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THE PERENNIAL AND THE PARTICULAR CHALLENGES OF DESIGN EDUCATION

ABSTRACT

Education in design shares with other disciplines a number of perennial challenges, including the need to transfer human culture, the choice of what parts of human culture to transfer and the decision as to what approaches work best in accomplishing that transfer. Design education also faces particular challenges, which are shared with only a few other disciplines. These are a predisposition towards the future, the increasing necessity of interdisciplinary approaches and the value for students in participating early in the culture of research. I argue for curricular advancements to accommodate each of these factors, including in particular a design PhD modeled on the humanities. Finally, I emphasize the importance of providing students with sufficient time to reflect.

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EDUCATION HAS A SET OF CHALLENGES THAT ARE PERENNIAL

First is the need for transfer of training, experience, knowledge and insight. Let’s refer to these things collectively as the cultural archive. The existence of that archive and its means of transmission is at the center of human culture. The transfer is often associated with youth and age, although it isn’t necessarily connected in that way, and with the exponential growth of change, it is increasingly not. What this means for the future of design education is that we can expect the trend to continue where it often happens that students know more about the current environment and immediate future than their instructors know. If our model is education as transmission, we limit the possibilities for combining the various kinds of knowledge available around the table for the best educational advantage. Alternatively, if we accept the concept of knowledge as co-creation in an environment that has been properly scaffolded to support learning, we have opportunities to bring together the best that all participants can contribute for their mutual advantage.

Which leads to the second perennial challenge – determining the extent to which the training, experience, knowledge and insights of one generation or one group of people are relevant to another group. It is often the case that what we have learned is no longer relevant and may even be incorrect. Much of it is culturally bound, with different cultures privileging different parts of the archive, and in addition, culture changes. Further, a significant portion of what we have learned, especially through experience, is essentially an accumulation of mistakes that we would avoid

making again, rather than an accumulation of good strategies that we would leverage for future benefit. As William Saryon's Armenian uncle (*Saryon, 1940*) so eloquently puts it:

| *"It is no harm. Pay no attention to it."*

Yet anything that has consumed our time tends to attract our attachment, so that we feel the necessity of proving that our time was not wasted, by believing that some of that time was well spent in learning valuable lessons. And in order to support the belief that the lessons were valuable, we seek to pass them on to someone else. In essence, we find ourselves in this quandary: "I have spent a lot of time learning things and they are no longer relevant. Now I am in the role of a teacher." This sequence of causes and effects, coupled with belief in the transmission model of education, is a significant part of the desire to use obsolete technologies in the classroom.

Third, given the premise that at least some of our cultural archive is worth transmitting, there is the vexed question of what approaches to teaching and learning actually work. To what extent is it possible, in fact, to teach, or is it best to think that the primary possibility rests with the capacity of the student to learn?

A corollary here is how best to determine whether or not someone is ready to learn, or we may say is at a teachable moment. We have tended to solve this by making learning expensive and hard to get, so that people self-select. But the granularity is too coarse and a lot of potential is left fallow.

A second corollary is the perennial challenge of how to assess learning. Given that someone needs to learn something, at what point is it fairly well established that the learning has taken hold? The best measure of education that I know of is behavioral change. If a person is capable of doing something after being educated that was not possible before being educated, and the person chooses to exercise that capacity, then education has unquestionably taken place. Slippages are possible, however, on any of the components of that declarative statement, and the simplest examples are where education consists of vocational training, which I recognize as only a deprecated subcategory of the more preferred process of education in a general sense.

It is also important at this point to distinguish learning from accomplishment. Someone can arrive at the classroom, for example, already having mastered the material—that is, in a state of accomplishment. That person will score well on exams, but will learn very little. Another person may arrive with no knowledge and gain a tremendous advancement, but score on average poorly on the sequence of exams. This is one of the fundamental injustices for everyone concerned.

As a constructivist and enthusiast for Freire (1970), I tend to feel that sufficient time spent in an environment that supports learning is a key element. People arrive at an understanding of the material at hand by engaging with it on their own terms and producing something relevant to the material. In order for students to get the greatest shelf life from the time spent learning, I advocate combining enthusiastic engagement with the material with a meta-reflection on the abstract or philosophical implications of the subject, or perhaps we might say an interrogation of the terms, the context, the felicity conditions and the bounds of discourse around the subject (*Foucault, 1976*). In some ways, the process is possible without a theoretical or philosophical basis, but it is strengthened when such a basis exists. As my colleague Keiichi Sato puts it, we can compare different methods in mechanical engineering because they share the common theoretical basis of Newton's laws of motion (*Sato in conversation*). Design does not yet have the equivalent theoretical basis, although I would argue that both general design theory and human factors has been, and will continue to be, a step in that direction.

DESIGN EDUCATION HAS DOMAIN SPECIFIC CHALLENGES

Now to turn our attention to design education, we face all the perennial challenges of education, and we add a few that are domain specific. Foremost among these is the disciplinary predisposition toward the future. It is necessary but not sufficient for the designer to have an understanding of the past and present, which is where most education has the luxury to end. In the case of the designer, the construction or extension or revision of the future artificial is the goal of the activity, and to facilitate that orientation toward change, it is beneficial that practicing invention be part of the education.

In other domains, invention is largely the privilege of the elite specialist, who has sufficiently mastered the archive to know what are its boundaries. For students completing an undergraduate degree, in whatever field, we ask that they can rehearse a part of the received wisdom in their own words. That is, we want them to have internalized some portion of the cultural archive relevant to their area to the extent that they can talk intelligently about it. For students completing a PhD program, we want them to be able to talk intelligently and comprehensively about a good percentage of the literature relevant to their area (which has admittedly been largely impossible for most domain areas of any appreciable size for more than a hundred years). We also want them to know how to produce research questions and pursue them to obtain valid kinds of evidence and argument. We want them to know how to manage objections. Fundamentally, we expect them to add to the archive, in whatever small proportion, and communicate that contribution in writing, usually at the length of a book. In the middle terrain are the masters students, who may be anywhere in the continuum between those difference poles.

