

02 Reflections on Teaching Research: A Conversation with Meredith Davis, Mary Dyson, Judith Gregory **SHARON POGGENPOHL**

ABSTRACT

As research in design is gaining traction in university programs, understanding approaches to teaching research skills, the value of a research approach in design and even fundamentally reflecting on what research is becomes germane. Like varieties of design practice, there are many varieties of research process and methods to address different research questions, and certainly different programs have different goals for their students at various levels of education. Three faculty teaching in university design programs with years of experience guiding research projects, reflect on their experience, offering different perspectives on this emerging topic.

> **AS** design is growing into a more knowledge oriented enterprise and designers are collaborating on larger, more socially far-reaching projects, the issue of using existing research and developing original research becomes a significant issue in design programs. Some universities are insisting that design take a place in knowledge development along side other disciplines that have a long research history. This puts pressure on faculty without an appreciation of research, much less the skills, to participate in a new initiative.

Unfortunately, research carries for some a stigma of inconsequence relative to design, or is seen as a puffery and intellectual inflation of academic origin. Varieties of research, their creative potential and usefulness in practice are often dismissed within both academic and professional contexts. Further, despite numerous sources offering practical knowledge about how to support creativity (Adams, 1986; Gordon, 1961; Holyoak and Thagard, 1995; Koestler, 1964; among others), some believe that the mystery of creativity must be maintained and think it is undermined by the logic of research. Given the typical humanities background of many design students and teachers, creative science is unheard of and unknown. Added to this is the design focus on making and doing as opposed to deeper questioning and critical thinking. Under pressure from university administrations with regard to research production, there has been a dilution of the meaning of research to include projects of little substance that yield little if any knowledge. The combination of these factors makes for considerable resistance to research. Yet, among the university design programs that integrate research into undergraduate through doctoral programs, research is developing and its knowledge product is increasingly apparent in international conferences and a few design journals.

The National Association of Schools of Art and Design (NASAD), the accrediting body in the United States for these programs, is in the process of adopting new guidelines for assessing these programs. Research is prominently mentioned in the new guidelines and separate standards for graduate professional and PhD programs are present, differentiating their teaching/learning goals. The American Institute of Graphic Arts (AIGA), the largest professional organization for design in the States has already adopted these standards.

As this initiative becomes more widespread, the need for reflection on teaching research across the curriculum becomes apparent. It is in the spirit of such reflection that the following conversation on teaching research in the context of design is offered. Participants in the conversation were selected based on their experience and commitment to teaching research and their dissimilar backgrounds. Meredith Davis has a background in design, Mary Dyson has

a background in psychology, and Judith Gregory, a background in informatics. All have years of experience doing and teaching research. Like many other design skills, the experience of doing deepens and amplifies the ability to teach this skill. There is no one unified way to approach research or teaching. Like design itself, with multiple forms of practice, the following reflections are based on differences in experience and goals.

Before the conversation begins, introductions to the participants are in order.

MARY DYSON

teaches research skills for essays, dissertations and theses in the Department of Typography & Graphic Communication at the University of Reading, UK. She has taught there for nearly thirty years and began supervising PhDs early on. She introduced classes to prepare undergraduates for researching and writing dissertations around twelve or thirteen years ago. This has spread to Masters students (MA Typeface Design, MA Information Design, MA Book Design, MA (Res) Typography & Graphic Communication). She also teaches the design of empirical studies through an undergraduate and masters project.

MEREDITH DAVIS

has primary teaching responsibility for graduate students in the Master of Graphic Design program and the interdisciplinary PhD in Design program at North Carolina State University. Although she has developed undergraduate curricula that develop student attitudes toward research, her focus has been teaching master's students since 1978 and doctoral students since 1999.

JUDITH GREGORY

has in one way or another been addressing different communities of practice and learning, primarily within graduate programs at the University of California/Irvine, the Institute of Design at the Illinois Institute of Technology, the Institute for Informatics at the University of Oslo, among others. She has been teaching research methods for fourteen years and her expression of qualitative research methods includes theoretical and philosophical contexts along with methodologies and methods.

SHARON: *Do you have a general model of research you refer to when teaching about research?*

MARY: I don't think so, which means I don't use an explicit model. A structure is provided to students for how to develop their dissertation proposal. I also get students to read and analyze past dissertations (under- and taught post-graduate) that have received good marks to identify their positive characteristics. Through these sessions, we discuss things like the way topics have been researched, how the dissertation is structured, nature of sources, etc. What this session reveals is that we do not have one model for a dissertation in our department. I guess I am addressing what we mean by research.

One approach that we encourage is the analysis or evaluation of original material, which may be collected by the student, found in an archive or collection, or created for the purpose of testing in an empirical investigation. This applies at undergraduate as well as postgraduate level and can apply to theoretical or historical topics.

MEREDITH: Master's and doctoral students have different reasons for learning about research. Our master's students are enrolled in a professional degree program with a studio focus and most won't continue as doctoral students. Their interests are largely those of professional practice in which the intent of research is to inform design decisions in a specific context. They aren't terribly concerned about certain kinds of details, such as sample size, or the generalization of results to the level of theory. Instead, they want to make informed judgments about the direction of their practice and to deliver well-reasoned solutions to practical problems.

Doctoral students, on the other hand, are interested in the development of theory that is relevant to a variety of contexts and an array of readers, some of whom have no background in design. There are broad categories of content that I talk about with these students. Don Norman has mentioned some of these categories, but I've added to his taxonomy with points I think he overlooks:

How designers think addresses research relevant to current concerns for innovation in ways that are deeper than managerial strategies. In particular, we've been interested in what design thinking can bring to teaching and learning any content.

