition itself consists of three rounds, each focusing on a different modality of conference communication. Teams are asked to develop a written paper, a poster, and a short presentation.

The Design Problems and Their Solutions, 2004 and 2005. The design problems posed each year were
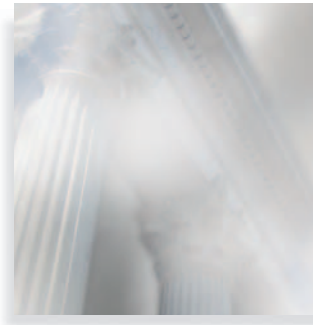
intended to be current and globally relevant, but also intriguing enough to capture students' interest. As 2004 was Olympics year, games were a major theme for CHI. Students were asked to consider the design of a voting system for the Olympics. We invited students to demonstrate that it is possible to design a reliable, flexible, and highly usable system for collecting spectators' scores. Students were asked to allow all those in attendance at diving and gymnastics events to easily and quickly indicate their score following each Olympian's performance. One system design should accommodate the needs of both competitions. By showing the differential between the audience score and the judges' scores, it was expected that audience engagement would, in turn, increase.

The challenge for the CHI 2005 Student Design Competition was to design for artificial companionship. In particular, the design was to support the social well-being of seniors above the age of 65. No specific direction was asserted; students were invited to consider items from the physical, to the virtual, and any combination in between. Solutions were required to be emotionally engaging, entertaining, and cost effective (less than $3000 USD to buy), and support at least one non-entertainment function for the owner (e.g., remind their owner to take medicine). Consideration of specific user groups' lifestyles, environments, cultures, and gender were strongly recommended.

The Competition to Date. Design is an interdisciplinary process, and, to date, the competition has brought together engineers, psychologists, designers, and artists from across the world to work on problems that confront international communities today.

Over the two competitions, organizers received entries from schools across the world. In total, 50 teams, representing 23 institutions and ten countries (from Austria, India,

Philippines, Sweden, Germany, Ireland, Korea, Mexico, Canada, USA), have submitted proposals to the CHI Student Design Competition. Of the 50 submissions, 30 have been invited to attend and present their solutions to the CHI audience, including teams from: Umea University, Sweden; Vienna University of Technology, Austria; The Savannah College of Art and Design, USA; Dun Laoghaire Institute of Art, Design and Technology, Ireland; University of Munich, Germany; CICESE, Mexico; Dalhousie University, Canada; Indiana University, USA; George Mason University, USA; Carnegie Mellon, USA; Illinois Institute of Technology, USA; University of Illinois, USA; and Nova Southeastern University, USA.

Winning Solutions. Both the 2004 and the 2005 competitions showed the creativity and engagement of students and their tutors.

The 2004 Competition. In keeping with the Olympic theme, medallions were presented to the winning teams— gold, silver, and bronze. The winning team in 2004 was iVo (Steve Aboud, Michael Albers, Tyler Nemes, Savannah College of Art & Design, USA), whose design solution consisted of a handheld voting device that would register a spectator's vote through a kinetic sensor embedded in the device. Depending on whether an audience member shook the unit to indicate their positive reaction to the athletic performance, or bent the unit to indicate their negative reaction, a computer system would tally the scores, compute the overall result for that venue, and display the 'audience vote' following each athlete's performance.

The silver medal team was WeInteract (Omprakash Pathipaka, Sidharth Saxena, Sriram Mohan, Vasudha Chandrasekaran, Indiana University, USA). Their design solution was also a handheld device that could be worn as a watch or as a pendant, and that would detect users' clapping and waving patterns during the event.

The intensity of these actions would be recorded and displayed for everyone to observe and compare to the scores assigned by the official judges.

The bronze-medal-winning team, AudienceNotMe (Jenica Rangos, Gahgene Gweon, Muriel Garreta Domingo, Carnegie Mellon University, USA), developed a third variation of a handheld voting device in which audience members would use a two-piece shaker and select either the positive or negative portion to shake and indicate their approval or disapproval of the judges' scores.

The 2005 Competition. The winning team for 2005 was mPath (Shweta Aneja, Kevin Makice, Apurva Pangam, Matt Weldon, Indiana University, USA). The mPath team proposed a fee-based data-management service for administrators of assisted-living facilities to oversee an ad-hoc volunteer network. Interacting with residents, these volunteers assess social relationships and emotional reactions, quantifying for the computer their qualitative observations. In turn, the system examines data over time to isolate anomalies, highlight trends, and anticipate future responses.

