part 1

morning programme

Liz Sanders
MakeTools

is President of MakeTools, a design research firm. Liz's numerous design awards, patents, publications, presentations, and her proven track record have established her as a leader in the field of design research. Her client relationships have included 3M, AT&T, Apple, Baxter, Ciba Corning Diagnostics Corporation, Coca Cola, Compaq, Hasbro, IBM, Intel, Iomega, Johnson Controls, Kodak, Microsoft, Motorola, NBBJ, Procter & Gamble, Siemens Medical Systems, Inc., Steelcase, Texas Instruments, Thermos, Thomson Consumer Electronics, Toro, and Xerox.

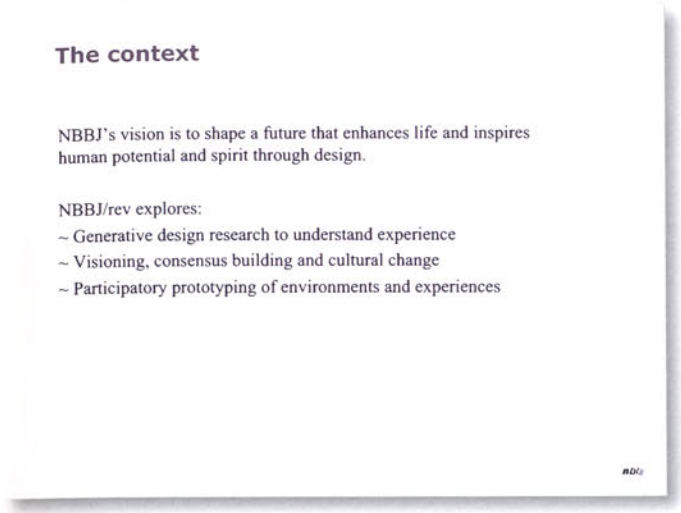
exploring co-creation on a large scale

designing for new healthcare environments

I am excited to be here and to have the opportunity to share some work that I have not been permitted to share before. I have been under cover over the last five years, as a consultant for a large architectural firm. The name of the firm is NBBJ. It's an American office with 10 offices worldwide and about 700 people: quite a large company in its field. I had worked in the world of products for many years, so this seemed to be a different kind of challenge, and I was ready for that. I have been working there with a small group of people, under the radar for the most part, trying to work out how to bring a human-centred approach to architecture and planning. We are not there yet. I thought it might take a couple of years. Now, after five years, we are just beginning to make some progress. It's a big nut to crack.

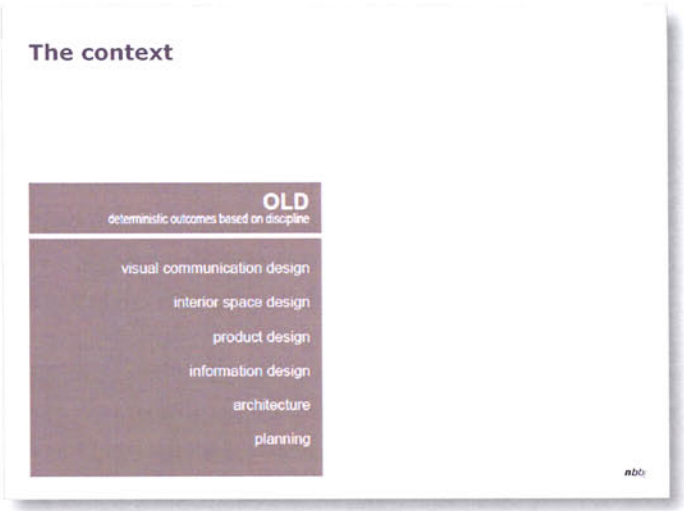
At NBBJ, as the website indicates, the list of services is rather traditional: what most large architectural firms would offer. You see no signs yet of the human perspective; we have not made it onto the website yet.

However, NBBJ's vision is much bigger than simply architecture. Its goal is: 'to shape a future that enhances life and inspires human potential and spirit through design.' It aspires to be a design firm with very lofty, human-centred goals. The little



group that I'm part of is called NBBJ/rev, and the work that we're doing and that I'll show you is exploring generative design research to understand experience: the experience of the people who would work in, live in and use the results of this process. We are doing visioning, consensus building and cultural change, and we're beginning to work with the participatory prototyping of environments and experiences.

Let me give you an example of what I mean by a large-scale project. I don't have pictures to show you. It's an ongoing project and we're not allowed to take pictures of the people we're working with. It's a new hospital campus for veterans in New Orleans and the surrounding area. With Hurricane Katrina, the entire hospital system for veterans was destroyed, and they are currently working out of office buildings and trailers. NBBJ is in the midst of designing the new healthcare campus. On this project we have 50 people from NBBJ, and 70 outside consultants. We're working with two local architecture firms. It's a one billion dollar project and the scale is 30 acres, and they have to take some neighbourhoods down for the development. We're currently in the design phase, and it's also very fast and aggressive and the completion date will be by 2013. That gives you an idea of the scope and scale. Those numbers are only the internal team, that doesn't include the veterans. The veterans in this case are a very special group of people, characterised mainly by their special needs, which include: post-traumatic stress disorder, amputations, low vision, traumatic brain injury, substance abuse, the list goes on. Therefore, the human-centred perpective is critical here. Our client, the Veterans Administration, has been wonderful in allowing us to practise a lot of what we've learned in the past five years with them. Unfortunately, I can't show photos from the New Orleans project, but I have lots of other examples from many other projects at various levels of scale.



The overall design context is that we're moving away from an old way of thinking about design, where the training of designers was based on the fact that you learned to design a product or a visual communication piece, or information; and the process was focussed around what it was you were designing. Architecture and planning were in this domain.