What people want and need is important to any user-centered design practice.

What the context demands addresses those issues that benefit more than the individual and that define modulations in the culture at large. Sustainability, for example, is more than something an individual wants or needs.

How design is planned, produced, and distributed includes the processes through which designers take action. Historically, there has been a lot of attention on production but less on distribution, which rises in importance in a digital world.

What effects design action has on people and settings examines the consequences of change for people and the surrounding social, cultural, technological, physical and economic environment. This includes the study of design history as well.

The research methods we use to study these issues are also a focus. The methods used by many design researchers have been borrowed whole cloth from other disciplines with little regard for how the people and settings for design may require new strategies.

We teach a course in research paradigms that exposes doctoral students to various philosophical and epistemological approaches to research. This work leads to the development of a conceptual framework, which we ask students to diagram and to support with appropriate literature. As an interdisciplinary design program, there are a number of paradigms represented by student research projects and faculty who supervise doctoral work. There is work that takes a positivist approach (daylighting and priming studies, for example), but also projects that are more phenomenological.

We don't try to narrow the range of positions, but students must be able to locate their positions within the larger landscape of ideas and be accountable to the standards of evidence within that position. We don't promote a single model of research.

JUDITH: My approach to teaching research methods in design education shares the principles that Meredith has outlined so well. I teach and have taught from more than one model of research in the sense that I've taught research in different disciplines: design, informatics, public health. I have theoretical and philosophical backgrounds in cultural-historical activity theory, actor-network theory and science and technology studies. The continuity between these

lies in common commitments and respect for phenomenology, ethnomethodology and appreciation of practices, experiences and discourses in situ and how they change and transform over time.

In teaching at master's and doctoral level, I emphasize the individual's (or team's) design research strategy in relation to the object of inquiry: thoughtful consideration of the problem and opportunity space (problematization); the coherence of the research methodology (creative multiple methods but not eclectic); clarity of one's research language (and fluency with some other research languages); and clarity of the line of argument. Figure 1 is a general look at the process.

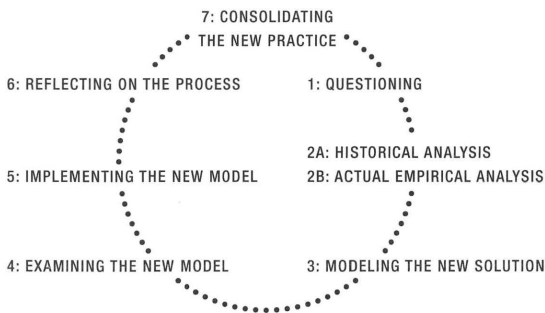


FIGURE 1 Sequence of epistemic actions in an expansive learning cycle
Adapted from Yrjö Engeström

SHARON: *If you were to scaffold the teaching of research across undergraduate through PhD experience, what learning goals would be present in each degree level?*

MEREDITH: At the undergraduate level, I think we need to do more in teaching students to frame design problems. Too much of what students do is predetermined by the faculty's definition of the project and its deliverables. In writing project briefs, faculty often strip problems of their internal conflict and overly focus all students on doing the same thing. And there is a lot of emphasis on designing formats (posters, websites, exhibitions), not on designing the interactions among people, activities, and settings. It is these latter concerns that require research. When students are given a "territory" and asked to systematically generate questions within that territory, they develop predispositions for research. And we can hold them accountable for learning about users and their contexts in our judgments about their work.

Master's programs, in general, are too much like undergraduate programs. They refine skills and fill in gaps rather than produce professionals with distinctly different competencies than those of undergraduates. It is evident in the discourse of professional magazines that most employers don't understand what designers with master's degrees bring to the workplace. I think master's students need to learn research methods that are matched to professional practice and to think about design in terms of its intersections with larger systems. If master's programs were about preparing practitioners who bring the influence of design to places where it previously had none, students would add value to professional offices. At the same time, the research perspectives that underpin such activity are preparatory for doctoral study.

Evidence-based doctoral programs are about building a research segment of practice in the field and constructing theory that drives practice. To accomplish that, we hold students accountable for the following:

Skills include the ability to:

1) review and summarize seminal literature; 2) write proposals that clearly articulate researchable questions; 3) develop and employ methods for influencing and measuring the impact of design solutions in responding to human needs; and 4) organize and present research findings in ways that are useful to designers, policymakers, community groups, and others whose work is enhanced by an understanding of design issues.

Critical perspectives ask that students form and articulate critical perspectives about specific research paradigms and methods.

Knowledge building addresses the production of knowledge that supports the decision-making processes and practices of designers, policymakers, community groups, and audiences/users of design, as well as the theoretical knowledge that contributes to the broader understanding of the discipline.

Dissemination asks students to subject their research to peer review and to develop skills in sharing research broadly.

MARY: This is putting me on the spot, but I have referred to our module descriptions for taught programs as these formalize the assessable learning outcomes.