Two teams tied for second position: "Calafia" (Pedro Santana, Marcela Rodriguez, Luis Castro, Angel Andrade, CICESE, Mexico; Victor Gonzalez, University of California, USA) and "Pollen" (Payaal Patel, Stefanie Danhope-Smith, the Savannah College of Art and Design, USA). Calafia's solution work in the maintenance of emotional ties between Mexican elders and their families living abroad. Based on interviews and evaluation of prototypes with elders and their families, the team envisioned and designed a system called "The Family Newspaper." The system facilitates the exchange of pictures, recipes, local news, and other day-to-day information. It also includes a photo-based memory game intended to alleviate cognitive decline. In order to make its use easier for elders, the

system is based on Tablet-PC technology. However, family members can access it through any Web browser.

Figure 1: An illustration of Calafia's proposal for maintaining social networks and keeping in touch with distant family members

Pollen addressed how to encourage and augment contact with friends and family to alleviate loneliness. In concept, Pollen consists of a recording dock and a "pod," rather like a flower. Special items can be placed in the pod. Placing the pod in its dock allows a voice message to be recorded and associated with the artifact. The pod then closes. Each Pollen "pod" is mailed to a recipient who, on opening it, sees the gift but also hears the recording. Although a very simple artifact, the thoughtful design process and resulting elegant, careful consideration of manufacturing costs impressed the judges.

Finally, we would like to mention geriComp, who, although fourth in the competition, offered a thoughtful design for consideration. Team members were Chun-Yi Chen, Marina Kobayashi and Lui Min Oh from Carnegie Mellon University, USA. The team suggested producing a wearable device that allowed the recording of current events through pictures and audio, and the storage of artifacts past photographs into a multimedia slideshow format for sharing with others; it also contained a GPS-like component for tracking the elderly person's location for safety purposes.

Lessons Learned. Lessons have been drawn from our experiences in the past two years. A first point is the realization that certain solutions are more easily transmitted through presentation media of poster and presentation than others. Although we have encouraged simulations and prototypes, few teams have submitted them. Of course, provision of simulations and prototypes requires considerable effort from teams who are already working hard to address the complex design problems in a short time. Further, it is not clear how such simulations and prototypes can be best supplied, reviewed, and shown at the conference itself. This underscores some of the inherent challenges that design professionals face when considering the best way to present potential solutions, but also suggests a design challenge for us as organizers of future events.

Reviewing and judging are difficult. Unlike most of the tracks at CHI, the design competition requires sustained communication with reviewers and student teams through many stages of the process. At CHI itself, judges need considerable discussion to establish agreed-upon criteria for assessing the designs that are submitted. Establishing appropriate criteria is not a simple task—certainly harder than selecting between different design bids from professionals in business settings. Judges need to consider the students' interpretation of the problem, the solution derivation and delivery, *and* the learning experience.

The 2006 Competition. The competition for 2006 is to be in the area of designing a service for healthcare, specifically in the area of nutrition. The World Health Organization states that "malnutrition covers a broad spectrum of ills, including under-nutrition, specific nutrient deficiencies, and over-nutrition; and it kills, maims, retards, cripples, blinds, and impairs human development on a truly massive scale world-wide." This year, we are inviting

student teams to design a service for personal monitoring of diet, exercise, and health for individuals. We invite you to look at the design-competition information on the CHI 2006 Web site. We encourage design programs in universities and colleges to consider this competition as we believe the competition sits well within an academic curriculum. We also invite comments and ideas, and look forward to seeing you at CHI 2006.

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Discovering User Information Needs: The Case of University Department Web Sites

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UNIVERSITY DEPARTMENT WEB pages are the focal point for prospective students, current students, parents, staff, and alumni who want to explore the university. Users visiting these sites expect to find the information they seek, perhaps most notably contact information for various people within departments, but also a wide range of information related to a specific department.

University department sites currently have a wide divergence in styles and content. This could be attributed to a difference in department philosophies and the range of tasks each department must support. Content will also vary simply because different departments have different information to present, and some may put more or less effort to their design. They appear to vary in some cases because they are designed without a plan of what to include.

There are likely, however, numerous common types of users and tasks that all university department sites should support. We believe a task analysis (some would call this a content analysis) is the first place to start to create a successful department Web site. Our task analysis is a set of tasks that could be supported for university department Web-site users.

We present a task analysis of user