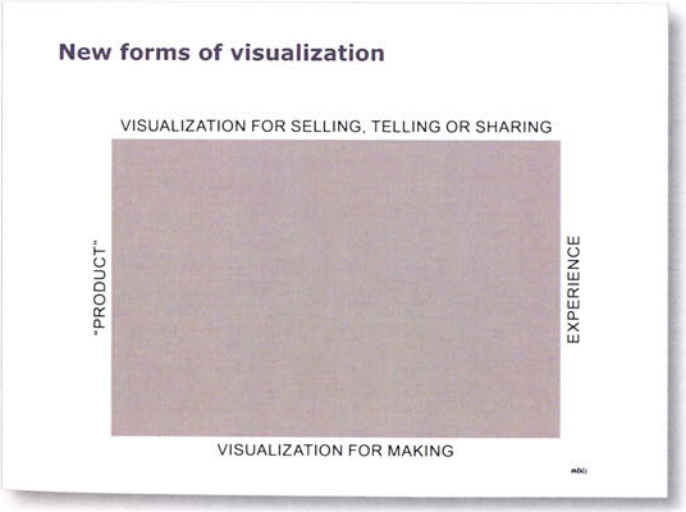
Today we are in the middle of a major shift, from outcomes based on your skillset to a much broader focus on the purpose of the design, and the holistic outcome. In the new design spaces, we are not necessarily designing products, but we're

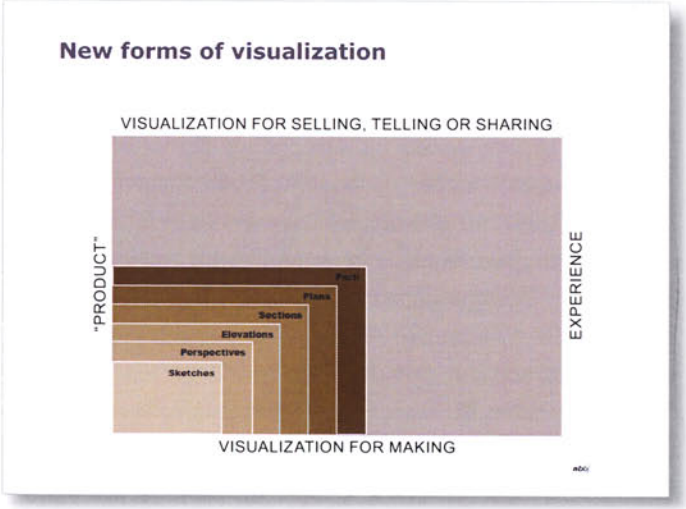
using all the skills on the lefthand side (see fig xx) to figure out how to design for emotion, experience, healing, or serving, and so forth. I'd say that most of the design disciplines now acknowledge the righthand side of this equation, and are trying to figure out how to work in these bigger terms.

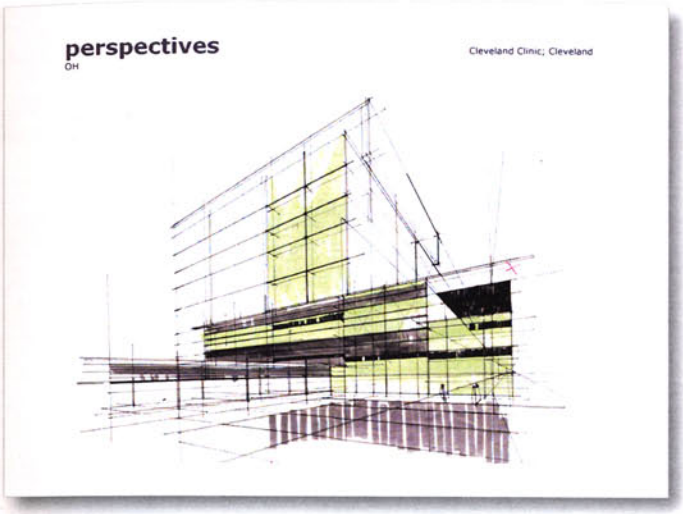
Architecture, in my opinion, is on the trailing edge. It has been slowest to move from 'architects design buildings' to 'architects need to be involved in designing for experience, healing and so on.' This is the bigger context of where we're going.

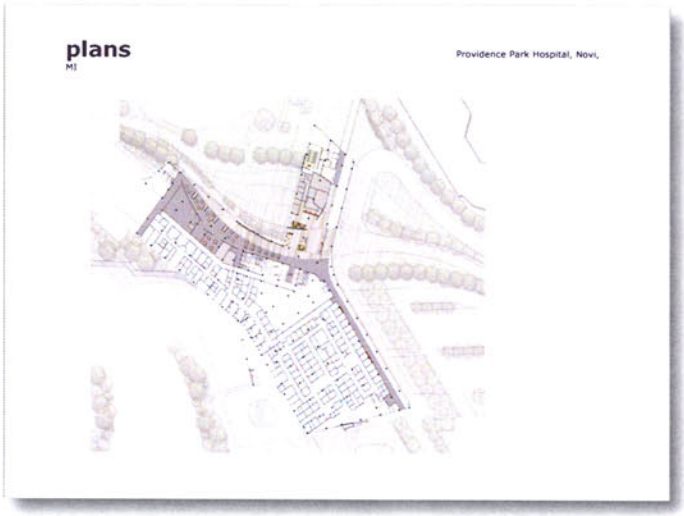
Now I'm going to paint a landscape of where our work has been, starting with a space that's defined by products on the left and experience on the right. By 'products' I mean things both real and virtual (eg websites as well as objects and buildings). The world of design today covers both product and experience.