At UG level:

- locate and assemble information on their subject
- review the literature of their subject
- draw on the appropriate methodology for their subject
- organize material and articulate effectively in written form

At Masters:

- exercise independent judgment
- locate, analyze and explain information about their topic
- critically review and evaluate the literature associated with their topic
- employ methods of enquiry appropriate for and relevant to their topic
- organize complex material
- write clearly, judiciously make and use illustrations, and present their dissertation to a satisfactory standard

For PhDs, I can draw on the criteria for examining the thesis:

- a critical understanding of their field
- an original contribution to knowledge
- recognition of the value/contribution of the work
- putting the work in context

Because of the timescale and scope of a PhD, I also encourage students to develop a coherent argument through the thesis and make links between possibly discrete pieces of their own work. They also need to appreciate the depth of argument required.

JUDITH: I'm very much in agreement with Meredith's critique of current Master's programs and the challenges for where they need to go. There's much room for creative recasting of Master-in-Design programs to orient more towards research principles that are shared across the sciences and to provide students with critical thinking and reflective acumen for the responsibilities that come with being a designer and designing. To be leading not only following.

SHARON: *Do you think an understanding of science is important for undergraduate students?*

MARY: Not in any comprehensive manner. As I introduce students to empirical research findings, I do want them to be able to evaluate them to a certain extent. I therefore introduce constructs such as hypothesis testing, reliability and validity. When they carry out their own testing, they learn more about experimental design.

JUDITH: Science is more important than ever—my high school and undergraduate teachers were wrong about ‘not everyone’ needing sciences, math, etc. I believe these are critically important going forward. Contrary to advocates of ‘informal learning’ as the mode of learning, I believe we need to carefully construct the zones of proximal development that take us (we and those with whom we learn also known as those whom we teach) from ‘half a concept’—which one can acquire informally, in situated cognition and from/in highly skilled practice—to ‘full concepts’—acquiring and internalizing scientific concepts. That is to say achieving those qualitative leaps that can carry one/us/all forward. I’m for a research language that traverses design and science (does not deny, does not dichotomize). I feel the same way about the liberal arts—contrary to regression in some circles towards ‘vocational’ and ‘technical training’ being fine for the great many, I believe that we need the liberal arts, humanities and design more than ever.

SHARON: *You mention “zones of proximal development,” Vygotsky’s powerful concept (1978). Recognition of a student’s understanding and level of performance is critical to helping them move along (figure 2). In graduate programs the variety of these zones among the students is a challenge and student backgrounds vary considerably along many dimensions, perhaps requiring a case-by-case approach to individual development.*

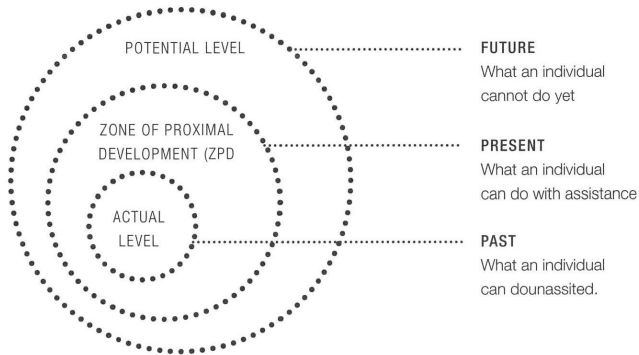


FIGURE 2 *Zones of proximal development*
Adapted from Wonjoon Chung

JUDITH: Design has been transformed by interactivity, interdisciplinarity and infrastructural responsibilities given the influence of ‘the digital’ across all fields and in social life. These layered transformations expand design responsibilities. Concurrently, the digital turn has opened onto youth, young designers and ‘citizen designers’ engaging in and creating new modes of learning—appjams, hackerspace, copyleft, open source, crowdsourcing, citizen designer, citizen science.

Design is especially well-positioned in Knowledge Mode II that refers to the generation of multiple forms of knowledge and contributions to social policy-making through collaborations between publics, industry, scientific enterprises and civil society (Kuutti, 2007, 2009 and others). Design students should gain the foundations of design thinking that can enable them to engage in such arenas. Having said all that, we should never neglect the importance of designing for 'everyday charm' and beauty in everyday life.

MEREDITH: I think it is important for students to understand disciplinary differences in modes of inquiry, which includes science, social science and the humanities, as well as design. Further, I think it is important for them to understand how these disciplines organize knowledge and what intellectual standards they apply to judging work in the field.

Traditionally, the general education of undergraduate design students has been "proximate" to their study in the major. Courses in various disciplines run concurrently with design study, but design faculty rarely know or make use of the content or concepts that students tackle in non-design courses. Occasionally design faculty will ask students to use content from other fields as the subject matter of design projects (for example, a poster on global warming), but the faculty don't assess the mastery of non-design content nor do they talk about the world views and methods of these other disciplines. Neither is there much instruction in reading research findings in other fields and students are often left on their own to make the leap from available data to design form.

These circumstances mean that students enter interdisciplinary collaborations with other experts at a deficit. The complexity of contemporary problems makes it likely that graduates of design programs will work in teams.

If they don't know how other fields define and solve problems, designers are at a distinct disadvantage and likely to be at the cosmetic end of a decision-making food chain.

I also think today's environment for practice has little tolerance for decisions that are not supported by compelling evidence about people, their activities, and settings. This heightened accountability for anticipating the outcomes of design action suggests that designers need to know what questions to ask and how to assess the implications of answers. Many of these issues can't be addressed through the traditional perspectives of design. So to prepare students for practice, schools have to think about what kinds of new information

are necessary to underpin the conventional form-making activity of design and how students make judgments about relevance.

