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## Notes on Design Connection Definition Experiments

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There seems to be a general awakening in the design community to the need to organize information for research purposes in databases. Parallel to this is a growing interest in encouraging more intelligent discourse regarding design research. Both activities require a more conscious and careful use of language. As evidence of this phenomena, the recent IIDD conference (ftnt - Japan 1999) website solicited definitions from the design community. Also an ad hoc group of designers and educators (ftnt - AIGA Advance Design Group) has discussed the possibility of setting up a definition process for new technology in particular.

This exploration is essential to the creation of a research database for design. The Institute of Design is in the process of launching its own database by summer's end with the plan to share it publicly and extend research connections to other institutions. In this way the building of a research culture in design is strengthened.

The following notes track several pilot studies that will serve to help identify a best practice for defining words that will form an initial vocabulary for tagging design research. It is important that the definitions be as simple as possible, avoid jargon, and reveal a general, but useful definition to which the language team can agree. Three studies are discussed: two studies (1 and 2) with graduate student participants and an academic study with a group of professors.

Factors important to this process are:

- the vocabulary will serve as access points to a growing database of design research
- dictionary definitions are too generic and lack a useful design focus
- the database and its language system must accomodate a community of users who will be international, representing various design sub-disciplines, and who will contribute to as well as use the information
- the vocabulary is not static but responsive to use and amendment

For these reasons the process of defining design terms must be collaborative and interactive. The criteria against which the studies below will be evaluated are:

- 1) quality of definition
- 2) efficiency of process
- 3) degree of intervention by the researchers

It is presumed that the goal is high quality and efficiency with the least intervention from the researchers.

The original design of this investigation included four studies. All participants in these studies were graduate students at the Institute of Design. The variations among the studies depended on the degree of information provided.

One variation (two studies) was abandoned after the first round. This study (in the interest of efficiency) provided an initial definition. Even though the researchers did not consider this definition a complete or polished one, the participants offered little by way of addition, criticism, or comment. This approach failed to provide interactive stimulation and was abandoned. The remaining two studies with students are presented in their chronological order.

### Study #1

Nine participants (ID graduate students)

Three unrelated words (interaction - framework - aesthetic)

Participants were asked for a definition of the three words  
Replies were expected within 3-5 days

#### Round 1

Each participant was asked to supply a definition for the three words (see endnotes for actual responses). No other information was provided. The definitions were analyzed according to the scheme below:

Noun — Verb — Object(s) — How

Using this with an example: Interaction

Elements from the nine participants' definitions are listed (see exhibit 1, analysis of round 1)

#### Exhibit 1 Analysis of round 1

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Noun	—	Verb	—	Object(s)	—	How
act		response		person to person		face to face
activity		exchange		person to object		remotely
action				person to environment		physically
behavior				entity to entity		visually
process						cognitively
communication						communication

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In this way individual definitions were deconstructed and the sense of the collective definitions synthesized. The synthesis was returned to the participants along with questions (see exhibit 2, with definitions and questions for the next round).

#### Exhibit 2 Stimulus for Round 2

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Definition: Interaction is an act of symbolic or physical exchange between entities in which each alters the state of the other through remote or proximate communication.

Question: some respondents included the following "players" for interaction; would you limit interaction? If so, to which ones (list numbers)?

- 1) person to person
- 2) person to object
- 3) person and environment
- 4) object to object
- 5) object to environment
- 6) environment to environment
- 7) all of the above

Definition: Framework refers to a structure that organizes the context and gives direction to developing a solution for a design problem.

Question: some respondents qualified the nature of framework with the following terms — are any of these terms important to the definition? If yes, which ones (list numbers)?

- 1) loose
- 2) generic
- 3) flexible
- 4) none

Definition: Aesthetic attributes refer to a quality of experience shared through formal and sensory characteristics that resonate with a person's sensibility.

Question: respondents mentioned the following qualifications for aesthetic — would you limit aesthetic to any of these qualifications? If yes, which ones (list numbers)?

- 1) visual
- 2) five senses
- 3) sensory
- 4) feeling
- 5) intellectual
- 6) all of the above
- 7) none of the above

The answers to the questions suggest a possible fine-tuning of the search structure that will be controlled through database design that we cannot pursue at this time. For example, interaction may have sub-categories that identify types of interaction such as person-object or person-person.