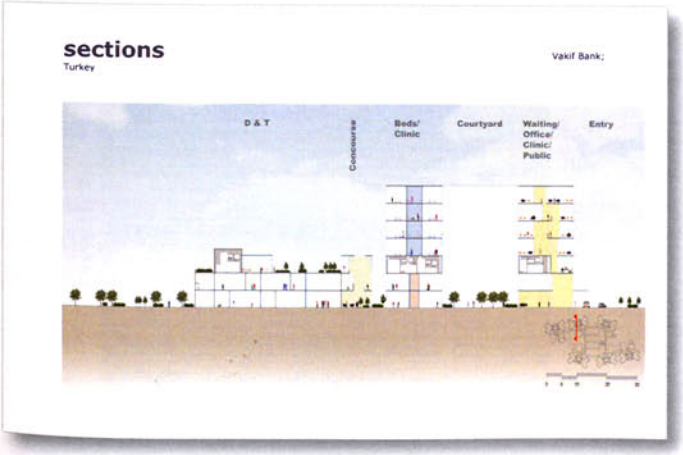
In this diagram, it's a space about design visualisation or design conceptualisation. On the bottom there's visualisation about making; on the top, there's another way of using visualisation for selling, telling, or sharing. Now, all the traditional visualisation tools of architecture and planning are in the making of the product quadrant. They are all about making the building, or plans or programmes (getting a little bit towards experience), but the tools don't really deal with experience.







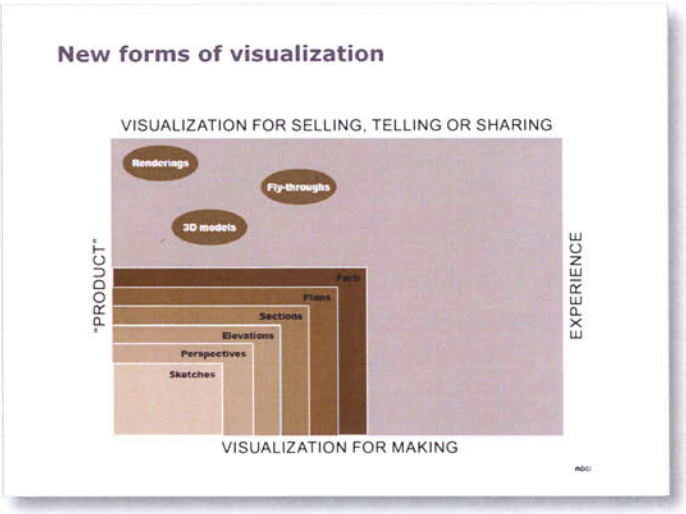


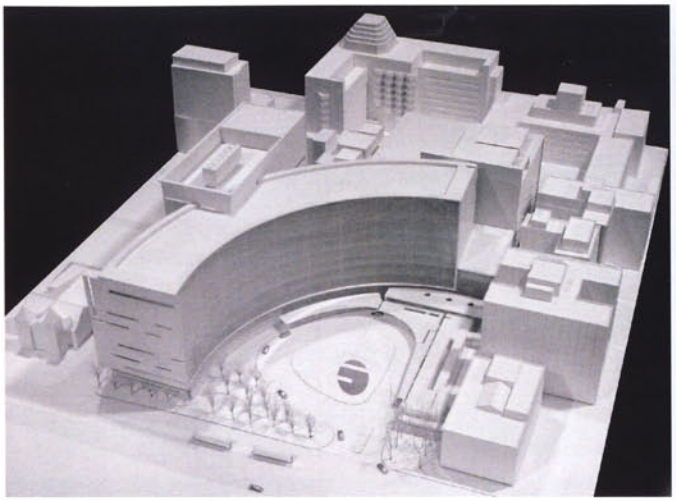


All the traditional tools are internal to the architectural team. They understand the tools. They know what they mean. The problem is that the clients usually don't get it – they don't fully understand what the output of the tools means or doesn't mean.

If this is an entire hospital, how big is a person in this map? How long would it take, to walk from one end of the site to the other? These are the kind of questions that clients ask when they are presented with visuals like these.

Therefore, architects use other visualisation means to help sell the idea to the client, such as renderings – aka 'money shots'. These can be quite expensive to produce, but as you can see, they are more like the real thing, with quite a bit of life and spirit. These are presented after the design stage, to convince the client that this is the way to go.



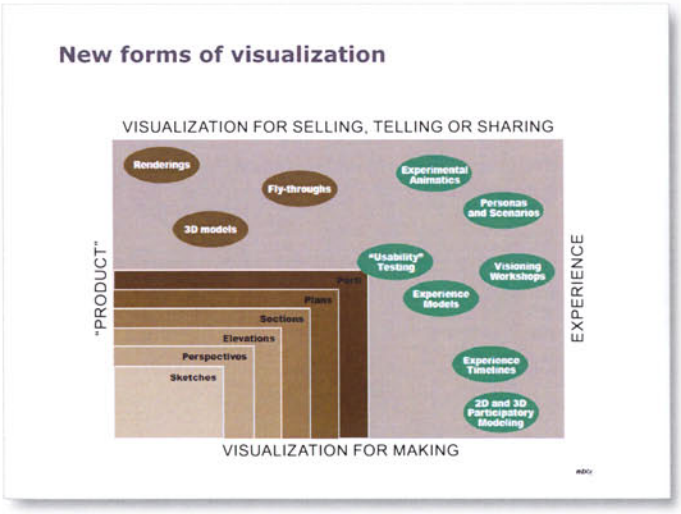


Another way not just to sell, but to share the idea, is to build 3D models on various scales so that the client can actually imagine the project, or animations, and you can generate fly-throughs in computer space.
The visualisations are used to sell the idea. It's not a case of, 'You're the expert and we're here to work together;' but more a case of, 'We're the architects and we will make it and sell it to you.'

