

THE HUMAN FACTORS-ERGONOMICS PARADE: A TALE OF TWO MODELS

William C. Howell
Arizona State University

If you attended the last two presidential addresses, you'll recall some pretty heavy use of the parade metaphor. Dave Woods deplored the fact that we HF/E professionals are always cleaning up after it; then Peter Hancock boosted our collective self-esteem by explaining that indeed it's our parade and our rightful place is at the front. I like this metaphor, so I'm making it a three-peat. But my main purpose in bringing it back is to ponder with you a question that's been nagging me for at least a quarter century and I don't think either Dave or Peter addressed—a question that I believe has profound implications for our future: *What, exactly, is this parade all about?*

I'm going to argue that the reason we find ourselves in the poop-scooping detail so often is that in our preoccupation with getting ahead, we've never really resolved the question of what we want this thing we call HF/E to be. As a result, we've been operating implicitly under two incompatible models, and drifting steadily toward the one that I feel holds the least promise. I'll spend the rest of my time today contrasting these models and exploring their respective implications. But first, we need to revisit the problem that kicked off all this parade talk in the first place.

It's pretty much summed up in Rodney Dangerfield's line: "We get no respect." Human considerations are underrepresented in design, our field is underutilized, and we're underappreciated as a science and a profession –by the public, by policy makers, by designers, and by the disciplines we're related to. Why is this? Again, we have a standard list of reasons:

- HF/E is small in numbers and relatively young as a field,
- our public image isn't the best (e.g., packaged common sense; a pseudoscience),
- we're functioning in a culture that's preoccupied with nailing the culprit when things go wrong rather than analyzing the total system,
- decision-makers in industry and government don't appreciate Hal Hendricks' dictum that "good ergonomics is good economics,"
- there are too many scruffy riders on the HF/E gravy train who didn't buy a ticket and give the legitimate passengers a bad name,
- we don't invest enough in self-promotion,
- we don't make our knowledge convenient for designers to use.

Clearly these are all legitimate complaints that merit our attention. But they aren't the *causes* of our influence problem; they're really just *symptoms*—consequences of the unresolved conflict between fundamentally different models of our field. Treating these symptoms will not cure what ails us. Returning to the parade metaphor, it's hard to drum up popular support for a parade if you can't agree on what, exactly, it's promoting, where it's going, or who gets to march in it. And it's even harder if you make the wrong decisions.

Let me put it another way. I think we all share this vision of an ergonomically correct world in which everything's designed from the user's perspective. But we have very different ideas on how to get there, and these differences stem from alternative – and largely incompatible – conceptions of our field. One

views HF/E as an emergent discipline through which we influence design directly; the other, as a general philosophy that we promote through as many disciplines as possible. I'll refer to these respectively as the *unique discipline* and the *shared philosophy* models. I maintain that we've avoided confronting this issue overtly because we know it would stir up a lot of internal dissension and, whichever side won, a lot of valuable members would leave in a huff. Instead, we've contented ourselves with treating symptoms and drifting toward the unique discipline model.

In the interest of full disclosure, I need to make of couple of admissions right up front. First, I'm strongly partial toward the shared philosophy model – and against the unique discipline model – although I realize that I represent a dwindling minority in this regard. Second, to make my point, I'm exaggerating the differences. Obviously, gaining acceptance as an independent discipline doesn't totally *preclude* cultivating a place within related disciplines. Practically speaking, however, I believe focusing on the one works against the other as I'll explain in a moment.

The essence of both models is the belief that human characteristics should be taken seriously in system affairs – something that isn't likely to happen by itself. The default condition is systems that bite – and as we all know, there's no shortage of those. Let's call this core belief the *HF/E philosophy*. Where the two models start to diverge is over the best strategy for getting the rest of the world to buy into this philosophy.

The unique discipline model suggests that we do it by establishing HF/E as the one official headquarters for this philosophy. We proclaim ourselves the one-stop shop for valid knowledge and expertise on human-oriented design, and get other disciplines – along with educators, corporate decision makers, politicians, the media, the courts, and the public – to recognize it. Once they've accepted our discipline's legitimacy, it's just a matter of selling them on the practical merits of what we're peddling (e.g., the “good economics” pitch). But unless we first make it as a unique discipline, this argument goes, HF/E will be doomed forever to an existence on the fringes of respectability. We'll remain a bunch of outcasts manning pooper-scoopers and competing with charlatans for the occasional crumb that designers and decision makers toss our way. Our world vision becomes a pipe dream.

