Rethinking Technology & Creativity in the 21st Century: A Room of Their Own

By Punya Mishra, William Cain, Sandra Sawaya, Danah Henriksen, & the Deep-Play Research Group, Michigan State University

Most of the wonderful places of the world were not made by architects but by the people
— Christopher Alexander (Alexander, Ishikawa, & Silverstein, 1977)

Introduction

As educational technologists, we often see ourselves as intrepid explorers, envisioning new frameworks and approaches designing new learning spaces guided by the intelligent application of new technologies – technologies that are fundamentally different from what has come before. We often question the judgment of teachers and students who resist our ideas, question our motives, and dispute our decisions. We are also sometimes scornful of people who seek to do things "their way" rather than in ways that *we* argue are required by these new technological possibilities. In a previous article (Punya Mishra & The Deep-Play Research Group, 2012), we argued that this emphasis on the "new" is a form of "chrono-centrism" i.e. the idea that "one's own era or time in history is the most important or the only one that matters" (p. 13). Our field sometimes asserts that since our world is on the cusp of significant changes driven by twin forces of technological change and globalization, we need to continually revamp and rethink our current practices.

In this article, we suggest that undervaluing our users may be to our own detriment as scholars and designers, neglecting as it does the kinds of knowledge and real world experience that "naïve users" (if we may characterize them as such) bring to the process and product of design. This gives short shrift to what has gone before, ignoring historical context, collective and collected knowledge, and the rich experience of past and current users.

Given the chance to introduce new technologies in classroom or other learning contexts, designers of learning environments often ignore what their users are telling them. More importantly they may ignore what users actually do–how they think, work, learn or behave. This tension between top-down expert design and more organic user-driven design processes (that sometimes even subvert the intentions of the designer) is not unique to educational technology. It is a theme that has played out over and over again in other design professions—architecture being a good example.

We argue, in this article, that observing and understanding the manner in which educators and learners construct their own ("naturally built") learning spaces, when provided the opportunity to do so, is something we should embrace. Users who question and subvert existing designs, and recreate them to reflect their own practices, can be a powerful impetus for creativity.

A classic example of such a top-down approach and its concomitant failure, primarily because the needs of the "users" were not factored into the design process, is the story of the design of the city of Brasilia.

Brasilia was one of the first cities to be designed completely from the top down. As its architect Oscar Niemeyer said, back in the 1950s, Brasilia was designed to be an *ideal* city—its design derived from an elegant modernistic aesthetic. Niemeyer wanted to bring breath and life to the barren heartland of Brazil, and within a few

years, Brasilia became the federal capital of the country. However successful and "hauntingly beautiful" (architect Norman Foster quoted in Banerji, 2012) it may be, Brasilia, as it turns out, was not a living space. It was built around an abstract plan, intended to resemble an aircraft. Brasilia is divided into city sectors (one for banking, another for hotels, and so on) connected with large avenues. There is a clear distinction between the expansive urban areas at the center, surrounded by residential buildings.

The problem, however, was that Brasilia ignored the complex (and often messy realities) of how people live. As Ricky Burdett, Professor of Urban Studies at the London School of Economics, described it in Banerji (2012), Brasilia "doesn't have the ingredients of a city: messy streets, people living above shops, and offices nearby". For example, it has no sidewalks, meaning that the streets of Brasilia discourage human interaction, leaving the city with no street life. This made Brasilia a dead city—where people came in to work, then left at the first opportunity they had to do so. In fact, week after week, Brasilia's inhabitants would temporarily flee its boundaries, seeking the more human hustle and buzz of surrounding neighborhoods instead.

Interestingly, the areas surrounding Brasilia, spaces that were designed by "real people" had a completely different "lived in" feel. As Burdett said, "All you have to do is to go out of central Brasilia and you get completely normal plazas and streets with kids playing, and places open every hour of the day and night, selling food and illegal alcohol and everything else." (Banerji, 2012) Clearly, Niemeyer's top-down beautiful design failed because it did not consider the organic interactions between the living space and its inhabitants.

Christopher Alexander and a new view of architecture

A strong critic of this top-down approach was the architect and scholar Christopher Alexander. He believed that most post World War II architecture had "virtually no ability" to create "living structures in the world" (Alexander, 1996). In contrast to the top-down perspective, Alexander offered a very different vision—a vision of architecture that emerges from the lived experiences of people.