At NBBJ over the last few years, we have been exploring the other half of the conceptualisation and visualisation space. Interestingly, it's easier for us to convince the client and end-users to work with us in this way, than to convince our own architectural team. You can see the line (in fig xx) between the brown and the green – we haven't connected them yet, we're just beginning to do so.

visioning workshops

These are, I would say, the most prolific approach. We seem to be able to get in right at the very beginning of projects, when the architectural and client teams are starting to imagine what this space will look like. This is an example of using a very large



toolkit and using it not on an individual basis, but putting a team together to use it to imagine what the future experience could be. We are not visioning the building, we are visioning the experience of the patients and visitors at the hospital, say eight years into the future.

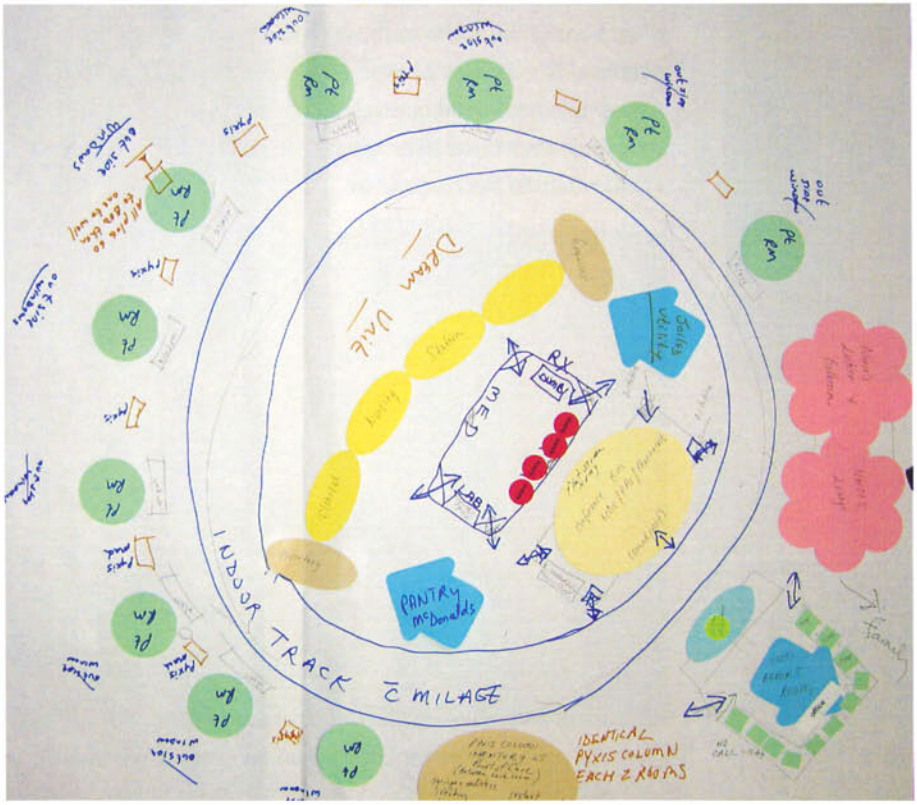
Often, we'll do the exercise internally. In this case, we did it ourselves predicting what we thought the client would and could do, and then comparing that with the vision of the clients themselves. This can be a very useful tool for assessing where they are and where we are.

In this photograph, they've been given a bullseye, so the priorities for the future vision can be better established collectively. Only so many things fit in the bullseye, so the discussion around what goes in it and in each ring is extremely beneficial, and this sort of visualisation can live through the project - as long as it's kept alive.

This photograph is from a visioning workshop. This is one individual this time - a visitor to the hospital. It's a similar kind of approach, but in this case we're working with individual people in the community who will be users in the future. We are not asking them collaboratively about the future at this stage. We are getting 10 or 20 or maybe more individual dreams, about what the future could be.

experience models

Here a team of nurses is working with a set of tools to imagine the ideal flow of people, information and materials within the patient floor of the future. We are not asking them to arrange the room or design the floor; but to think about experience, the flow of stuff, in that space. You can see there are many ideas here that had never been thought about by the architectural team before. Sometimes though the team will come back and say, well we thought about those things before. What the research helps them to do is to understand where the priorities are for the nurses. You could have 20 good ideas, and not be able to execute most of them. The research helps point out what really matters.



This shows a different project and a different set of nurses. You can see that the locations of the research tend to be in a storage room in the hospital, or wherever we can get the space. We are used to the fact that we might start with eight nurses and end up with four because they're called out on duty. We have learned to be very flexible when working in hospitals.

experience timelines

See the big dark line across the paper? Here we're in the early stages of the project, but we've already generated a picture of what the future experience could be. In this case, we're describing how it could play out over time. It's how the experience could unfold from the current situation up until six to eight years from now. In hospitals, it may take two years to design the hospital, and two to three years to build it. We're designing always about five years ahead. The timelines can be done with teams of people, or with individuals.

This is an individual timeline, expressing the current hospital journey. This is a nurse's representation of the ups and downs of the patient's experience. We also had patients do the same journey with the same toolkit, so we could get a feel for the differences there.

participatory modelling

We do play on the 'stuff' side of the equation, we're trying to integrate the experience research with the making.

Here we have two former cancer patients, who are given the opportunity to lay out the patient room for a long-term stay. This was a very early experiment to find out how we could get nurses and other staff members and patients to tell us what would be the ideal layout of a room, using little scale cut-outs of all the amenities typically found in a hospital.

We were amazed at how well it worked, that people could not only make the future room, but also imagine future scenarios within it.

three-dimensional toolkits

We have a number of different three-dimensional toolkits; this is one I call velcro modelling, which uses velcro so that all the items can stick easily together and people can generate ideas instantly.

This is a workshop in Helsinki with some university people, design-firm people and hospital people exploring future mobile technology for use within the hospital environment. Here we're working full-scale in an actual hospital enviroment with healthcare people, so this is an ideal scenario for generating ideas about the future, and not just generating them but playing them out in an actual context of use and running through hypothetical scenarios of the future. The more you get full-scale, real and 3-D, the better it gets, but it also gets very expensive to do, so you can't mock up whole hospitals.