By contrast, the shared philosophy model focuses on selling the HF/E philosophy through disciplines that are already well recognized – or coming to be – and the more the better. Think of it in theological terms. Instead of spreading the gospel by founding a new denomination, you do it Billy Graham style, welcoming any and all comers to your revival meeting – hoping for a lot of conversions. In our case, this means drawing people of all disciplinary faiths into our big tent. The more the merrier and the more of the HF/E gospel they take away with them, the better. But we don't insist that they abandon their faith in favor of ours, or earn a certificate in order to qualify as disciples. Mostly we just want them to understand and value our core philosophy, and to recognize that it's shared by many disciplines, all of which contribute importantly to user-oriented design. We'd like them to appreciate their limitations (as we should ours).

With this basic distinction in mind, let's dig a bit deeper into the implications of the respective models. The unique discipline view is necessarily about boundaries and turf: defining it, controlling it, defending it, and promoting it. To make it as a discipline, you have to have several things. First, you need a *content domain* that's distinguishable from others, that's widely accepted by those who identify with it, and that's recognized by the outside world. Second, you need a *critical mass* of people who are well versed in that content and identify with it. And finally, you have to have *institutional control mechanisms* like accreditation of training programs and credentialing of practitioners to reinforce the boundaries and ensure the legitimacy of those who represent it – especially those who market their services. You also want the folks who generate new knowledge to do so under your banner instead of some already recognized one. You can't afford to let incompetents give your discipline a bad name, nor can you hope to impress anyone if you have to rely on other disciplines for most of your substantive content.

Now, let's contrast these implications with what follows from the shared philosophy view. Since you don't lay exclusive claim to any turf, you don't need control mechanisms to protect it from infidels, or to vouch for its citizens. Rather, the idea is to make disciplinary boundaries as permeable as possible – to encourage human-oriented concepts, theories, and methods (along with those who develop and apply

them) to move uninhibited throughout the territory. The goal is to get all kinds of people to grasp the power of this philosophy, to appreciate the wealth of scientific knowledge it has generated under a host of disciplinary flags, and to commit to advancing the cause – through science, practice, or merely public support. The assumption is that the synergy resulting from diverse disciplines converging on a shared philosophy enriches them all.

Let me make this implication a bit more concrete by focusing on our existing institutions – our professional organizations, scientific publications, professional conferences, and the like. They're important for promoting the HF/E philosophy under both models, but they do it in different ways. Under the shared philosophy view, they serve mainly to educate and lead rather than define and control. Their orientation is outward rather than inward; their perspective, inclusive rather than exclusive. In this model, an institution like HFES serves as the *big tent* under which folks from many disciplines can gather and share their respective knowledge. In the other model, it functions more like an *exclusive club*, reserved for those who've survived the screening process, taken the oath, and learned the secret handshake.

Now, as I said at the outset, we've never made a conscious choice between these two models, although we're clearly drifting toward the exclusive club concept. Lest you doubt it, let me quote from the current HFES Strategic Plan. Our first official objective is to “Articulate the definition and boundaries of the discipline of HF/E and its unique technology,” and the first action item under that goal is to “deliver the message about the boundaries/definitions of the discipline to other organizations.” In other words, stake out turf and put others on notice. I don't think that's quite what our founders had in mind, and I don't think it's the result of thoughtful consideration of where this path leads. Rather, it's the result of knee-jerk acceptance of the unique discipline argument. I'm going to suggest that we've become so fixated on the professional identity route that we've all but lost sight of our original destination: that ergonomically correct world. The means has become the end. And we've all but stopped considering the alternative route.

So at the risk of getting bombarded with ripe fruit, I'm going to explain why I think we're traveling the wrong path. In particular, I want to point out the practical problems that stand in the way of our really making it as a discipline, and by extension, that limit our ultimate impact. Let's review what it takes to be a viable discipline and see how we stack up. You'll recall the core requirements include a *unique content domain*, a *critical mass* of like-minded folks who identify with it, and *effective institutions* to control its boundaries.

What about *content*? Ours is large and diverse, and getting more so all the time. Some consider this our greatest strength. The problem is, our diversity and growth come not from within, but mostly by annexing new territory – pieces of well-established disciplines that we've recently discovered (like *Organization Theory* and *Psychometrics* and *Gerontology*), or newly emerging specialties that we want to co-opt (like *Cognitive Engineering* and *Computer Supported Cooperative Work*). Consider the topics in the 1997 Handbook: they run the gamut from architecture to toxicology, from eyeball anatomy to transportation systems. And if you compare this one to the 1987 edition, you'll find that their number is expanding rapidly, and virtually all of them – especially the newer ones – draw heavily on other disciplines.