For the uninitiated, Christopher Alexander is an Austrian architect who has designed over 200 buildings that adhere to his idea of "living environments." Additionally, Alexander also was a prolific advocate of his own approach, writing about his design philosophy and theories, most famously in his book *A Pattern Language* (coauthored with Sara Ishikawa and Murray Silverstein). In this book, Alexander suggested a completely organic rather than constructed approach to building spaces. He claimed that architectural creativity emerged through a deep understanding of the naturally occurring interactions that exist between the inhabitants of an environment (as contextualized within its topography, culture, and society). By explaining these patterns, Alexander seeks to empower users and inhabitants of a living space to develop, change, and shape their own environments around the pre-existing organic interactions in that space. Therefore, he argued that instead of allowing architects to impose a structure on a living environment and having that structure shape interactions, the natural interactions within the living environments ought to shape its architectural structure. As such, Alexander suggested that *an environment is best shaped by those native to that environment.*

From urban architecture to high-tech learning spaces

If this analogy to architecture appears initially a bit of a stretch, we offer an example of how users (i.e. teachers and learners) reconfigured the learning space in a technology-rich classroom, in ways that made sense to them. These changes were driven by differences in instructor and student needs, pedagogical goals, and content.

We'll provide a bit of further context. The classroom here was purposefully designed to meet the perceived needs of synchronous hybrid learning. This type of learning occurs synchronously in the same time/space, (often through video conferencing), with students and instructors who are both face-to-face and online. In these courses some of the students are physically present in the room with the course instructor, and the rest are located elsewhere (either in a separate face-to-face group, or distributed individually across multiple locations).

In our university the advent of a new hybrid doctoral program prompted the design of a new and unique kind of classroom, geared towards various modes of technology-enhanced learning. From the very beginning this was to be a "high-tech" space that would allow students and instructors, both near and far, to work and learn together. The room had two large screens that could be used to project video of the participants at a distance, or to share a computer screen. There were cameras around the room, some of which could be controlled by students at a distance (using a web-based interface). The chairs in the room were unusual too: they were mobile, and equipped with iPads that could be used by participants for video conferencing. The idea was that individual students in class could see and interact with the students who were "beaming in" remotely, and vice versa.

As it turns out, despite the best intentions of the classroom designers, they could not predict just how users would actually be using these spaces. Moreover, the design of the space reflected one form of pedagogical interaction, while the users had many more in mind.

In the next section we will show three different instantiations of the same learning space, as determined by the needs of the instructors, their students and the unique content, of these three different hybrid doctoral courses. The three course models that follow arose organically, as users (teachers and learners) creatively

navigated the emergent tensions of designing learning spaces in an unfamiliar hybrid context. (These models were developed by Dr. John Bell and the second and third authors as a part of research carried out by the College of Education's Design Studio).

Three models of user driven learning space design

In each of the following cases/models, users took the space and modified it to their own needs and requirements. What is important here is that the space (a classroom) they were using was one that had been designed top-down for teaching at distance. The users of the space however, had very different ideas. They took ownership over the space, and through flexibility, creativity and ingenuity, came up with solutions that best fit their learning and teaching goals and purposes.

Model I, Shared Portal: The first model, we call the *Shared Portal,* emerged in a doctoral seminar. Weekly readings and activities were assigned to guide explorations of concepts and ideas of the course. The students in the course engaged in individual and small group projects and discussions, which were entry points into larger discussions on how people experience, record, reflect upon, and synthesize complex domain knowledge.

The distinctive challenge of this class was that half the students were physically present in the classroom with the instructors, while the rest were spread out individually across multiple locations. The instructors viewed these whole class discussions as central interaction points for the perspectives, opinions, and insights of both the students and themselves. Moreover the instructors wished to support active interaction and engagement between both kinds of students (those who were physically present, as well as those online). That meant using online mediation for all interactions.

Interestingly the idea of using the iPads on the students' chairs was dropped almost immediately, as was the idea of having multiple classroom cameras that could be controlled by students. Instead, just one single camera, perched high over a SMART board was used in order to give remote students a wide scope view of the classroom. The only problem with this was that this "wide-angle" view of the class prevented the remote students from seeing the face-to-face participants in a more personal and individual way. In contrast, the remote students joining in via the use of video-conferencing software, could be seen quite clearly on the SMART board – since each of them used a web-cam directly focused on their faces. The remote students were completely missing out on the rich non-verbal interactions that occur in face-to-face interaction —facial expressions, gestures, eye-level contact and so on.

This classroom structure and interactions can be represented as follows (see Figure 1). Figure 1 demonstrates a classroom space where some participants are together face-to-face, and connected to other individuals located remotely (as the figure shows, the oval and a group of remote participants located separately from each other). The groups shared one point of contact, namely the video stream out of the classroom to the remote students, and from the remote students in to the classroom SMART board.

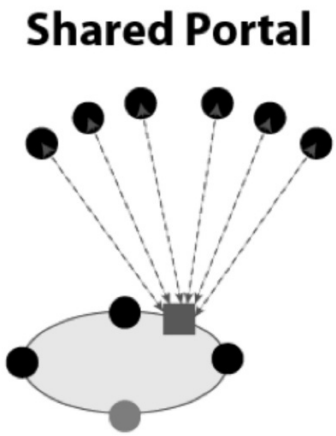

Figure 1. A schematic diagram outlining the "shared portal" model in a hybrid learning space.