Since exploring the patient room 2-D toolkit, we've also generated a 3-D toolkit for modelling smaller-scale spaces such as nurses' stations and patients' rooms. This photograph gives you a sense of just how many items are in the toolkit, and how abstract the pieces tend to be.

This photo is a group of nurses collaboratively generating an ideal patient room of the future. At this point in the project, we know how big the room can be, for various reasons, so

they have that space constraint: they are working within some see-through walls. What's interesting is that these nurses work at the same hospital on different floors and they didn't know each other before. They have spent maybe half an hour talking together before this exercise, yet in eight minutes these three women made all the decisions on this room together.
Two views are showen above.
If you work with experts of the patient room experience and give them the materials, warm them up, so they can complain about how they currently work and get that out, then they can come up with the room in a very short amount of time.
Notice that they cheated: they added the bathroom. They were working so fast we didn't even notice – they were supposed to stay within the walls. They added the bathroom because they told us they needed that space.

In the toolkit, some pieces are very literal, such as the toilets and sinks which come from purchased doll's-house kits. Because while there are wonderful opportunities to learn from ambiguous components, in hospitals you have to have toilets and sinks.
This is a single patient room. It looks like there are two patients and two beds, but one is the patient's husband, and he is having a nap. The second bed is not a bed but a couch.

The nurses make the space very quickly and then the story emerges. They will explain what's there and why, and they will take the dolls and show us and run through things.

I watched this team, and even the order in which they made their decisions was extremely informative. First, they placed the patient's bed. Then they positioned the window, the clock and the TV. Then they figured out where all their stuff needed to go. It was patient first. This was the kind of room a patient would be in for weeks. It wasn't the sort of room where you might be for a day or two, I think that situation would lead to a different sort of ordering. I was impressed by their ability to take the patient's role and to drive everything from that.

One team decided that they didn't want to do the patient room because they had more problems in the nurse station, and the toolkit had enough potential ambiguity that they were able to mock up their own workroom using the same tools and materials, and very explicitly tell us what went where, and why.

usability testing

The term usability testing tends to be used in many different ways. Within NBBJ, it makes sense to refer to this particular mock-up application as usability testing. What is going on here is that we've designed a new patient room that has never been done before. It has some peculiarities that needed to be tested out. The entire room is mocked up. As you can see the walls are particle board.

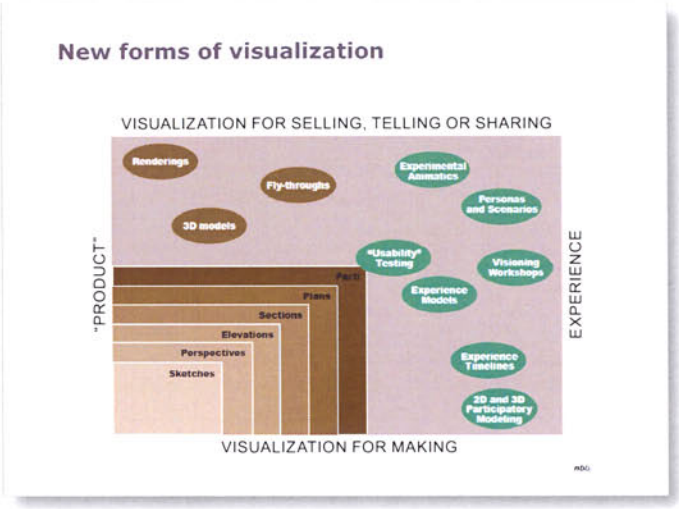
This is a full-scale, entire room, completely mocked up. What we did then was have nursing teams go through scenarios of use, including some where a lot of people would come in with a given patient, testing the limits of the room at a very early stage. Generally, architects don't tend to build 3-D models until much later, at which point it's too late to change things that didn't work. What you see going on here are discussions about what the architects would consider details, but which the nurses consider critical.

Typically, architects are not very involved with questions like, 'Where's the soap? Where's the hand sanitizer? Where are the towels?' From the point of view of a nurse, looking at things in an experiential way, you could start the whole room from that and design from there. It was a very useful exercise, and resulted in lots of little tweaks from an architectural perspective which were then recognised in this full-scale mock-up

personas and scenarios

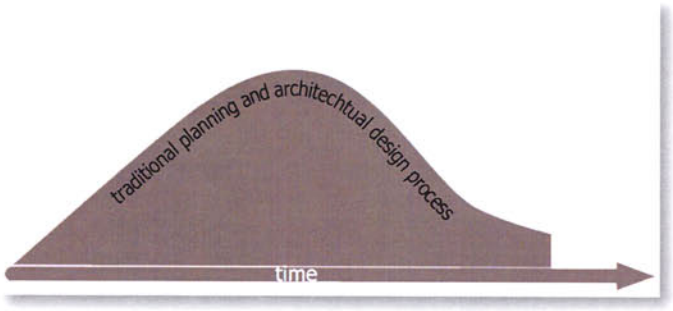
We also use personas and scenarios. I think this approach is widely used in product design now. Interestingly enough though, it had never been used in an architectural office before.

Our newest trick in the toolbox is puppets. For some people, especially those who are a little more extroverted, it really brings out the emotions in the stories of the future. In this case, a patient living with type 2 diabetes is using the puppets to talk about the kinds of things he and his wife talk about. You can see from the position of the puppets how he feels in that discussion with her. We have doctor puppets and nurse puppets and people puppets and patient puppets and a lot of times what we do that works very well is we give people a choice: we ask, do you want to make something with velcro, or tell us a story using puppets? And we've found this a great way of letting people use their strengths to tell us about their experience.