Now, desirable as diversity may be in theory, simply accumulating pieces of other disciplines doesn't add up to a unique content. Raising our flag over a piece of *Organization Theory* and calling it *Macroergonomics*, for instance, doesn't make it exclusively ours. Nor does grabbing a hunk of *cognitive science* or *biomechanics* or *social psychology*. And the more we lay claim to, the more problems we encounter. As the former Soviet Union discovered in the geopolitical domain, it's not easy to mold a lot of diverse pieces together into a coherent whole.

I'm told that after the Society crafted its Strategic Plan, the HFES Executive Council struggled mightily to identify our unique content. They found it a daunting task, but ultimately settled on “interface technology.” While this label certainly covers a lot of what we do, I know plenty our folks who don't consider themselves in the interface business, and a lot of outsiders who do – and who wouldn't take kindly to the idea that they're treading on foreign soil. So much for our *unique content*.

What about our *critical mass*? Do we have – or are we likely to attract – a substantial body of like-minded individuals who are well versed in our unique content and crave to be identified as HF/E professionals? Let’s look at the Society’s recent history. We have only about 4,700 members (including students and affiliates), and we’ve been pretty much stuck on that number for 15 years despite heroic recruitment efforts. In fact, the trend over the last few years has been slightly downward. Now, this tells me two things. First, we may be claiming a lot of new territory, but we aren’t converting many of the natives. Second, we don’t seem to be faring much better in growing our own – I’ve seen little evidence that the number of newly minted professionals from accredited HF/E programs is increasing substantially.

I hasten to add, however, that the demand for folks who do what we consider HF/E work *is* growing by leaps and bounds – and that demand is being satisfied largely by folks trained in the disciplines we’ve been trying to annex. Many of these people and the programs that train them just aren’t keen on adopting our name or joining our club – and their employers could care less so long as they can do the job. Let me relate a personal episode that brought this reality home to me.

A while back the late Earl Alluisi and I worked on a survey of experimental psychology graduates who’d wound up in nonacademic jobs – we interviewed them, their employers, and their graduate program mentors. What we found was that most were doing what you’d consider HF/E work under all sorts of job titles, their employers were extremely happy with them, but very few wanted to be identified with human factors or ergonomics. Or, for that matter, with psychology. To them, human factors signified old-fashioned “knobs and dials”; ergonomics, “time and motion studies”; psychology, the shrinking of heads. They much preferred specialized labels like *HCI professional* or *usability analyst* or even *cognitive scientist*. Admittedly this was a biased sample from another decade, but my recent experience editing your journal and chairing the NRC Committee on Human Factors tells much the same story. Folks who are attracted to what we consider HF/E work – be it research or application – aren’t exactly beating a path to our disciplinary door.

Or to the HFES. But while the Society may not be getting bigger, its membership – like its content – is certainly getting more diverse. And not just in areas of expertise but in positions on fundamental policy issues like whether we ought to sanction selected credentialing bodies, endorse government ergonomic regulations, or limit HF/E applications to things that are solidly grounded in science. Such differences of opinion may be stimulating, but they certainly don’t do much for the *critical mass* requirement. A small cadre of diverse specialists who disagree on fundamental professional and scientific issues is hardly the formula for successful discipline building.

And that brings us to our third requirement – defensible, meaningful, *consensus-based control mechanisms*. Since this gets us into the business of credentialing, which I want to explore in depth momentarily, I’ll simply point out that a large, diverse content domain shared with many other disciplines and populated by folks who don’t all see eye to eye isn’t real conducive to the creation of defensible control mechanisms.

So where does this put our chances of making it as a unique discipline? I don’t know what the Las Vegas oddsmakers would say, but I sure wouldn’t lay my money on it. We seem to be lacking in all three core requirements, and the trends are not encouraging.

Much of the huge, diverse content domain that we now include within our self-defined boundaries really belongs to other disciplines that don’t seem inclined to cede it to us. It’s they who are doing the cutting edge research in their specialties, and very often it’s their students who wind up in the design roles we feel should be reserved for our kind. We complain, sometimes with good reason, that they aren’t prepared – either by training or disposition – to do HF/E right. And what’s worse, some of them don’t even realize it. *But the question is, will tightening control over our small flock of sheep and distinguishing it from their vast herd of assorted goats improve the situation?* I doubt it, and I’ll be very specific as to why. Let’s return to the unfinished discussion of boundaries and quality control.