As the teachers and learners began to rework the learning space for their needs, things in the classroom were repurposed toward new use. A crucial insight was the addition of an additional mobile classroom-camera at the eye-level of the students in the classroom. This camera was jerry-rigged together with the use of an iPad camera with video-conferencing software, mounted on a cheap tripod. This improvised contraption (dubbed the "TriPad") could be moved from person-to-person anytime someone in the room was speaking (somewhat like a microphone being passed to multiple speakers). And because it was close to the participants, this little iPad video-stream gave the remote students a close-up view of the speaker, offering the nuances of body language, non-verbal signals, and all. In a room with myriad technology (each chair was equipped with an iPad), it was this small creative solution that made a world of difference. It gave new dimension to the interactions—dynamic, personal and access-orientated.

For small group discussions, a standard solution might be to tell students exactly which online platform they should use. However, the instructors purposefully left the technology choice open so that students could negotiate this toward their group's needs. A consequence of this decision was that most of the students *did not* use the tools that had been designed into the space (the iPads on the chairs, etc.), and choose to explore tools and find ways that worked best for them to collaborate in simultaneous face-to-face and online environments. For example, one group chose to work on Skype for a personal discussion of the week's readings—but kept their video off so that discussion of the text itself was the main focus. Other groups used a variety of technological tools simultaneously (Google Hangouts + Etherpad, etc.), while still others made a point of using a different interactive space each class session—perhaps to better experience the affordances and constraints of each.

It is important to note that many of the affordances of the designed space were not used at all; or if they

were, they were often used in ways that were not intended by the original classroom designers.

Model II, Personal Portals: The second model, which we call *Personal Portals,* was an even clearer reflection of modern technological and educational trends—there was a predominance of remote learners. The class was composed of two instructors, seven face-to-face and twice as many (15) remote students. As a hybrid setting with an uneven balance of students, there was less of a demand for physical space (a technology equipped classroom) than there was for online space. Moreover, the instructors wanted the students' small group discussions to be the primary interaction points for learning. Any whole class discussions were kept to brief overviews and announcements from the instructors. Thus, the situation required a combination of online platforms for audio/visual conferencing, and a combination of devices for remote students. The result involved remote students using two devices simultaneously: a laptop or desktop computer for small group interactions on Google Hangouts, and an iPad for whole class segments through another online conferencing platform.

From an instructional design perspective, we might think of the whole class discussions as a kind of central "piazza", around which smaller transactions (individual and small group projects and activities) are interspersed. To facilitate this in a traditional face-to-face setting, students would move to the physical edges of the larger classroom space to allow smaller personal interactions. But making a place for smaller scale interactions in this hybrid/online course meant moving to a different online space—while still remaining in contact with the whole class space. Visually, this arrangement can be represented (see Figure 2) as a classroom space (the oval) with multiple connections between that space and the remote students (the dotted lines that end in the squares). Again, this structure utilized the designed space in ways that were not anticipated. The remote-controlled cameras

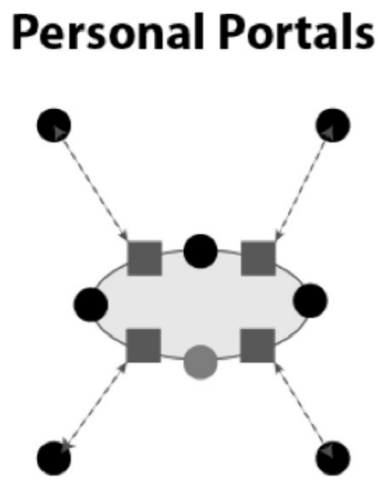

Figure 2. A schematic diagram outlining the "peronal portal" model in a hybrid learning space.

that were part of the original high-tech vision for the classroom were never used. But the chairs with the iPads became an important affordance, because they allowed small groups to work together as the remote students were "beamed in" to the iPad screens.

Model III, Linked Classrooms: The third model, *Linked Classrooms*, featured a single instructor, who taught two different groups of students that were equally spread between two separate locations on different campuses—and linked through a single online conferencing platform (see Figure 3).

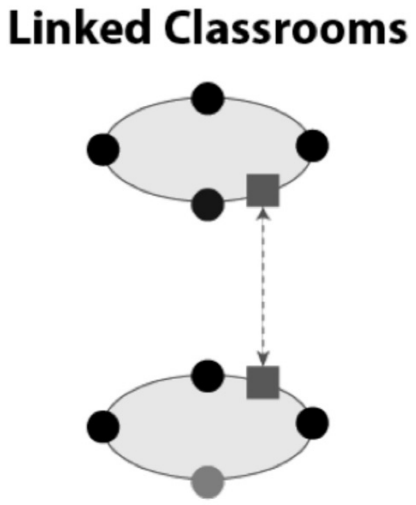

Figure 3. A schematic diagram outlining the "linked classrooms" model in a hybrid learning space.