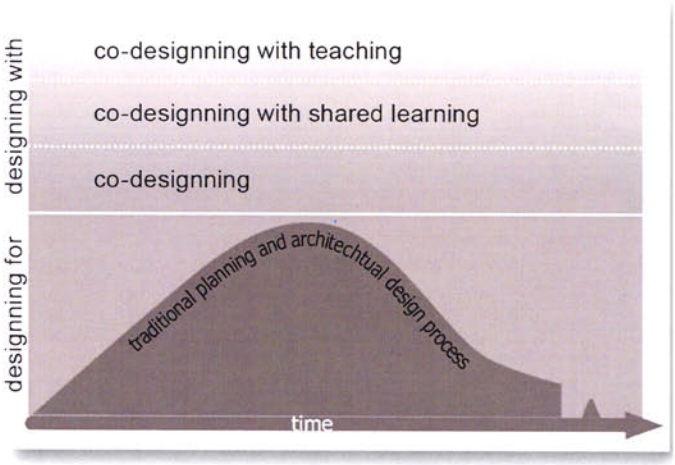


In review, here's an anecdote from our project in New Orleans. You can imagine that the architectural team would be standing in the lower lefthand corner, looking at the job ahead of them through the lens of the visualisation of all this stuff. From the architects' point of view, the precise location of the rest rooms, on a 30-acre campus, would be a detail, something they would expect to get around to later.

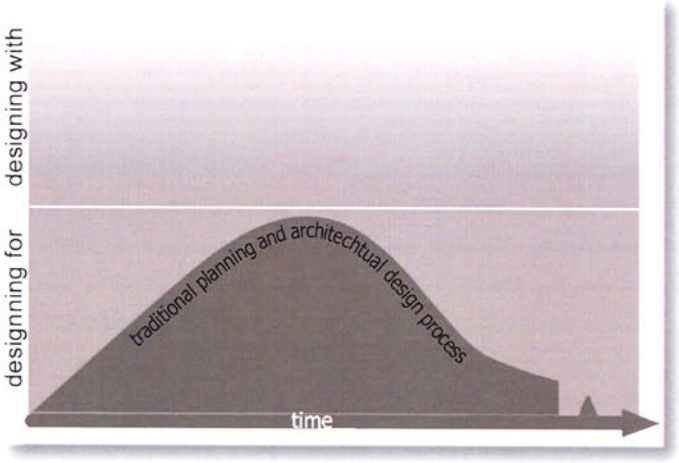
When you're standing on the other side, looking at things from the point of view of disabled people in wheelchairs, the location of the restrooms is the big idea. That's one of the things we've seen in our research: it highlights how what is important to the users often seems trivial relative to all the other issues that the architects are dealing with. So we're grappling with that sort of dilemma.



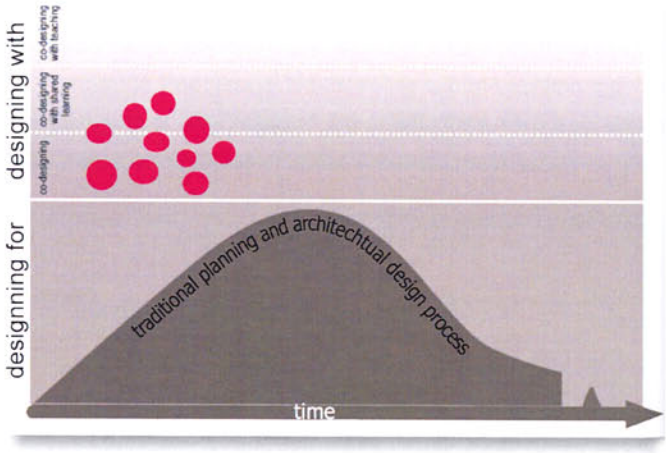
In summary, this is a picture of the traditional architectural design process over time. There's a lot of activity in the schematic design, the design development. And the traditional architectural process is about designing *for*. Designing for the client, for the patients, for the visitiors and for the family. You can imagine that it's a big enough task of co-creation just to get the architectural team aligned.



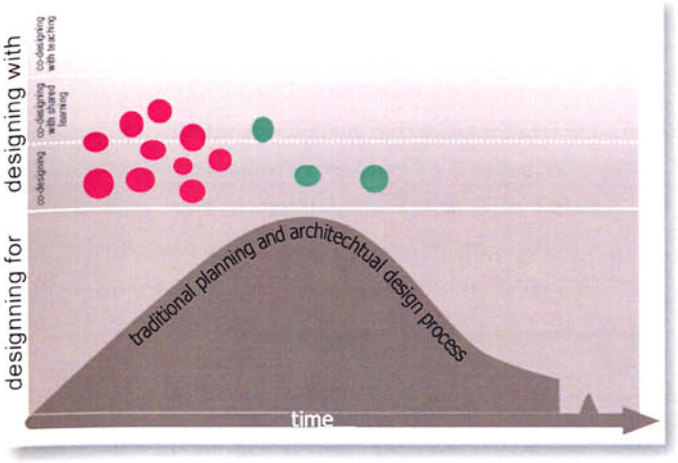
designing at the same time. An even higher level is co-designing with teaching, so when the project is done the designers know how to do it themselves.