The standard means of exercising control over an applied discipline is *credentialing* – accrediting training programs and certifying individuals. Of course, we’re already doing both to some extent, and a lot of you want to see more of it. Problem is, our growing diversity and lack of a unique content make it very difficult to define and enforce meaningful credentialing standards. If we expect programs and

individuals to cover the waterfront, their knowledge will be a mile wide and a foot deep – offering little improvement over the ill-prepared outsiders we so roundly criticize. If, on the other hand, we sacrifice breadth for depth and tolerate wide variation in specialty profiles, how can we distinguish our sheep from their goats? Can we really say that a well-trained cognitive psychologist or computer scientist who doesn't know squat about ¾ of the topics in our Handbook, but recognizes that human considerations are important, is less qualified to design interface software than somebody who's got some HF/E credential for roughly the same content? I don't think so.

In my view, what credentialing generally does – unless it's very specific and rigorous and demonstrably valid – is encourage mediocrity at the expense of excellence. This is particularly true in cases like ours where the content domain is large and diverse. All you can do is set minimal, flexible standards that result in wide variation in the quality of those holding the credential. Programs with few other virtues will make sure they clear the accreditation bar; marginal individuals will do likewise with certification. In both cases, it's their only route to respectability, and it puts them on a par – officially – with the best in the field. If you want to see how this works, you need look no further than that paragon of institutionalized mediocrity, the *public education* profession. Will it spare society from *real* incompetents? Maybe a few, but at considerable cost. And the evidence of overall benefit is shaky. Personally, I've seen just as much dubious work – research, applications, and court testimony – from certified members of this profession as I have from the unwashed. And I've seen some damn competent work in all three areas from outsiders. I understand the concern about clueless computer scientists and physical therapists calling themselves *HF/E experts*. I just don't think credentialing will fix it.

Looking at it from another angle, I'm not sure expanding certification and accreditation would have much practical effect even if it actually did elevate quality. Why? Because you still have to convince the rest of society, and when you're small and new and competing against firmly entrenched disciplines that claim large hunks of the same turf, that's not easy to do. Especially when you don't even register on the public radar scope, and what you're pushing is basically a generalist product in a specialized world. What HF/E credentialing really does, in my opinion, is give club members a leg up on the competition in a few settings – like the justice system – where any official-looking credential is presumed to mean something. Usually by people like judges or managers who are clueless as to its significance.

Summing up the case against the unique discipline model, I don't think we have a well-defined domain that we can call our own, or much hope of creating one. We're small in numbers and holding – neither defectors from other disciplines nor bright-eyed students are beating a path to our disciplinary door. And that catchy name we've saddled ourselves with doesn't help much either. On the other hand, the HF/E philosophy is alive and well and beginning to take hold. If we weren't so hung up on the discipline thing, we could be giving it a real boost in the right direction. And one more thing, the further we move toward establishing our independence, the more distance we put between ourselves and the disciplines from which we draw the most vital new information. I've seen it happening already in material submitted to the journal, and it's not a pretty sight.

Okay, so I'm big on the shared philosophy model, but I haven't said anything about what, exactly, we'd do differently if we were to move in that direction. Now I will, starting with education and training. Would we scrap the excellent programs that now train folks in HF/E? Of course not. But we wouldn't waste our energy and theirs on some futile accreditation effort. We'd let the educators decide how to train them, and the market decide which programs produced the most useful talent. Instead of *dictating*, we'd *facilitate* – helping educators and students track the market and vice versa, and promoting information exchange among our many disciplinary constituencies. We'd continue to do surveys. And we'd publish educational *guidelines* (not *requirements*) – not just for HF/E programs, but for courses at all levels in all sorts of programs, from kindergarten to the doctorate to adult education. *If anything, we'd devote more attention to getting the HF/E philosophy into "foreign" fields than to protecting the purity of our own.* We'd put more emphasis on short courses, workshops, continuing education programs. Conversely, we might encourage our own HF/E programs to rely more heavily on other disciplines for content such as organizational behavior or psychometrics or cognitive psychology instead of [them] trying to do it all themselves.

Would we give up our HF/E publications and conferences? No way! These are, after all, the very institutions through which we can best promote and illustrate the HF/E philosophy and connect the diverse disciplines that contribute to it. We'd want to attract leaders in related fields to submit manuscripts to our journals and become avid readers. We'd want them well represented at our Annual Meeting. The wider the audience, the greater our influence. We might even want our Annual Meeting to feature more cross-discipline programming instead of just competing sessions that appeal only to specialists.