In Round 3, the definitions were unchanged from the previous round. They were sent to participants along with one question, which was:  
In the last round you selected sub-components of interaction — what might “environment” mean in the context of interaction?

The results were thoughtful, but once the graduate students felt comfortable with their definition, they did not push the definition further. They were pragmatic about getting it done. In this study there was no attempt to try for a consensus.

For the final Round, definitions were sent to participants along with thanks.

#### Evaluation of Study #1

- 1) quality of definition — uneven
- 2) efficiency of process — 3 rounds were accomplished quickly
- 3) degree of intervention — varied, at first none (only words were supplied), however in rounds 2 and 3 there was high intervention as the researchers formulated synthetic definitions and provided queries to stimulate the participants' thinking process.

#### **Study #2**

This study was set up similar to Study #1 with the same general group of graduate student participants. This time, however, participants were given 3 related words: Interface - Interaction - Navigation. The words were not identified as being related, but the expectation was that the participants would easily see and respond to their interrelated nature. This proved to be the case.

Participants were asked to define the three terms. The difficulty with this study was that the related terms tended to overlap and be used in the definitions of the other terms, making for redundancy and vagueness.

This study was abandoned as the entangled words and definitions seemed too difficult to consider. The researchers thought the process would be inefficient, requiring too much researcher intervention to yield good results. The participants were caught and immobilized by the related words. The cluster of words was formidable and clouded the process of definition. This was an unexpected result. While the researchers expected that related terms would sharpen the definition process, it tended to do just the opposite.

## Academic Study

### Definition development

A more process extensive study was developed with five accomplished design faculty from a variety of sub-disciplines and three countries. All the participants were skilled authors, routinely engaged in thinking about design research. The academic participants agreed to participate in a process to define one word: interaction. Their identities were not disclosed to the other participants. The researchers, of course, knew their identities as they processed and forwarded their communications, substituting alphabetic tags for their names.

The meaning of words and the construction of a vocabulary is a daunting task as we tend to vacillate between extreme positions regarding the stability of words: the dictionary is the authoritative final word on meaning or meaning is dynamic and socially constructed. (fnnt on history of dictionaries) Other factors complicate the task. Like etiquette, recognized and respected forms of cultural and social use have fallen into an optional status as media cleverness clouds common usage and saturates consciousness with the new. (fnnt Wm Safire and Plain English movement) In this context finding a reasonable constraint and focus for the construction of a vocabulary is made even more difficult.

Background on the project and instructions to the participants were purposely kept to a minimum (see exhibit 3). Before the event even began, one participant offered advice to the researchers regarding process. These concerns were answered with personal correspondence, but the advice was not accepted. The pilot study's goal was to uncover the issues and difficulties involved in obtaining a definition consensus among a group of professionals.

### Exhibit 3 Instructions to academics

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Thank you for agreeing to participate in a brief study to investigate a process for collaboratively defining design research terms.

The goal is to define words that will serve to access design research through a controlled vocabulary.

The definition should reflect commonsense use in the design community. Your response will be anonymously circulated among the language panel.

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Round 1 resulted in five definitions, one of which was significantly different from the others in that it took a very particular focus on the design use of the term interaction. The other four definitions were more similar and their differences flagged issues for discussion (see exhibit 4 for the initial definitions).

### Exhibit 4 Initial definitions

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"Interaction is a causal cognitive and physical relationship between people which is sometimes mediated through objects or technology and which may respond to or influence other interpretive and behavioral patterns." A

"Interaction is an action that implies at least two active agents engaged in an exchange. By extension, in the communication design field, the interaction between a user and an interface. Interaction design: the design of software or communications where a user works with a computer in order to acquire information or engage in entertainment. Interaction design involves building options that permit or require choices on the part of the user, with a view to adapting to different, albeit active styles of information acquisition. Freedom of choice is obvious for interactive entertainment in the electronic media." B