SHARON: *Regarding literature searches, what do you suggest if the literature is too extensive?*

MEREDITH: I believe students need to master the compilation of meaningful bibliographies, regardless of the student level. I'm not comfortable with telling them what to read and what not to read or having them work with someone else's bibliography. There is no shortcut to developing this skill; they have to slog through the literature to understand what is relevant.

That said, the search involves finding what is seminal in the field and developing phased strategies for reading. They need to become familiar with citation and to read for the frequency with which particular studies are mentioned in the information they find. I send them to the library first for reviews of tables of contents and the light reading of several chapters. Their natural tendency is to dive into single books, reading and taking notes from cover to cover. That approach isn't very strategic when there is a lot of territory to cover, so we talk about that and how to build a log of what they've read.

Another practice I use is to give them a seminal text and ask them to work outward from that book or study. What kind of thinking led to the text and what ideas followed because it was published? I think it is important for students to see sources in a chronological listing; there is something to be learned by what authors address at particular times in history and who followed whom.

JUDITH: I mentor and coach students at master's and doctoral level on strategies for conducting literature reviews and forms of discourse analysis. Off the top, I recommend to 'talk' to people whose writings you especially cotton onto. To be ready to talk with them, read key works they value, writings that they place in proximity to their design research inquiry and design practice. In addition to usual literature searches—for which university librarians are terrific resources, I also ask students to choose two journals and peruse the journal over a ten-year period for the discourse on their topics of design interest. These days, students are often already adept at web searches; yet they will benefit greatly from expert help for cross-disciplinary searches related to their design focus and to get to a sound research level of familiarity with the literature.

Periodization of the discourse(s) is important, helpful—and artful. Mentors and key thinkers can help with this. One thing I learned as a young research analyst and new entrant into emerging discussions

is to talk with leading people and find out about someone's own 'self-critique' or reflections on where they'd gotten to and where they're heading next. In this, it helped that I'd been in journalism (as a metaphor and as a practice) in that I was comfortable asking experts how they saw the shape, the edges, the boundaries of knowledge, debates, inquiries, the unknown—and what questions they were turning to now, their new points of focus.

MARY: Too much literature commonly means that they have not narrowed down their topic sufficiently, so this is what I propose. At PhD level, I also discuss strategies for scanning material and criteria for selection. I try to discourage PhD students from trying to conduct an exhaustive literature review at the beginning of their research. I encourage them to do something like a pilot study or analysis of some material.

SHARON: *Mary, do you do this so students avoid becoming overwhelmed and lost in the literature, or to make research a practical, experienced skill?*

MARY: Both of these reasons: I believe there is a danger that students will lose their way and go off in various directions. I do this myself. This can be valuable to some degree, but without some clear parameters, the finding of new leads can become a disconcerting experience. For those students who intend to carry out some form of empirical research, I believe that a relatively simple study early on can provide a focus, introduce students to the procedures involved in testing, and hopefully the results raise more questions that can be pursued.

My experience is that much of the initial reading may not be relevant at a later point (at UG & PG level) as the research moves in a slightly or very different direction. Getting your hands dirty, through analyzing material, or running an experiment identifies what literature is relevant.

At undergraduate level this is scaled down but I do discourage students from writing their introduction/lit review first and encourage them to start in the middle—identify the meat of their dissertation, which is what will gain the most marks (in our context). Otherwise they can read around the subject at a rather superficial level and avoid addressing their research question.

SHARON: *What do you suggest if the literature is sparse?*

MARY: Although I don't recognize this as a problem, it can unnerve students. I suggest that they consider whether there is a parallel or related strand of research/literature, or a more general topic that they can draw upon. Initially students (mainly undergraduates) tend to search for their specific topic (e.g., design of TV listings) rather than

more general literature (e.g., list or table design). Our library staff gives sessions on searching databases with exercises.

As mentioned above, I also encourage students to make the majority of their dissertation their own research, rather than relying on the literature (even at undergraduate level).

JUDITH: Limited literature can mean that you are really onto something new. Ask for help by an interdisciplinary or trans-disciplinary committee who can: a) verify that it is indeed sparse because it's a new thread or strand, unraveling or winding up, gaining momentum, and/or b) point in new directions which might well be in other sciences than the 'locus' or fulcrum point seemed to be at first, i.e., they help open up the search.

MEREDITH: Not everything is in books. There is a lot to be learned from observing what people are talking about in blogs, in online journals, and on research-oriented websites. So if students are critical and learn standards for judging the credibility of information, they can find a lot that isn't in the library. In some cases, this opens opportunities for interviews or correspondence with someone who is currently conducting research in a related area. I am frustrated, however, by a general lack of student preparation for such interviews; students need to do some work before they talk to an expert and they jump too quickly to emailing people with questions that are so broad and unformed that it takes a dissertation-level explanation by the expert to answer them. I don't think faculty are working hard enough at developing these skills in the students they mentor; there is a lot of "passing them off to someone else" and it is not the job of experts to narrow the student's research question.

Students often have a limited bibliography because they don't know how to develop a semantic network of key words for their search. If something doesn't come up in the catalog or on the Internet that is a direct match to their chosen term, they may assume nothing has been written. So we talk about that. And a study may be good for method, for example, even though the content of the study is not directly related to the student's investigation. So they need to really think about how to develop a good key word list.

I also send students to theses and dissertations to see what other students have uncovered, as well as to the notes sections of important books. It is always helpful to contextualize literature; looking at how someone else used the same material makes that possible. And recently, I have found that foundations and think tanks are great sources. They often foreshadow emerging research topics and publish reports that support these investigations.