Would we continue to lead the effort to develop evidence-based HF/E standards or "best practices" documents? Why not? Who's better positioned than we are to convene the necessary experts to do this job right? But instead of searching primarily within our own boundaries, we'd start with the disciplines where the best information on the relevant human characteristics is found – be it biomechanics, sociology, medical ethics, cognitive engineering, or gerontology. This is a role, I believe, for which we are preeminently qualified.

And finally, what about the HFES? Would it wither and die if it abandoned its primary objective of defining and defending boundaries? Would it suffer irreparable damage if it quit trying so hard to get recognized as an exclusive club and focused instead on drawing the unwashed into our tent and enlightening them? I don't think so. To the contrary, I believe we might over time experience growth beyond our wildest dreams – and not just in numbers, but influence. Heretical as it sounds, I'd *relax* membership requirements and category distinctions rather than tighten them, making it available to almost anyone who could demonstrate a sincere interest in human-oriented design. If Society membership wasn't viewed as an implicit disciplinary credential, we wouldn't have to worry so much about who we let in. And if we didn't pretend to represent a unified disciplinary perspective, we'd have far fewer internal problems. Let me dwell on this point for a moment.

As President, I've spent much more time and effort this past year wrestling with issues caused by our disciplinary compulsion and related politics than on anything else. Members want the Society to speak loudly and with one voice on matters of great significance, like the OSHA ergonomics standards, the IOM medical accidents report, and the Florida voting debacle. The problem is, each of our constituencies wants us to say something different, and gets very upset if we don't. Issues like HFES's role in accreditation and certification, what we publish in our journals, our Fellowship status requirements, and even what we call ourselves are equally contentious – for exactly the same reason. *Most of these problems would vanish if we didn't try to cobble ourselves together into something we aren't.*

I've often wondered how we got ourselves so committed to this unique discipline model in view of what seem to me its obvious limitations. I don't have the answer, although I have strong suspicions. I think some of our folks truly believe it's the only way we can have a real impact on design. I respect their conviction but question their logic. Others are somewhat less altruistic: they realize that claiming and holding turf can give our folks a competitive advantage, and that's at least partially what's driving them. It's purely a guild thing. I respect their logic but question their motives. But I think the biggest reason of all is simply inertia. After all, we've got a name (of sorts), a clubhouse, some journals, an annual meeting, and a gaggle of folks with at least something in common – why *not* call ourselves a discipline? Most of us have just sort of assumed it's the thing to do without seriously questioning it or thinking through the implications.

To me, the bottom-line question for the field and the Society to ponder is one and the same: *Do we want to remain a relatively ineffectual mutual admiration society or make a difference?* If our parade is really about making the world a better ergonomic place, the unique discipline model won't get it: we're too small, too diverse, and too obscure. The only way we can reach that goal is by leading a movement within *a lot* of established and emerging disciplines – adopting some version of a shared philosophy model. This doesn't mean stepping aside or compromising values; just changing strategies. We can and should be the driving force within the HF/E movement, the main spreaders of the gospel. Integrating, facilitating, convening, and, as Dave and Peter so graphically put it, *leading* rather than cleaning up after what in fact *is* our parade.

If, instead, our parade is mostly about gaining for the chosen few a dubious edge on the competition, the unique discipline model may well succeed – but only at the expense of the loftier objective. Just let's not delude ourselves into believing it's a viable means to that noble end rather than the end itself. That's what's known in my discipline as *rationalization*.

So, that concludes my substantive remarks. I imagine many of you will remain unconvinced, and some may even be angered by my audacity in straying so far from orthodox thinking and spoiling the party. One would expect a Presidential address at a Society's annual celebration to be a rallying cry – a stirring pep talk that sends everyone away feeling good, fired up, and ready to do or die for the home team.

Let me assure you that my intent was not to offend or deflate. Quite the contrary, it was merely to stimulate serious thought at a most propitious time. As you may or may not know, our Strategic Plan is currently undergoing an intensive review – and I hope you'll pay close attention, letting your representatives know how you feel. If you're happy with the current emphasis on defining and defending boundaries, fine; after all, it's *your* parade. I just wanted you at least to consider another option – the one that once attracted enthusiastic marchers still has a lot going for it but has succumbed, I believe, to more parochial interests. If you all do that, and do it seriously, there'll be no lingering doubt over what this parade is really all about once the review is completed – whatever path it takes.