But for design students, the contribution to the future artificial is a kind of addition, at least in potential, to the cultural archive. So it would be beneficial if design students could begin to learn, as early as possible, what is involved in making that kind of contribution, so that more of their efforts have a chance of being included. That is, there is a need for increased participation by students in the culture of design research; the factors relevant to a research contribution should be introduced early, and scaffolded appropriately by the professors who are working with students at different levels of knowledge and experience. These factors include the need to become familiar with the relevant portions of the archive, to be able to formulate research questions and determine what kinds of evidence are appropriate, to collect evidence, analyze the findings and communicate the results.

I have done this kind of research work with over 65 different student researchers in the past ten years, from junior undergraduates at community college to senior postdocs at top-tier research institutions. There is no question that many challenges exist, and that they are different challenges at each stage of the educational and mentoring processes. It also does sometimes happen that students are simply not ready to begin thinking

about research. I would argue that those students might be better off not pursuing university education, since I believe that universities are where we attempt to maintain diversity, as my colleague Susan Liepert has so eloquently expressed it, in the gene pool of ideas (*Liepert in conversation*). For those who are interested and able to engage with research practices at some level, it is useful to be able to identify the points along the continuum at which the student can already contribute, can contribute with some mentoring, and will be able to contribute at some future date, but not at present. One of the outcomes of mentoring in research is to help the student move along that continuum.

In connection with that series of changes, we would like for them, as soon as possible, to begin engaging with the processes of creativity and invention. Some design schools explicitly address these needs, delving into what the cognitive psychologists have learned about the relevant processes. My colleague Ahmad Fakhra has been looking into this area as the subject of his PhD research (*Fakhra and Gregory, 2010*). I believe that there is a good future for this kind of educational innovation, so that future design students will be able to talk with some confidence about the cognitive processes involved in creativity, and will have available a set of toolkits for invoking creative processes as they are necessary.

Another challenge that is not unique to design but is still fairly domain-specific is the need for students to learn about interdisciplinary approaches. Design is one of those (admittedly increasingly common) areas of human activity where the results are better when a group of specialists can cooperate effectively. One pedagogical approach that I have used in this context is the formation for course purposes of interdisciplinary research projects where the student leading each project can only choose team members from among other people who are not in the course. They define the kinds of people they need for the project, then go and recruit. The other team members might be junior colleagues, senior colleagues, or at the same level as the students. They might be from the academy or outside the academy. But the student needs to justify their presence on the team—then manage their efforts to a successful completion of the project. I can see that future versions of this strategy might involve a greater scope, so that there are for instance team members who only participate virtually, or groups who contribute through the

establishment of some “architecture of participation” (*O’Reilly, 2004*). I also foresee an increased role for what we might naively call artificial intelligence on research teams, but in fact this may simply take the form of advanced technologies that we are at this point only able to glimpse.

One of the things those technologies should provide is enhanced access to what will be a better archive specifically in the area of design. There is excellent design research being done in a whole range of areas, and the systems for allowing researchers to discover it, understand or interpret it, and apply it to the next project are among the areas of design research that are advancing. A better archive will provide not only better access to research results, but also improved access to the data, so that it can be re-arranged, aggregated and re-analyzed in new contexts. We should also begin to pay more attention to the idea of replication studies, where previous results are interrogated through researchers re-running studies in different environments. A better archive will also contain kinds of metadata that are not currently available, in order to assist future researchers in discovering relevant studies (e.g., the *Scalar* project). This metadata may exist within documents, where XML encoding has been applied in interpretations that can be layered over time. It may exist within documents, so that, for example, a researcher could locate previous studies by research method, or by demographics of study participants, or by the statistical measures applied. Finally, it may exist at the level of the collection, so that pre-existing subsets of the archive can be examined along with analysis that has been done on them.

What this implies for the PhD in design is that it should come to accommodate more directly the nature of the field. Many excellent design PhDs at the moment draw their approach from the sciences and social sciences, which produces a good result, but does mean that they tend to sidestep the production of new cultural artifacts in favor of the study of existing cultural artifacts. I am interested in a design PhD that draws instead on the tradition of the humanities PhD, where the research takes an object of study (for example a novel by *Dickens*) and subjects it to interrogation through some theoretical lens (for example postcolonial theory). The result is that each PhD project, and indeed each instance of subsequent scholarship, is intended to enrich the original object

of study through an accretion of observations, analyses, syntheses and reporting.

For designers, a PhD of this kind would include the production of a sufficient set of new cultural artifacts to constitute an object of study representative of an interesting topic domain (for example an ecosystem of intelligent domestic appliances) coupled with an interrogation of that set of designs through an appropriate theoretical lens (for example the concept of social capital). The discussion in the dissertation will need to include the rationale for accepting the designs as appropriate representations of the topic domain, in addition to the actual theoretical interrogation.

All of this of course takes time, and a final entry in the list of perennial problems of education is to be able to give the students sufficient time to reflect. While it is true that behavior change can be accomplished by putting people on an educational treadmill, the change to behavior in that case will not include the tendency to pause and think things through. If the culture values education, it should not penalize students who would benefit by being able to take some years on a problem and engage it at a sufficiently deep level. As Simon (1969, 108) has observed, it takes at least a decade for someone to develop the highest levels of proficiency in a field. Given that the duration seems prohibitive, the potential benefits are also enormous, and I believe we could all benefit by collectively making education a much higher priority than it has been to date.

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