MARY: I'd like to echo this concern regarding interviewing. We are also wary of our students firing off questions to experts and I talk about my own experiences of receiving questions from students at other institutions. Interviews can be seen as an easy way of collecting material and I like to point out some of the difficulties, without putting them off. I suggest that interviews may need to be an additional source of material and should not be relied upon as students may find that they receive no response to their enquiry. I ask students to:

- *Reflect on their reasons for carrying out an interview (for their dissertation)*
- *Describe potential problems there might be in carrying out an interview (and how they might deal with these)*
- *What they might do (prepare) to try to ensure that their interview is a 'success' and helps with their research*
- *What do they need to know or do beforehand?*
- *What do they need to do afterwards?*

The last point leads to gaining ethical approval for research involving people: explaining what ethical research means and how to submit an application to our University Committee.

I also send students to past dissertations and theses to help with their bibliography and also to check what has already been covered as they must do a different dissertation.

SHARON: *How does a student know when they have covered the extant material?*

MARY: This is probably only a potential problem at PhD level. My initial response is that they don't know, but more recent tools (e.g., citation index) provide more checks than were previously available (for journal articles). However, these are probably more developed within Science (those I use). It is encouraging when a new journal article does not include a large number of references that are new to the reader.

SHARON: *In other words, the reader has covered sources well and is reassured.*

MARY: Absolutely!

JUDITH: Ask for help. This is a key point where mentors, faculty, colleagues wise with time are especially needed. Part of this (and the other lit search questions above), lies in distinguishing the near interval of time for the research at hand, whether 6 months, 1 year, 2 years, 5 years ... from a 20 years landscape forward. There will be time.

MEREDITH: I require graduate students to visualize the literature in a concept map that matches what they think are the primary ideas related to their investigations. For doctoral students, this allows them to compare philosophical or epistemological perspectives. For master's students, it encourages them to explore work from a variety of disciplines. In some cases, I ask them to map the concepts from a single book or reading; their maps tell me what sense they are making of the literature. I can identify misperceptions quickly and the maps form the basis of our one-on-one discussions. We also use the maps to figure out what is missing or how we are going to limit the problem to something manageable. I find this especially helpful in working with students who are reading in areas that are entirely new to them.

The maps are also useful in writing. I use *Learning How to Learn* (Novak et al, 1984) that describes a narrative mapping strategy, concept nodes are connected by propositional statements that form complete sentences. Students can write from these kinds of maps, choosing different points of entry (different nodes) for discussion. It helps visual students to see the structural relationships among concepts and to explore a variety of ways to construct research arguments.

SHARON: *What aspects of research do you find most problematic for students?*

MEREDITH: Defining a problem that is both manageable and worth doing is difficult for doctoral students. Graduate students have a tendency to define problem scopes that are too large. They don't want to give up anything they think is important and don't see their study as the start of a longer research arc. So paring things back to something manageable is the toughest work. In asking them to write a research question with 3-5 sub-questions, I am usually certain that one of the sub-questions will eventually rise to the level of a final research question. But it takes a while for the student to see that possibility.

Another problem is more recent. Growing awareness of methods and concepts that have been borrowed from other fields causes some students to think they are qualified for research studies that are essentially about something other than design. So framing the question appropriately as a design research study is critical. The language in framing investigations and the ordering of concepts in research questions are important. Students want to settle on the question quickly; they don't like the uncertainty of not having a "prescription" for action. Slowing them down and asking them to write many questions is tough, but it pays off in later stages of the research process.

MARY: At undergraduate and masters level, deciding on a topic to investigate that will maintain their interest and realizing how narrow that topic needs to be is difficult. Then there is the difficulty of getting started so that they can see whether they can research this topic (or not) and whether they are still sufficiently interested.

The questions that students pose can also be unrealizable in that they want to determine the 'success' or 'influence' of, say, a brand and have no concept of how they will measure this.

The self-directed nature of this work can also be problematic in taught programs where practical projects with shorter deadlines take precedence.

JUDITH: Understanding and becoming conversant in research languages, modes of analysis and discernment of the line of argument in relation to particular research methodologies, traditions and languages—along the way of sorting out one's own research language, methodology and line of argument is important. I might approach this by thinking of clusters. Undergraduates and master's students are coming from such a diversity of preparedness and exposure or lack thereof. We need to respectfully lay the basis for discussion in common, so that students can make knowledgeable and reflective choices. I like *Reflexive Methodology* (Alvasson and Sköldberg, 2009) and other such works because they help us trust ourselves while working through the internal and external dialogues of research inquiry.

SHARON: *Are there cultural aspects to consider in how research is approached and taught?*

MARY: I don't have much to offer here. I have been surprised by the expectations of some PhD students, which were based on their past experience, but I don't know how general this is. I have learned to be more explicit about the need for PhD students to develop their own research questions (with my support) rather than being given them.

MEREDITH: I'm not sure what you mean by "cultural aspects." As subject matter, the context for the study, or where students come from?

With respect to the contexts of studies, it is difficult for students to do field work in a culture with which the faculty isn't familiar or with which the student isn't familiar. I find it hard to address cross-cultural content if I don't have first-hand experience. Similarly, it is tough for international students to understand the American context. So much of the interpretive task depends on abstraction and cultural nuance.

So I am very careful about what I agree to mentor. I currently have a Columbian student who wanted to study the impact of after school design programs in developing children's "citizenship." The term "citizenship" was simply too general and too culturally loaded to take on. We settled on "empathy for people with experiences different from their own" as a concept that has fewer political and cultural overtones, but that contributes to good citizenship.