“Interaction denotes mutual or reciprocal action or influence. In design, the term interaction often describes mutual or reciprocal interaction between human beings and two-way electronic or electro-mechanical systems. These include such devices as computers and machines that respond to user instructions or orders. These machines may also enter a cycle of action and response involving the user’s earlier responses to prior machine states. Interaction takes place among human beings that act upon each other when two or more actors mutually interact. The essential concept of interaction is reciprocal action, influences, or effect.” C

“Interaction: Inter = between, mutual, reciprocal; and action - the bringing about of change. This would make interaction ‘a process of mutual or reciprocal influence’ among the variable or parts of a system. John Dewey distinguishes interaction from transactions: Interaction changes the position or state of the parts relative to each other. Transaction additionally transforms or alters them. Thus, the parts of a machine interact, whereas humans, in the course of communication, transform each other as well. We describe interactions as a succession of actions and responses, the latter triggering further actions.” D

“Interaction is the reciprocal ability to provide a dynamic interchange between two or more elements, i.e., matter, persons, concepts, objects, environments, performances, and experiences, felt and acted upon by all participants, conceptually, physically, intuitively, cognitively, and emotionally in various degrees.” E

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Round 2 returned the initial definitions along with a request that participants comment on other definitions, and reconsider or refine their own definition. One participant stated: “I reviewed the definitions and I feel overwhelmed by the notion of reacting to them. They all make sense. You will say that is a cop-out. I think the richness of the term invites the variety of responses. I find nothing wrong in any of the attempts.” Another observed that: “...the word ‘interaction’ has completely different meaning than ‘interactive.’ Even though related, the latter has been clearly adopted by designers who talk about the specific interactive role of the merging technologies in the communication role. As such true reciprocal communication has not happened yet, unless one wants to suggest that chat rooms are different from letter writing and the telephone, and filling out forms for credit card purchases. Therefore ‘interactive’ is a hollow term still waiting to evolve into ‘interaction.’”

Yet another participant checked in to see how aggressive he could be in attacking his fellow participants’ definitions. This group of responses demonstrates the variability in a social process of definition and the sensitivity needed to manage such a process.

Four of the participants offered detailed comments on the array of definitions (exhibit 5 is a synthesis of responses prepared by the researcher, but not shared with the participants).

Exhibit 5 is a synthesis of participant comments and analysis of important definition features. This was prepared as a way to get a more holistic grasp of the definitions by getting beyond the linear sequence of language. Round 3 contained three sections: section 1 reviewed the disposition of the five definitions (see exhibit 6); section 2 contained comments from the previous round based on the original definitions; and section 3 showed the current state of affairs.

Definition from participant A

Interaction A **causal** **cognitive** and **physical** relationship between people, which is sometimes mediated through objects or technology and which may respond to or influence other interpretive and behavioral patterns.

"D" objects and suggests we avoid causation but if we use it, it should be mutually causal.

"D" objects - cognition is not an attribute of interaction but enters into the explanation of the process.

"D" objects - agrees it can be observed and studied but is not a mass/energy continuum event.

"D" objects to limiting it to people, fears it will become a rubber term encompassing all human endeavor. "E" agrees that limiting it to people is a problem, wants to use word in an abstract sense, mentions environmental interaction.

Missing: mutual and reciprocal interaction  
Missing: environmental interaction

General comments: too narrow, too specific to design to be widely used and understood

A makes no change.  
E endorses A's definition.

Definition from participant B

**Interaction: action that implies at least two active agents engaged in an exchange.**  
**By extension, in the communication design field, the interaction between a user and an interface.**

"D" objects to exchange.

**Interaction design: the design of software or communications where a user works with a computer in order to acquire information or engage in entertainment.**

"D" objects to limiting it to people

**Interaction design involves building options that permit or require choices on the part of the user, with a view to adapting to different, albeit active, styles of information acquisition. Freedom of choice isobvious for interactive entertainment in the electronic media.**

Missing: system - system interaction

General comments: too limited to information, rests on vague concept of agency

B makes no change to definition.