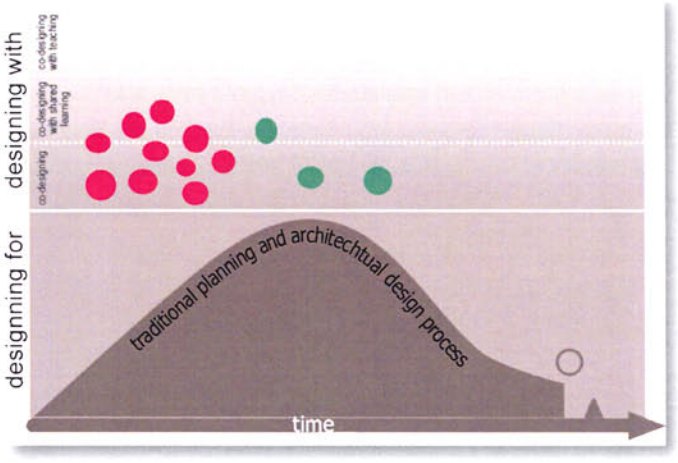


What we are seeing now is that there's a whole other way of working that's about designing *with*: designing with the client, and with the end users. That's very much what we're trying to do with Rev. There are many levels of designing with. There's co-designing, that's one level. Another level of intensity is co-designing with the client and learning together about co-



You can see that the funding that it takes increases as you go up the chart. It takes a lot more time and effort to do co-designing with teaching. We have examples from product design where clients have come to work with us at that very high level. In architecture, we're just trying to get up to the first line, to connect the designing *for* and the designing *with*. Most of our



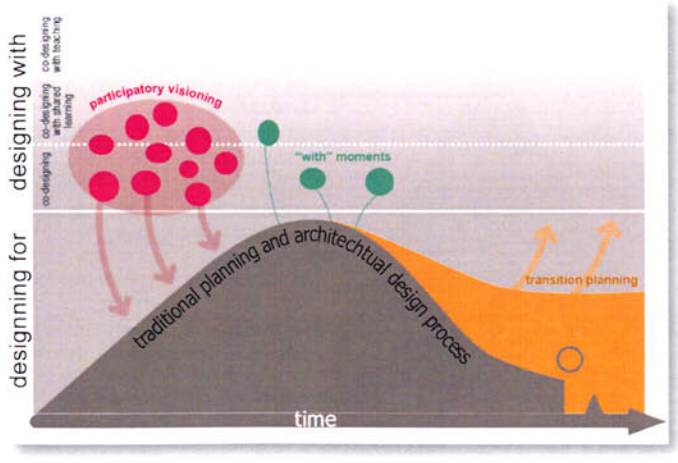


little experiments are in the beginning of the process above the line. They're not joined up, because often we don't know if our findings are used: we come in the beginning, and often we don't stay at the table, because the budget was written three years ago, and there isn't room in it for us.

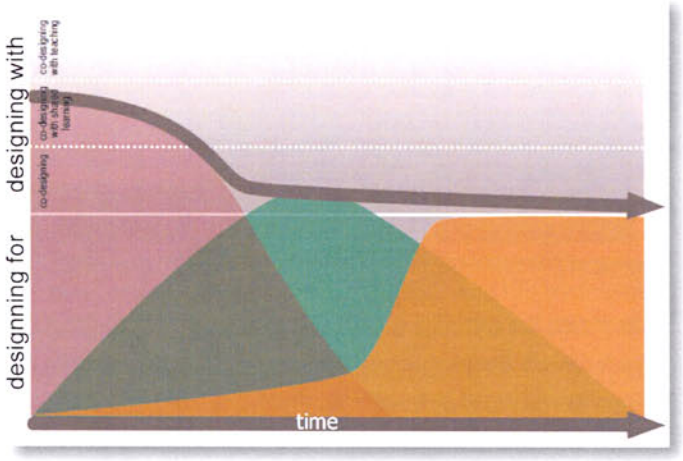
In the New Orleans project we are at the table: 1.5 people in a team of 50. So we're at the table, but not with a large team. We have had some opportunities where we've been able to work inside the process, with the clients or users. And the third little bubble is the recognition that an architectural firm with a vision like NBBJ can stay with the client, after the work is done (and there's going to be two to three years of construction). Typically the architect finishes the drawings, and two years later the client moves in. But there's an opportunity there to stay with the client to help them figure out how they may need to change their mindset or way of working for the new building, which may operate very differently

transition planning

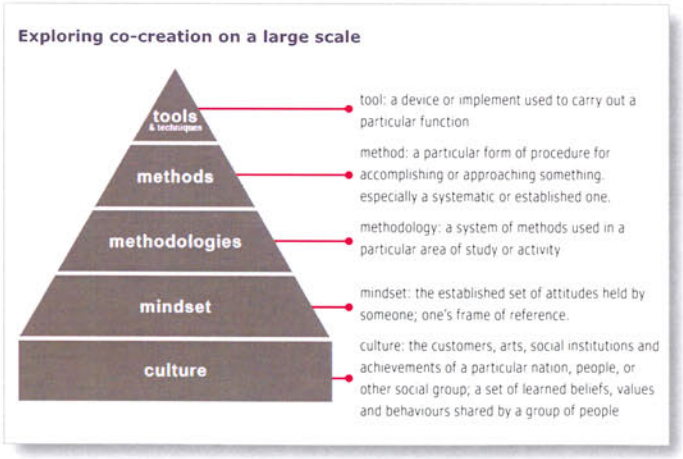
This is where we are now. We've done a lot of participatory visioning, in 2D, 3D, and timelines, and we're learning to connect it. We're finding our advocates within the architecture and planning and design team, and we're trying to stay at the table. We've had some very successful 'with' moments, where we come in and get engaged and try to stay engaged. The orange just shows that the ocean of 'staying with the client' between the end of designing and the beginning of moving in is an area lots of agencies are moving into, in the USA it's referred to as 'transition planning'. There's a huge opportunity to aid that transition.



The picture might hopefully soon look like this. It's beginning to take shape. We're very positive that we've been recognised as keepers. We have our own studio. That will help us to continue to make these changes.



In a nutshell: this is what we've learned – and we kept wondering, why is this so hard? Why is it taking so long? This chart helps explain why. It's not just about tools and techniques, because these need to be practised through methods which are organised, clustered and approached through methodologies, and most critical is the mindset with which these tools and methodologies are used. If we are working with people who don't think it makes sense to design with the client and design with people, it stops there. If we can work together with that kind of mindset, then we have the ability to change the process and change the culture.



We are working our way down here, and we have some significant collaborators, but we still have a lot of work to do.