In terms of where students come from, I think the art and professional culture of bachelor's and master's programs in design create a particular challenge for PhD study. Little about these curricula in most American schools currently prepares students for PhD-level, evidence-based research. This is especially true with single-discipline art schools. Art school education typically involves limited exposure to non-design study and general education coursework is often slanted primarily toward the humanities. Some graduates of these programs struggle with social science concepts and systematic investigation and they often see doctoral study as an extension of studio-driven investigations, which is not our curricular intent.

JUDITH: On cultural considerations, I think about this on different levels and from different experiences and contexts in which I've taught research methods. One dimension is certainly the diverse practice, disciplinary and epistemic cultures from which master's and doctoral design research students come. The IIT Institute of Design aims for the Master-in-Design cohort (of 50-70 students) to be a mix of 40% students from non-design backgrounds and 35-40% international students. Several of the PhD-Design candidates were already highly accomplished design teachers, some well-known designers and some already established design researchers. That makes for a stimulating and challenging mix. One result is that everyone—international and US master's students—needs to learn how to work in international teams in the many projects in which they participate. It's not only that international students gain experience in the US design culture; US students are introduced to culturally-grounded differences in aesthetic preferences and different styles of professional interaction—and everyone needs to learn 'grace under pressure.'

While at the Institute for Informatics, University of Oslo, I was a core faculty member in the dual International MSc-Informatics and MPH programs of University of Oslo, University of Eduardo Mondlane (Mozambique) and universities in South Africa, Tanzania and additional partners. Across these contexts, master and PhD students included staff of Research Institutes, Ministries of Health and Medical Faculties as well as early career informatics and medical master students. I learned much in regard to inter-cultural, international and interdisciplinary collaboration. As principles that I carry with me, I learned that

mutual learning and reciprocity among design collaboration partners and between designers and users is key to success in intercultural, interdisciplinary, international and inter-institutional contexts. And that respectful dialogue in which difference is valued is essential to intercultural sensitivity and collaboration; shared ground is co-created, not given. I believe these principles adhere to our teaching and our relations with our students from diverse backgrounds as well.

SHARON: *In the case of PhD study, how extensive should their knowledge of research methods be?*

MARY: My views have changed on this. PhDs within the UK have increased generic skills training which can provide a much broader perspective on research methods. I think this is a positive move as our Graduate School provides this support, removing the requirement for disciplines like ours (with a small number of staff) having to find the expertise ourselves. PhD students are therefore now in a good position to gain an overview and to consider their choice of approach. Our departmental PhD student seminars also highlight research methods that open up discussion to a broader audience (which includes masters students) and familiarizes PhD students with methods beyond their own.

MEREDITH: I think instruction in methods is essential. This is an aspect of research education that isn't better if "discovered" by the student in the course of the study. Students need a variety of methods in their repertoire and discussion of how methods are alike and different; what they are good for; the kinds of data or findings they produce; and the "cost" of one approach over another in terms of resources.

We used to teach research methods in the first semester of the PhD curriculum. We pushed it to the second semester when we discovered that students were "a method searching for a problem." They chose research topics that matched the kind of work they wanted to do, but they often wound up addressing topics that were insignificant...

.....
.....
.....
It is easy to count things, for example, but more difficult to determine what those things mean.

Now we begin by asking students to think about research paradigms and worthy topics. This has produced more interesting studies, and unless the research is an explicit study of methods, the means for conducting the research are selected for the fit with the research question.

We require students to submit proposals to the Institutional Review Board (IRB) for approval, even when the study doesn't require it (as in pilot studies with student populations). The IRB is great at asking questions about method that the student often overlooks. I think the IRB application process actually does more to focus the student on method than does the proposal writing.

JUDITH: I agree with Mary and Meredith so I will only add briefly here. One of the responsibilities of Doctors In Design Research is to have a quite comprehensive knowledge of methods and research approaches. Most important considerations are clarity and meaningfulness of the overall research strategy for the knowledge that may result in relation to the research questions.

SHARON: *What factors enter into making a method selection?*

MEREDITH: There certainly has to be a fit between the method and the kind of evidence that supports the research question. We ask students to justify such choices in their proposals. When they can triangulate findings through multiple methods, we encourage it.

Sometimes the study is in an area that doesn't have a deep history or well-established methods for studying it. Grounded theory, for example, is a useful approach in these circumstances; that is, working backwards from data collected through a variety of methods, then coding data to extract principles or a hypothesis from what is found.

There are also many practical concerns in their choices. If the method calls for access to people and a reasonable sample size, we encourage the student to think about that in developing the research question. For example, it is very difficult to do research with minors in K-12 schools. If the student can only gain access to a few students, then the method and resulting claims need to reflect that or the student needs to refocus the study on older users who can grant permission for participation. The same is true of longitudinal studies. The student has to decide if collecting data over time is really possible and under how many different conditions something will be studied. In other cases, the personality of the student matters. Some students just aren't good interviewers, for example.

MARY: I agree on the difficulty of conducting interviews and also discuss this when addressing interviewing.

At issue is what methods can address the research question. Then the experience and interests of the student; accessibility of resources, including people; need for a rigorous approach.