The instructor had never previously taught two separate groups (split between two physical spaces on two different campuses) in the past.

While this unique course split (necessitated by logistics) was new to him, he quickly identified the presence of a single space that could be used to the class' advantage, i.e. the virtual bridge afforded by online interaction. The conferencing platform allowed for up to six participants to share their webcams simultaneously. These webcam streams appear as small frames within the conferencing platform, showing whoever has shared their camera with the rest of the class. Realizing the group-to-group format used only two of his six possible frames, the instructor decided to add the "TriPad" innovation (the mobile in-class iPad camera mentioned in the first model) to his classroom. This was an important technological pedagogical move. The instructor had realized that the frames in the online conferencing platform were his to fill as he thought necessary for the course. As a result, he began to add a series of guest lecturers from a host of different geographic locations, greatly expanding the scope of the content, the discussion, and the learning and opening the two face-to-face locations to a broader spectrum of professional community interactions and perspectives.

On learning from users

As we look across these three examples, one thing stands clear. The meaning of the space, the classroom, emerged as much from the plans of the designers as from the practices of the users of that space. Winston Churchill famously said, "We shape our buildings; thereafter they shape us." However our experience in some sense was the opposite. The architecture of the space did not determine user behavior, but rather user behavior determined the architecture of the space.

The tools we use may be new. And the spaces we function in may be ones that never existed before. Yet we suggest that there is still a lot that can be

learned (both literally and figuratively) from thinkers and scholars who have thought deeply about how we engage and interact with each other. In addition, our users are an important part of the process. By engaging with them, knowing their goals and desires, and most importantly, understanding their practices, we can create vibrant intellectual spaces that allow for engaging learning. The urge to interact on multiple levels is a powerful and organic human impulse. It finds ways of expressing itself, often without the aid of an overarching vision or top-down design.

Alexander suggests that the only way to design "lived spaces" is to either have the inhabitants of the living space inform the design right from the beginning, or to have the architects of the space closely observe the organic interactions of inhabitants and then engage in the design process. This facilitates a natural and usable design trajectory—one that is aesthetically "whole" in the way that it is seamlessly tied to its context (Mishra and Koehler, 2008).

A similar pattern could be seen with all of the instructors of the three courses we described here. Some instructors chose to let the "inhabitants" (students) choose and negotiate the tools and designs for small group interactions. Other instructors closely observed the organic (proven) interactions that occur naturally in learning environments and structured the collective spaces (and technology supports) around those interactions. In each of these cases, however, the original, deeply thought-out, well-intentioned, top-down, plans of the original designers of the space were ignored or subverted in multiple ways. Some elements that were considered important by the designers (such as the controllable cameras) were never used. Other elements (the iPads on the mobile chairs) were used by some groups, but not by others. And finally, many elements emerged organically as the instructors and students actually engaged in the act of teaching and learning (such as the TriPad). In each case, however, Alexander's dictum of observing users, learning from them, and incorporating their natural interactions consistently holds true.

In this paradigm, the task of the architects (of learning spaces) involves listening and facilitating the design, rather than dictating or forcing it. Creative and contextual approaches to designing learning environments acknowledge the power of epistemologies and perspectives that lie in existing knowledge. Repurposing these ideas requires knowledge and awareness of this knowledge, but also requires designers to make basic human interactions the cornerstone of any final design.

Experts in educational technology may have designs in mind for where and how interactions ought to take place–but such designs are essentially a plan, or an initial vision—a model created by an expert, not the audience or the users. Often, designs are not synonymous with the reality of everyday life, learning, or common interactions. And in such cases (as in the earlier example of the city of Brasilia), reality then has a way of intruding, to either alter or reject the design–no matter how elegant or desirable it may have appeared at the beginning.

In order to function best, designs must be created flexibly, with sensitivity and attention to context. The experiences of real-world interactions, and the needs of real-time, real-life users must seamlessly become a part of learning design. As Michael Crichton famously notes in his book Jurassic Park (Crichton, 1991, p. 159), "life finds a way." If that is indeed the case, maybe the best thing for us as instructional designers is to try to understand the deeper patterns of human interaction, to learn from scholars and history, and to listen to what users are saying. But most importantly, to closely observe what they do—and then get out the way. Sometimes, the most creative solution may be to step back and do nothing at all.

Note: *The Deep-Play Research group at the college of education at Michigan State University includes: Punya Mishra, Danah Henriksen, Kristen Kereluik, Laura Terry, Chris Fahnoe and Colin Terry. Address all communication to Punya Mishra <punya@msu.edu>.*

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