

white paper for:
berkeley - stanford CE&M workshop:
defining a research agenda for AEC
process/product development in 2000
and beyond

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data island: information technology working intelligently in order to facilitate breakthrough research

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when i was younger i used to read these books called 'choose your own adventure' books. they were texts where the reader was asked to decide how the main character should act and the story would continue based upon decisions the reader made as he or she was reading. by making a decision and flipping to the corresponding page, the reader was actually taking part in the creation of the story and the same text could produce a variety of stories based on the combinations of choices the reader made. i always cheated when i read them by keeping my finger on the previous page and see how the story progressed based on my decision, if i didn't like the result, i would go back and choose another option. as the story progressed and grew in complexity, it became difficult to keep my fingers in all of the pages that contained choices. eventually i had to commit to a path and get on with the story (as all my fingers would become engaged marking my previous options, i could no longer turn the pages to go forward).

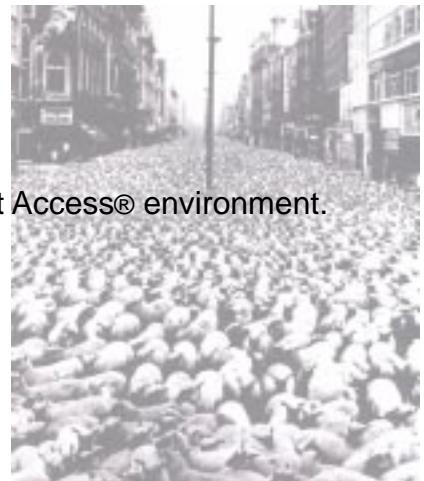
"Our 'storehouses of knowledge' must be continually replenished"(CII/NSF p. v)

History is important to the development of research. Without an accessible history, you are loosing information as fast as you gather it. Information without an accessible history is known as 'dead data'. This history that we speak about is not textbook history, it is not something written and finalized. It is a history of shifts and it functions as a resource. If some sort of data serves as a resource, it is essentially defeating typical conceptions of history and is now taking part in and informing thought-shifts of its own. Information that influences, contributes, and exists as a part of many accessible histories is known as 'dynamic data'.

The Data Island provides for a consistently available "history" (a term that we are already coming to understand as something of a misnomer). Data can be broken down and taken out of context. This is not deconstruction, construction, post-structuralism; this is entropy. But like sediment and other sub-structural matter – this "island" rests on a foundation whose pillars enforce, inform and provide a constantly available matter for manipulation.

- *Creativity - must consider diversity of people, different perspectives, increased complexity.*
- *Basic research builds a storehouse of knowledge (for later use)." (CII/NSF p. 13)*

We recognize that some sort of mass storage is a necessity. Mass storage provides a common and total molecularity from which all construction disciplines can benefit. In a fashion this is what makes the Data Island so interesting: we no longer think of information residing in databases or tables or rows or columns. Instead we envision data simply existing somewhere. This is not a neat and tidy (and basically useless) Microsoft Access® environment. This is about an idea that is approaching cyberspace and total manipulability. This is space- absolutely imaginary, absolutely virtual yet, at the same time, a completely measurable, absolute reality. We have the tools to create references to data and then to create inter-relations that make multiple structures take on manifold meanings. This is how information becomes extra-contextual and immediately relevant to other disciplines. The more molecules the better.

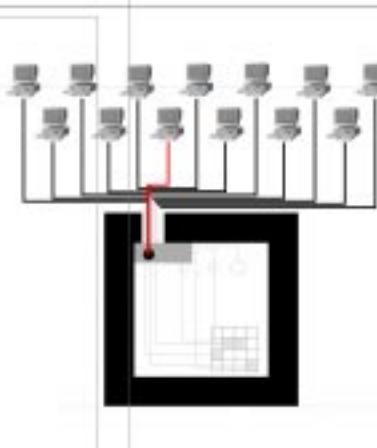


Access® environment.

"To find the support functions really needed for creative organization by authors and editors, we must understand the exact representation and presentation of human thought, and be able to track the continuities of structure and change.

This means we must find a stable means of representing structure very different from the sequential and hierachial--a representation of structure which recognizes the most anarchic and overlapping relations; and the location of identical and corresponding materials in different versions; which recognizes and maintains constancies of structure and data across successive versions, even as addresses of these materials become unpredictably fragmented by editing." (Nelson)

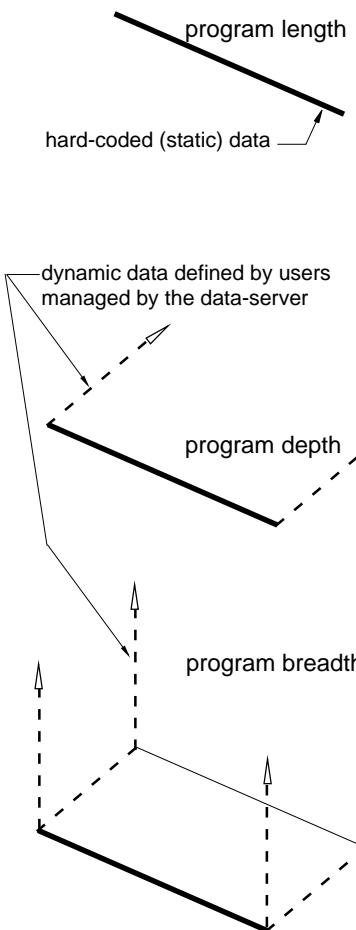
"There needs to be a mechanism to tell us what is in the 'Storehouses of Knowledge'. Need attention to 'get the information out'. " (CII/NSF p.19)



Data Island exists in a moment of total contradiction. On the one hand it exists to foster entropy and a spirit of total accumulation. On the other hand, our Data Island provides the tools for organization- navigating entropy.

