User Research Tutorial/ Workshop

Diane Schiano
PARC

parc
Palo Alto Research Center

- *Science is the elucidation of common sense.*
  - *Francis Bacon*

- *There are the hard sciences, and then there are the difficult sciences.*
  - Gregory Bateson

- *There are lies, damn lies and statistics.*
  - *Mark Twain*

- *You can learn a lot by looking.*
  - Yogi Berra

Goals

- Responding to results of survey, and given your diverse backgrounds & interests.
- A Brief, Introductory
  - Overview of User Research
  - Major Approaches to Research Design
    - » Principles & Pragmatic Considerations
  - Recommended Resources
  - Examples & Discussion
- More tutorial than expected, but feel free to interrupt, ask questions. I'd like this to be interactive. I'll post these slides, and I'm happy to follow up later.

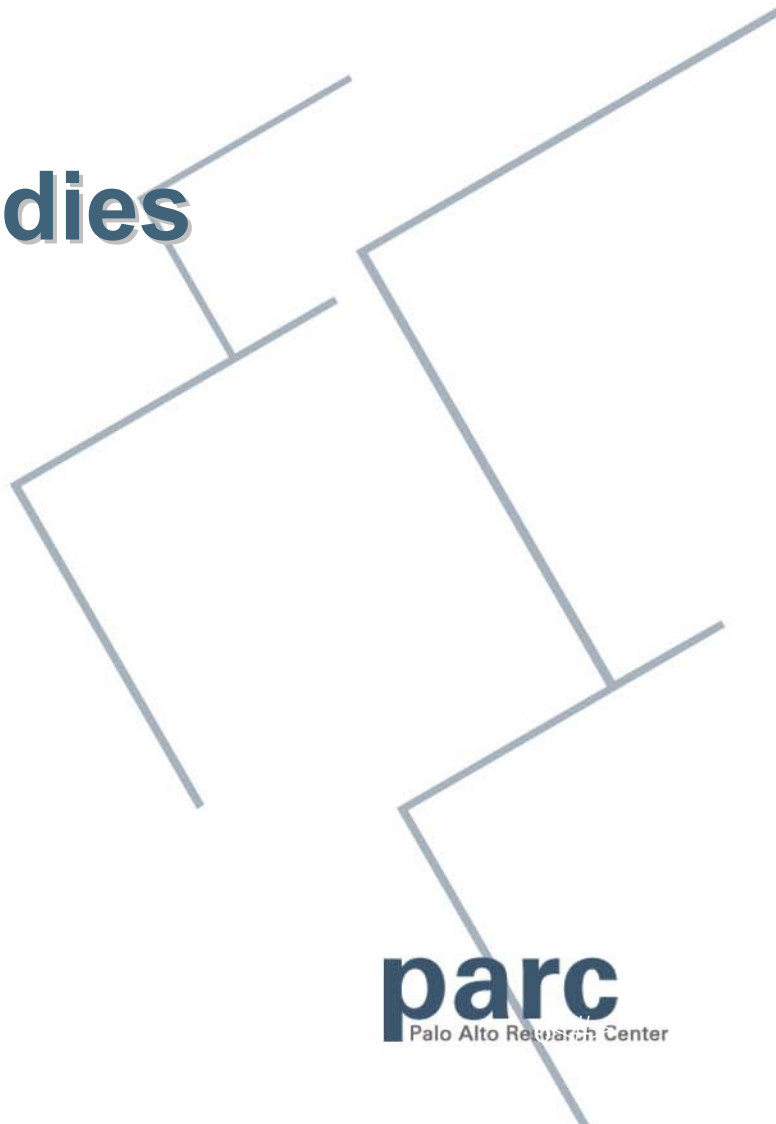
http://home.comcast.net/~diane.schiano/

Introductory Exercise

Overview

- Three “U”s of User Studies
  - Usefulness, Usability and Use
- All You Ever Need to Know About User Research Design in 25 Slides or Less
  - Overview of Research Design
    - » Two Distinct Approaches…& Convergence
      - Qualitative & Qualitative Methods & Deliverables
    - » Core Research Principles & Pragmatic Considerations
- Discussion Options
  - Extended Examples of Convergent Approaches
    - » Quantitative Analysis of Qualitative (& Quantitative) Research (Workplace IM Study)
    - » Evaluating a Mixture of Qualitative & Quantitative Findings (LambdaMOO Project)
  - Research Design Clinic