Definition from participant C

**Interaction denotes mutual or reciprocal action or influence.** In design, the term **interaction** often describes mutual or reciprocal interaction between **beings and two-way electronic or electro-mechanical systems.** These include such devices as computers and machines that respond to user instructions or orders. These machines may also enter a cycle of action and response involving the user's earlier responses to prior machine states. Interaction takes place among human beings that act upon each other when two or more actors mutually interact. **The essential concept of interaction is reciprocal action, influence, or effect.**

General comments: none





Definition from participant D

## INTERACTION

**Inter = between, mutual, reciprocal and action = the bringing about of change.**

**This would make interaction “a process of mutual or reciprocal influence” among the variables or parts of a system. John Dewey distinguishes interaction from transaction: Interaction changes the position or state of the parts relative to each other. Transaction additionally transform or alters them. Thus, the parts of a machine interact, whereas humans, in the course of communication, transform each other as well. We describe interactions as a succession of actions and responses, the latter triggering further actions.**

General comments: captures notion of process, wide range of examples under controlling concept of interaction, clear distinction between interaction and transaction

D alters the definition.

**Inter = between, mutual, reciprocal; and action = the bringing about of change.**

**This would make interaction “a process of mutual or reciprocal influence among the variable or parts of a system.” We**

same as above to here

**observe interactions as a succession of actions, each responding to prior actions and each being responded to by succeeding action. We study interactions by identifying patterns in this succession, and we design interactions by providing material support for desirable patterns to emerge.**

Definition from participant E

**Interaction**  
**Reciprocal** ability to provide a dynamic **interchange** between two or more elements, i.e., matter, persons, concepts, objects, environments, performances, and experiences, felt and acted upon by all participants, conceptually, physically, intuitively, cognitively, and emotionally in various degrees.

General comment: no operative distinction between kinds of dynamic interchange

E withdraws the definition.

## Exhibit 6 Disposition of definitions

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Round 1	A	B	C	D	E
	def	def	def	def	def
Round 2	holds	holds	holds	refines	drops out
	E joins				

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A summary of issues and objectives from section 2 follows:

- avoid “causation,” but if used it should be mutually causal.
- “cognition” is not an attribute of interaction; cognition enters into explanation of the process of interaction only.
- “physical” is not an attribute of interaction even though the ‘interaction’ event can usually be observed.
- interaction is not limited to people — technology is an important mediator and aspect of design.
- environment should be considered an attribute.
- “exchange” in interaction is questionable.
- active agency is not clearly applied — systems interacting with other systems come to mind.

### Process reflections

Running parallel to the definition activity was a discussion of definition process. Given the academic nature of the participants, this was inevitable and certainly useful to the development and refinement of process. Despite the fairly uniform credentials of the participants regarding academic and design experience and knowledge, there were significant differences in sophistication regarding thinking about language and definition.

One particularly vocal participant, recommended use of two standard references: Merriam-Webster’s Collegiate Dictionary and the Shorter Oxford English Dictionary for baseline definitions; this would assure that the meaning captured would be understood by most users. He went on to say: “If a clear and overwhelming majority of users use the word another way, one might accept that the word has taken on a different meaning in a field. Without that evidence, a divergence in meaning may suggest that the user has developed a private vocabulary. It may also mean that there is a language microecology in subfields of the discipline where the word is used this way. To fail to distinguish among these issues represents a serious danger in a project like this.”

The second technique this participant recommended was the collection of citations. This would require a significant numbers of helpers to clip and xerox words in use. While this was the technique used for the original creation of the Oxford English Dictionary, the nature of the use of these keywords as part of a dynamic interactive database system does not lend itself to such an indepth and extensive investigation.

Another concern was the problem of developing overly narrow definitions. One participant reiterated the goal of the process: “If I understand the purpose of this project, we seek clear definitions of words used in ordinary language, defining them in such a way that design researchers and designers can make the best use of them. That is, we do not seek to define words in a specific way that will be used only by and for design research specialists or designers.” This participant went on to observe the integrative nature of design research and the broad areas it covered and communicated with as evidence against the usefulness of any super-specialist approach.