Some methods are intrusive and raise questions about the findings. One student observed writers for almost a year. There were times when she simply left the room because she realized her presence was unsettling to the writers and their behavior was unnatural. In other cases, technology can help. One of my students studied primary school children during recess to discover if their play in “unscripted” natural spaces involved metaphorical language that was not used by children in “scripted” playgrounds (it did). She put tape recorders in fanny packs that children wore when playing outside. Within minutes of donning the fanny packs, the children forgot they were being recorded.

JUDITH: Pilot studies are essential for getting a sense of what can be learned by way of particular methods and how so. Trying out methods in an analogous setting and/or with analogous participants can help the researcher(s) think through the basis for good triangulation of research methods in relation to the research questions. Clarity about the object of inquiry is essential for considering methods and how the methods will be carried out as they are shaped and governed by the conceptual-methodological research framework. A key phase that also shapes the methods is the conceptualization of units of analysis in intermediate spaces and contexts for understanding interactions, practices, materialities and temporalities. Then the researcher and mentors need openness in regard to the object of inquiry along the knowledge, research and design journey. Intermediate concept construction is also iterative sense-making.

SHARON: Are you troubled by the fact that design uses research methodology from other established fields?

MARY: Most definitely not, but I am biased. This is less of an issue in terms of training and expertise now that we have a Graduate School.

JUDITH: No. Not *prima facie*. What's important is that the research methods employed are sensibly used and/or adapted towards the research inquiry. Sensibly coherent combinations of methods in mixed methodology research approaches are often carried out within master and doctoral studies. Research methods employed in design research by now include: qualitative social science methods (ethnography, semi-structured interviews, participant observation, audio/video documentation of interactions and activity); design experiments; *kansei* engineering methods for understanding emotions; distinctively design methods such as cultural probes and charette. Modes of analysis include: grounded theory coding and analytic memo-writing; various modes of analytic metrics and quantitative analysis; aesthetic analysis of form and space, artifacts, architecture and public spaces; historical, documentary and archival analysis;

analysis of human-computer interfaces, information systems and other kinds of knowledge infrastructures. Modes of analysis include 'fuzzy set' analysis for emergent or rare phenomena for which the number of instances are few (Ragin, 1987). Amidst all this, other fields are starting to use 'design methods.'

MEREDITH: I'm not bothered by borrowing—but I do think we have to be critical about how we use approaches from other fields. Methods reflect perspectives about what can and should be measured. In one of my own projects, for example, my behavioral research collaborators favored methods that yielded the highest number of score-able elements in students' problem solving. The process was parsed into so many individual elements that it no longer reflected a holistic process. On the surface, human factors testing in labs seems a good match for studying user interaction with software, but it doesn't tell us why people use the software in the first place, how surrounding contexts influence their performance, and what they expect to accomplish if successful in mastering the program. So I think we have to be careful about what is not being studied when we adopt methods from other disciplines.

MARY: Meredith has raised the very important issue of ecological validity and this is something that pervades my own research area and is raised in my teaching of empirical research. I don't think there is any easy resolution to the conflicting aims of scientific method versus reflecting design practice or normal context of use. So I just present the dilemma.

SHARON: *Pierre Bourdieu (1980, 1998) has explored this reflecting on the idea that science and practice exist in completely different modes of time. Science is timeless while practice is situated in time and rife with contingency. His Logic of Practice is an argument against a science of design.*

SHARON: *Do you think design should develop its own research methodology?*

MARY: I'm not sure what this might look like. Drawing on my own area of expertise, I do think there are issues of applied versus more theoretical research; how materials are selected for study etc. I'm not sure if this would constitute a different methodology or particular applications of existing methodologies.

JUDITH: Provisionally and ecumenically, I'd say yes, I think so. I believe this is already happening in some design schools and doctoral design research programs. By provisionally, I'm thinking about the proposition that design becoming a discipline can also come from the discipline of design itself (Cross, 2001; Blevis, Lim and Stolterman, 2006; Kuutti, 2007, 2010). By ecumenically,

I'm thinking about how this expands the design research repertoire rather than veering away from the design-mixology with transdisciplinary research approaches we've been discussing. How research methods get put together depends on the research inquiry and how its questions, concepts and design directionality are shaped, explored and interpreted.

SHARON: *What philosophical underpinnings support design research?*

MARY: Although I may have particular leanings, I don't think I can label them as I don't think in these terms.

MEREDITH: Not really sure what you're after in this question. Seems like an endless list if you're talking about the content of design research. Do you mean what underpins the idea of doing research in design? Or are you going for what philosophical frameworks are relevant (ex. pragmatism)?

SHARON: *I am after philosophical frameworks as fundamental anchors for thinking. Early in my thinking I began as a logical positive, then I began to understand its shortcomings. Then I discovered I was already a practicing pragmatist and found John Dewey particularly enlightening. I imagine others have a different trajectory leading to other filters. I am just curious as this does change our perspective and influence how we think and work with students.*

MARY: Well I suppose I am an empiricist, but that is fairly obvious. It does influence how I advise students, most certainly. I have softened over the years and am now more open to qualitative research methods. I also acknowledge the importance of craft knowledge but still like to challenge it from time-to-time. As I am now mellowing, I have turned to looking for ways to bridge the gap between scientific approaches and design writings (based on experience).