Three “U”s of User Studies

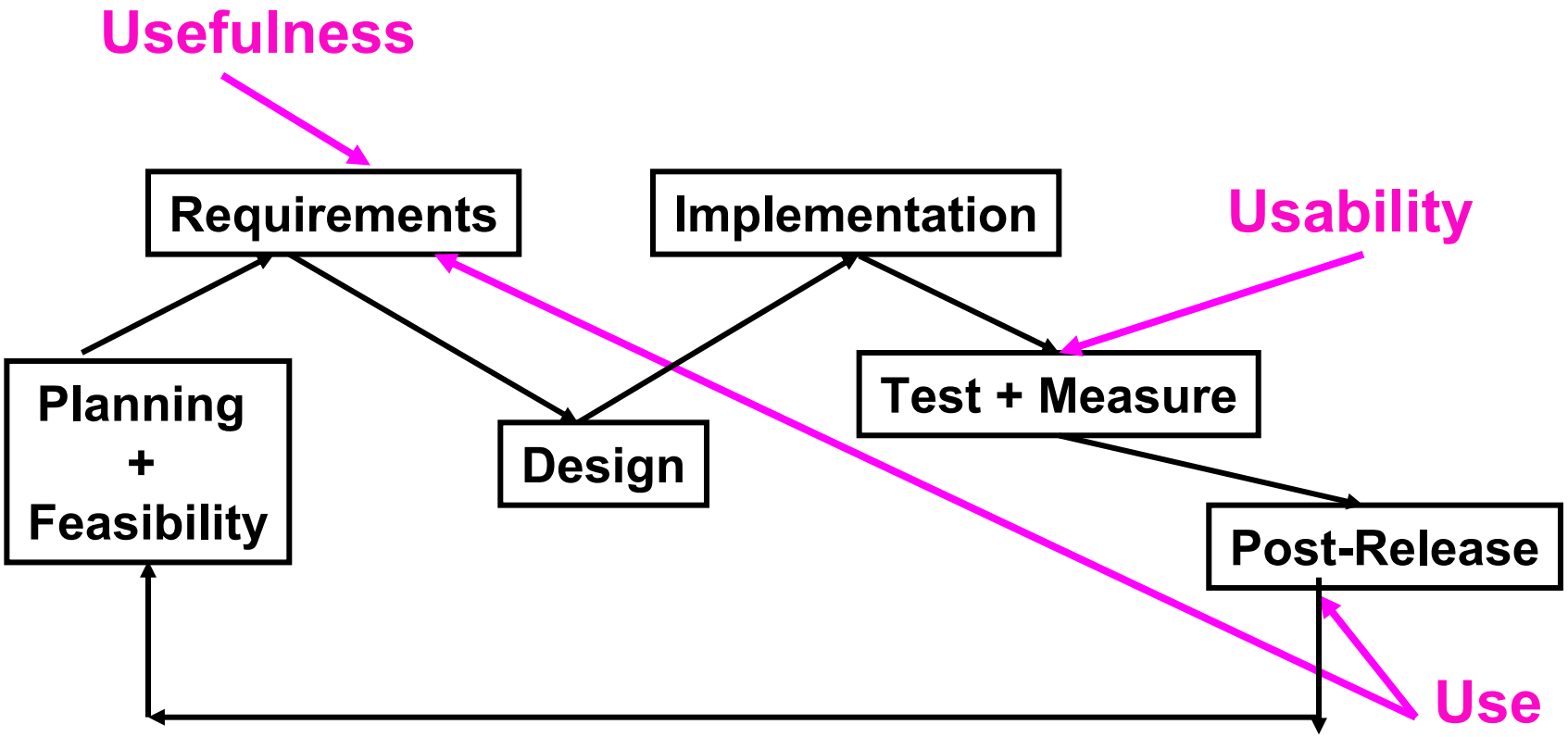


parc
Palo Alto Research Center

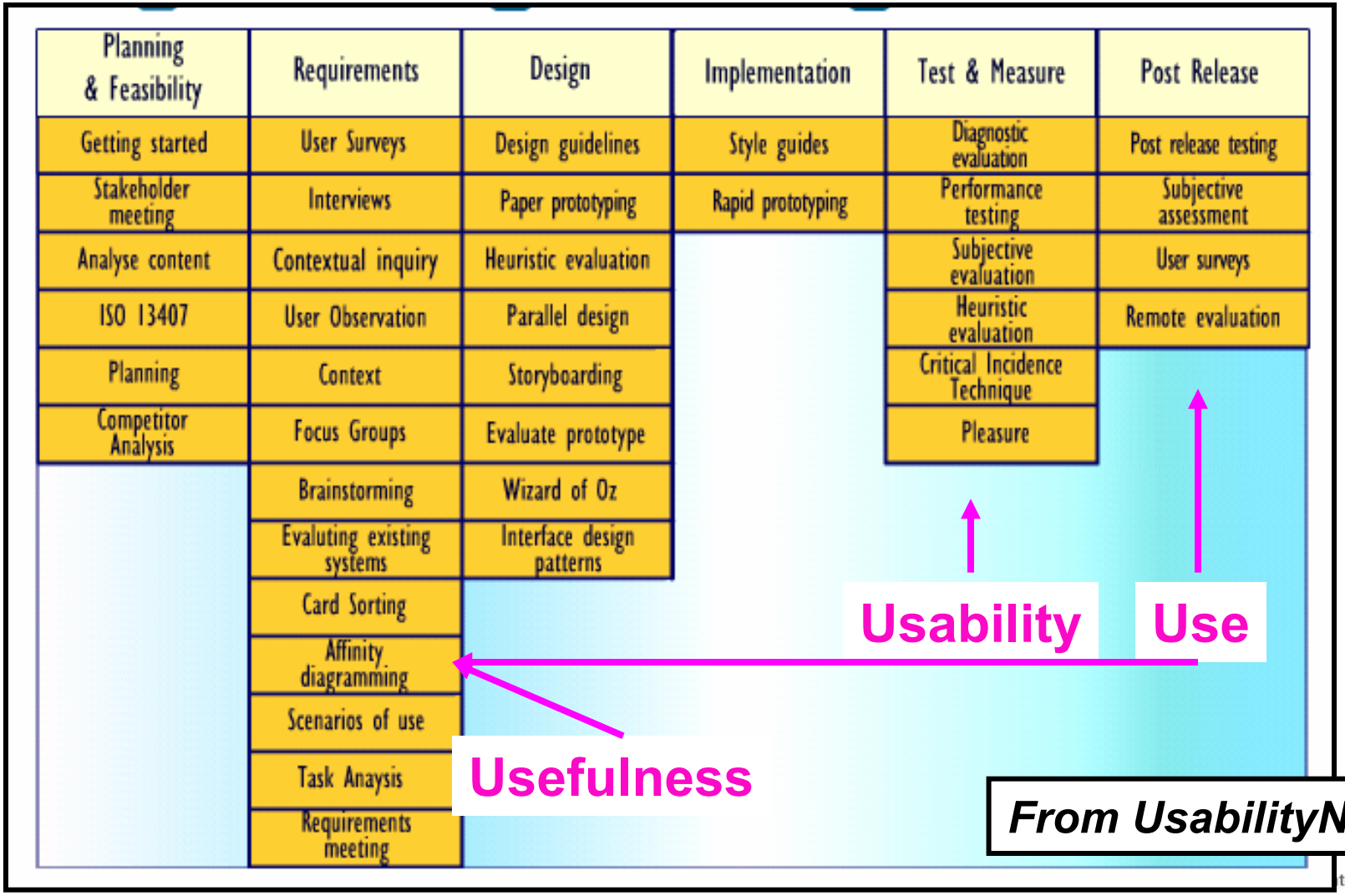
Three "U"s of User Studies

- Usefulness
  - Why--and how--could the product be useful to people? Design (& marketing) implications from current practice?
- Usability
  - How easily--and well--can the product be learned and used? Implications for re-design?
- Use
  - How do people actually use the product? Implications for re-design?