R & D is a task of creating multiple solutions to puzzles- the pieces of which are not always readily available. But so what? If you don't have the pieces that you need, you craft them to suit your purpose. Creativity + Intelligence. Chaos + Organization.

"The panel reasoned that ideally a neutral representation should be found which keeps the cognitive processes separated from the data (possibly a three dimensional model with temporal information). Such a rich but neutral model will offer maximum flexibility as processes and requirements change, because it is unbiased. One member called it "communication between" rather than "integration of," and hence a mapping is required between the various data formats needed by the individual project team members." (lbbs p. 9)



what is the data island?

Data Island is a flexible framework customized to the needs of the host. Then a structure is implemented so that the framework can grow in two dimensions (the breadth and the depth). Its third dimension is the length of the program, as of yet, this does not change. The depth and breadth of the program grow exclusively and continually through usage and are managed by the data-server, the length is the actual amount of code that tells the program how to perform. Therefore the program is not an amorphous blob. The fact that it is not totally amorphous may be a problem, limiting the possibilities of Data Island's ability to adapt to the changing future (as opposed to pure growth). This is an issue that needs to be discussed.

Data Island also (and perhaps more importantly) has the ability to track usage and users' activities. This could be important to study where certain research overlaps previous research and the patterns of particular research methods. Tracking these paths may give some insight to the thought processes of researchers and allow us to understand the exact development of a research project (which paths were chosen which paths were avoided). With this ability, it may be possible to begin to pinpoint (some certain circumstances) where incremental research becomes breakthrough research.

Data Island is software to study and understand research practices as well as a powerful research tool.

how does data island work?

Data Island is a server-side application, it needs only to be installed on one machine then other workstations can access the information through the internet (or an intranet). It is web-based so it can link to other databases around the world, and for users, is platform independent—the only type of software required to contribute to the Data Island is a recent version of a java-enabled web browser.

The most significant component of the Data Island is the data-server. This is where all dynamic information is stored, sorted and retrieved. To translate information from the data-server so that it can be outputted on an HTML web browser, Data Island uses a common gateway interface (CGI script). The CGI script is where the structure is defined and it remains static as opposed to the HTML pages and data-server which are constantly being updated and added to.



are there any examples of data island being implemented in the world?

The first and currently the only application of Data Island exists as a materials research database for the Office for Metropolitan Architecture (OMA) in Rotterdam, the Netherlands. OMA is an international architecture office that strives to use the most current and cutting-edge materials in new (often unconventional) ways. Here the Data Island is configured to respond to the various methods of material classification used around the world. The program can accommodate an unlimited number of users and store an infinite number of projects. Users can customize their interface to best fit their research processes and then contribute to the program's depth by inputting research data. Administrators are responsible for controlling the breadth of the program by adding new research projects and research categories. Administrators are also responsible for monitoring the research activities of users and alert design teams of research overlap and data redundancy.

how does data island work for the AEC industry?

- Establish mechanisms to foster and develop breakthrough research incubators..."
- Develop effective communication channels among the three construction sectors and produce research products that are adapted and expressed in terminology relevant to the three sectors.
- Facilitate sharing of information, collaboration, and linking between the three construction sectors and produce research products that are adapted and expressed in terminology relevant suggestions to universities.
- Establish a mechanism to collect, from the worker's level in industry, pressing topics for research and make them available to the universities for consideration in their planning processes for future research." (CII/NSF p. viii)

Data Island is completely customizable to the needs of any company, individual or institution; then customizable (along the same lines) to specific projects; and finally customizable once more to the individual end-user (ie. the researcher or data enterer).

"...the achievement of breakthrough research requires the removal of paradigm blocks ...[and]... a greater willingness to take chances"(CII/NSF p. 8)

Through being able to track usage and patterns, it is anticipated that Data Island will help facilitate break through research. This will be accomplished by the fact that Data Island makes research histories available. One may be more apt to take risks if they are able to go back and choose another path. One can more readily work from the findings of others around the world through Data Island's connectability.

notes and bibliographical information:

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cover illustration by ronald southwick.

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drawing on p. 2 by ronald southwick.

image on page 3 from: W. January 1999.

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disclaimer: none of us are software developers by trade. we have all received educations from virginia tech in the field of architecture (except for shawn boles, who studied english, especially post structuralist theory). we are working on this program because we see information technology seriously integrated within the future of research and development for the construction industry. our goals and interests lie in research and the efficiency of research and development technology. we have submitted this paper in an effort to make others with common interests aware of our actions and to use this as an opportunity to gain new insight and ideas from fellow practitioners and academics in order to develop this idea to its fullest potential. any comments or ideas are welcome. thank you.

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