JUDITH: Returning to your question about philosophical underpinnings, I would say the boring 'it depends.' Where my own interests are broad and include phenomenology, ethno-methodology in certain of its ways, critical science and technology studies (too compound a philosophical 'house' but very rich in concepts, range, thoughtful reflection across the board—I wish for more coming together with design research). For me the socio-historical school that goes by 'cultural historical activity theory' (Cole and Engström, 1993; Raeithel, 1992) and 'socio-cultural historical research' are important in good part for their explicitly philosophical depth. I'm also quite familiar with contrasting positions by now, e.g., actor-network theory and the like. The archeology of knowledge (Foucault and others' brilliance); the dialogicality, polyglossia, refractions of Bakhtin and those who follow; the techno-feminist philosophers of science . . .

MEREDITH: Personally, I am a pragmatist and a fan of Dewey. I think pragmatism provides a sound philosophical basis for research in a field of practice that, in many ways, grew out of trades. Thinking about design as a discipline with articulated theories of action is a fairly recent activity in comparison to fields with longer research histories. I also believe that the situated nature of design problems, in which interpretation and use depend so much on context, make it hard to see real value in making everything a matter of "proof." But I don't expect my students to share my position and what our introductory course in research paradigms does is expose them to a range of philosophical and epistemological positions through readings and discussions with researchers who have different worldviews. These positions have their own intellectual standards and my concern as a teacher is whether the student's philosophical stance is fully informed and defensible in terms of these standards. I do believe the emergent nature of the design research culture, variability in our definitions of design as a discipline and a practice, and rapidly changing contexts and purposes for design research make professional consensus about an appropriate philosophical framework unlikely at this time, if ever. What schools can do through the work of their graduate students and faculty is demonstrate the implications of adopting one position over another. Over and above the findings of any study, this is a contribution to the field.

SHARON: *What question/answer of importance to you have I failed to ask?*

MARY: These questions have made me reflect on how I teach and I feel as though my approach is bottom-up. Although I do plan and deliver classes, my feeling is that I am most effective in delivering research skills through individual tutorials and feedback on writing, i.e., responses to specific projects. This is clearly not an efficient way of teaching. I raise this because I don't know how I would teach someone to do this teaching. This is why you are asking us these questions I believe.

SHARON: *It appears you teach on a case-by-case basis in relation to relevant knowledge and experience. Perhaps it is too soon in the development of design research to have a more systematic and carefully clarified set of goals and methods. I have often envied Science and the ability of a research project to be carefully positioned on the backs of others and the ability to see the trajectory of work; to see the past and anticipate the future.*

Your participation in this conversation advances our thinking about teaching design research. I am certain you have even more to share. Thank-you.

.....

REFERENCES

- Adams, James L. 1986. *The Care & Feeding of Ideas, A Guide to Encouraging Creativity*. Reading, MA: Addison-Wesley.
- Alvesson, Mats and Kaj Skoldberg. 2000. *Reflexive Methodology: New Vistas for Qualitative Research*. Thousand Oaks, CA: Sage.
- Blevis, E., Y.K. Lim and E. Stolterman. 2006. Regarding Software as Material in Design. In *Proceedings of Wonderground 2006*, Lisbon, Portugal, Design Research Society.
- Bourdieu, Pierre. 1980. *The Logic of Practice*. Stanford, CA: Stanford University Press.
- . 1998. *Practical Reason*. Stanford, CA: Stanford University Press.
- Cole, M. and Y. Engeström. 1993. A cultural-historical approach to distributed cognition. In Solomom. G., editor. *Distributed cognitions: Psychological and educational considerations*. Cambridge, UK: Cambridge University Press, 1-47.
- Cross, Nigel. 2001. Designerly Ways of Knowing: Design Discipline Versus Design Science. *Design Issues* 17.3, 49-55.
- Gordon, Wm. JJ. 1961. *Synectics*. New York, NY: Harper & Row.
- Holyoak, Keith J. and Paul Thagard. 1995. *Mental Leaps, Analogy in Creative Thought*. Cambridge, MA: MIT Press.
- Koestler, Arthur. 1964. *The Act of Creation*. New York, NY: Macmillan.
- Kuutti, Kari. 2007. Design Research, Disciplines, and New Production of Knowledge. In *Proceedings of IASDR 2007: Emerging Trends*, Hong Kong Polytechnic University, November 12-15.
- . 2009. Artifacts, Activities and Design Knowledge. In Poggenpohl, S. and K. Sato, editors. *Design Integrations, Research and Collaboration*. Bristol, UK: Intellect Books.
- Novak, Joseph D, Bob Gowin and Jane Butler Kahle. 1984. *Learning How to Learn*. Cambridge, UK: Cambridge University Press.
- Raeithel, Arne. 1992. Activity Theory as a Foundation for Design. In Floyd, Züllighoven, Budde and Keil-Slawik, editors. *Software development and reality construction*. Berlin: Springer.

Ragin, Charles C. 1987. *The Comparative Method, Moving beyond qualitative and quantitative strategies*. Berkeley, CA: University of California Press.

Vygotsky, L.S. 1978. *Mind in Society, The Development of Higher Psychological Processes*. Cambridge, MA: Harvard University Press.



ABOUT THE AUTHOR

Randa Abdel Baki is a design educator, graphic designer and an artist residing in Beirut, Lebanon. Currently, She is the chairperson of the Graphic Design Department at the Lebanese American University, where she has been teaching since 2005. She completed her graduate studies at Pratt Institute NYC where she also worked extensively as a designer and art director. Her designs and artwork have been exhibited internationally. Abdel Baki's scholarly activities include successful bilingual typographic methods, specifically solving the challenges of Arabic and Latin bilingual layouts. Her professional experience encompasses many areas in design including publication design, packaging, and multimedia design.