Another participant observed that to the extent that we were able to identify the particular meaning a term has taken on in design, we would reveal our particular cultural values and that this in itself would become an interesting analysis. The other recommendation from this participant was to depend on core dictionary definitions in common use and then describe the context of use. "I don't think straight dictionary definitions alone will get us very far, but I do think we need to avoid making definitions based solely on how a term is currently used within a field...it is important for the definition to be capable of becoming operational for research — to make it possible to analyze, measure, and describe examples of the phenomenon. I'm also concerned that these definitions survive a specific technological moment — that they not depend on the technology *du jour* and therefore become useless in a few years."

Because there are many sub-disciplines in design and the language panel consisted of only five individuals, one participant recommended indirectly that the language panel be enlarged to cover more specialities: "I argue against establishing a micro-ecology whose fitness landscape renders our vocabulary incomprehensible and unable to survive outside the boundaries of our pool."

The language panel's discussion centered on what constituted a useful definition and how to create it. While the researchers are also concerned with these factors they are additionally trying to balance a socially constructed definition that can be accepted by many researchers who may benefit from accessing design knowledge and its underlying research.

## Conclusion

Structuring a definition process

Many things were learned about setting up a definition process from this series of studies. These factors can be divided into: participant management and process management.

Participant Management

- anonymity is important so that participants can freely comment on each others' ideas
- definition groups should be limited to three or four participants at most so that the researcher can more easily monitor and prepare the various rounds
- participants will require careful selection

Process Management

- instructions must be simple and clear
- words for definition should be presented without any initial definition
- words given in any group for definition should be unrelated
- 5-10 words should be given at a time (this will prevent overworking individual words)
- researchers will have to intervene with a synthesis

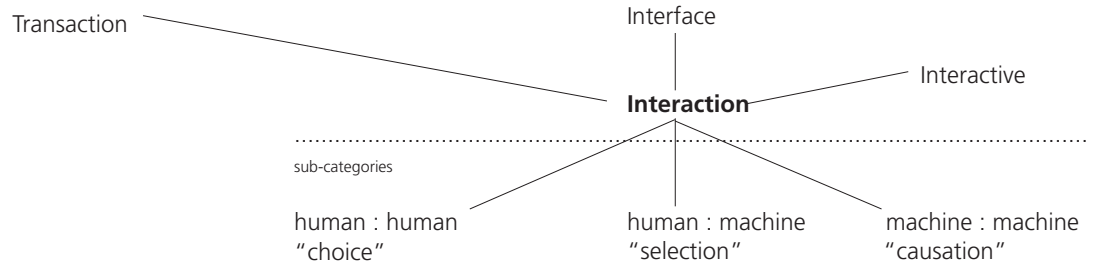
Remaining questions

Questions still remain — some of them follow, emerging from what we've learned so far.

Regarding the words — we've learned that:

- closely related words will appear in the definitions, perhaps because designers are integrators
- diagrammatic relationships of words based on association can be loosely created from the participants definitions (see exhibit 7)

## Exhibit 7 Related words and sub-categories developed from Interaction language panel responses



Questions that remain regarding words:

Should participants receive words the researchers believe they are particularly well suited to define?

Should the participants select the words they will define?

Should the words be given to participant groups through a random process?

Exactly how many words should the participant receive at one time?

Regarding the language teams — we've learned that:

- the psychology of the participants is important — too many stubborn, cranky individuals spells trouble if consensus is the goal

Questions that remain regarding language teams:

If the group fails to attain consensus, what is the fall back position?

Researcher intervention? Shelving the word until a later time? Passing the word on to another group?

Regarding definition process — we've learned that:

- instructions for participation need to be simple and clear with perhaps a sample round using one fairly easy word as a test case
- a systematic method to track and run the process is essential in:
  - tracking participation and anonymity
  - assembling feedback
  - providing analysis
  - knowing when to give a compromise definition
  - how to stimulate consensus

This seemingly simple process is full of complications that need to be worked out in order to obtain quality definitions, achieved efficiently, and with minimal researcher intervention.

Defining "interaction"

Finally, the synthetic definition of "interaction" follows:

"Interaction is a process of mutual or reciprocal influence among the variables or parts of a system. Interactions are a succession of actions, each responding to prior actions and each being responded to by succeeding action. By identifying and studying interaction patterns in this succession, we can design interventions that provide material support for desirable interaction patterns to emerge. The essential concept of interaction is reciprocal action, influence, or effect."