Q & A with the audience

Q How do you tackle the two perspectives issue – for example, with the bathroom positioning in New Orleans, where the architects see it as a detail, and users see it as vital?

A We haven't solved it yet. One thing we're doing is having wheelchairs and scooters in the office at NBBJ and we're trying to make everyone on the design team use a wheelchair or scooter for at least a day, to give them a feel for that. There's a veterans' facility in Colombus, Ohio that NBBJ designed with a major bathroom problem, and we're trying to get people there so they can understand the issue. The problem is bad enough that in the little store there, they sell underwear. Think about that: why would they sell underwear there along with the candy? Because people don't always make it to the bathroom. So we don't have answers, but we have lots of ideas, so we keep trying.

Q Do the architects actually use the information you get from the users?

A Some of them do, yes. Part of it is figuring out how to present and when to present; the project is so big and moving so fast that it's hard to get their attention in a meeting. So we're exploring many ways of impacting them. And we're making really good progress, but there is lots of progress still to be made.

Q When you design with users, do you specially select the users?

A No, we don't. We carefully prepare them for the session they are going to be in. The preparation usually gets them to think about their work, and the way they live. We work with anybody in that way, as long as they are prepared.

Q Is there a minimum number of users for this kind of research?

A It depends on how much time and budget we have. Definitely it would be more than two, but on occasion it has only been two small groups. So, we have to be careful what kind of conclusions we make. A lot of times, when we're designing with users, we're inspiring the team, not choosing a direction. So you need a variety of people that are engaged for that. You don't necessarily need a lot of them.

Q How do you inspire the team?

A We try to get them to come to the sessions and give them a role. We request they come along and do the audio or notes, we try hard to get them help us decide what to do. So we try to bring them along with us. Once we've got them to come once, then it's easy to persuade them to come back. Getting them to come along for the first time is often the hardest part.

Q How do you deal with conflict between participants, and between participants and designers?

A We don't usually ask the participants to come to any consensus. They're there to express their own ideas, and we encourage them to disagree with each other. Then we take that data and make sense of it. If an architect or designer is sitting in on the session, then generally we don't voice any disagreement out loud; we let the people speak, and record that, and then discuss it later. Often, people want things that for one reason or another are not allowed in the hospital. That happens all the time. But we don't say, 'Oh, you can't do that, this is a hospital.' We just let them dream. And we sort it out later.

Q Are medical specialists from the hospital involved in this process?

A Yes, both in the regular process and in our process, and we might have them construct things to see what they have to say. We also have medical specialists on staff, healthcare consultants who tend to be people who were nurses for a long time. We work closely with them, and they have collaborated on all the tools and techniques.

Q At what level do you communicate the results to the designer?

A Some of the designers are involved in the process from the start on a very intense level, for others all we can do is present summary material. So we work very hard to make it impactful. We show video if we've been allowed to shoot video. We relate it to what it is they need at that point in time. So it depends on the team, the timing, and where the project is – so I don't have any magic answers. We've been trying a variety of approaches. Sitting in the team space is a good idea, although in this case it's such a big team. So we have to fight to get that spot.

Q Do you ever make calculations where you have to persuade the client that something is worth the extra money that it costs?

A No, we haven't been fortunate enough to be at the table at that stage, and be involved in that part of the process.

Q What are the cultural differences in practising this sort of work in Europe and in the USA?

A I think it is much more advanced in Europe than the USA, which is why I come here a lot. I think it's starting to be used and recognised and talked about in the USA, but that's only in the last few years. I think it's a lot to do with the mindset: if you have that expert mindset, it's harder to admit that a user could drive the design of a room.

Q Is decision-making undergoing a change in projects like yours?

A Traditionally, the architect has been the lead decision-maker. I think in architecture that's still true in most cases. But now the client is demanding a seat at the table. Architects have noticed that if they treat themselves as the expert, they have to sell their ideas to the client, and that's a lot of work. But if you work together, you don't have to sell the idea. There's just sharing and telling and the ownership by the client is huge. And in some of these projects, where the nurses have laid out the floors, ownership is probably the main result: they took part in the process and they feel ownership and responsibility for that design. So what's changing is that the client is saying, yes our people are important. Our veterans are really important: we are there to serve them. So things are shifting.

Q Do you also evaluate the design after people have moved into the building?

A No, not usually. That really surprised me. But when the project is over, the relationship tends to disappear. There's usually no money left. There's also a bit of hesitancy to be confronted with what didn't work.

But now that transition planning is increasing, I'm sure post-completion evaluations will increase too.

Q When you let users be co-designers, users act like designers and fall in love with their own ideas. So how do you use their results?

A We summarise what we've heard, but we're careful as to how that is presented. So in the case where the nurses were mapping out the space, the summary map said 'Nurse Dreamland'. So there is no question that this is a hypothetical dream future solution, because there were things in it not permitted by hosptial standards. So we capture the dream and make sure it's communicated. A lot of the work we're doing is at the experiential level, so there's less of a tendency for them to fall in love with the stuff. We invite them to stay with the process, instead of just using them for their ideas. That helps too.

Q Have you done anything to facilitate or explore the predictability favoured by large organisations, in terms of quantifying your work?

A No. That could be a future step. At the moment we're just struggling to get a seat at the table through the whole process. But the more we design with others, if those decision-makers are making a vision of the future collaboratively and with pictures and words, then that's what we're focussed on and we're starting from that. Then eventually in the future they will help us with that. So we will get to that later. The big advantage of healthcare is that they really do want it to be patient-centred, and nurse-centred, and family-centred. So our clients are sometimes bigger advocates than our team members. There are some standard metrics that measure how well the hospital works; and we're developing a new set of metrics more concerned with experience for the veterans' hospital. But bear in mind that you won't get those figures for five years; the feedback loop is really slow. So we'll be grappling with those things. But at the moment we just want to get the designers into wheelchairs and into bathrooms!