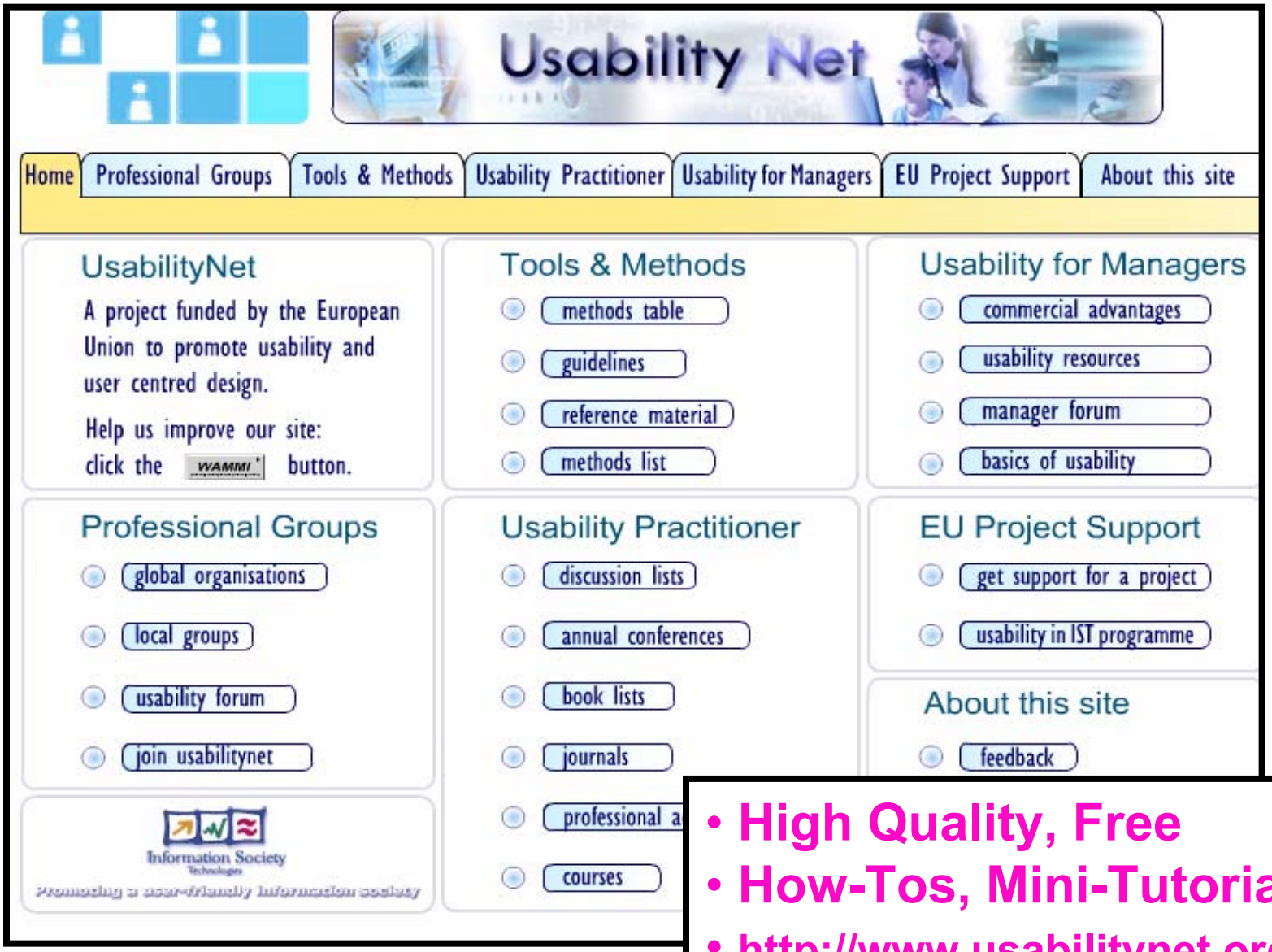
Usefulness, Usability, Use in Product Design Cycle



Usefulness, Usability, Use → Different Questions, Different Methods

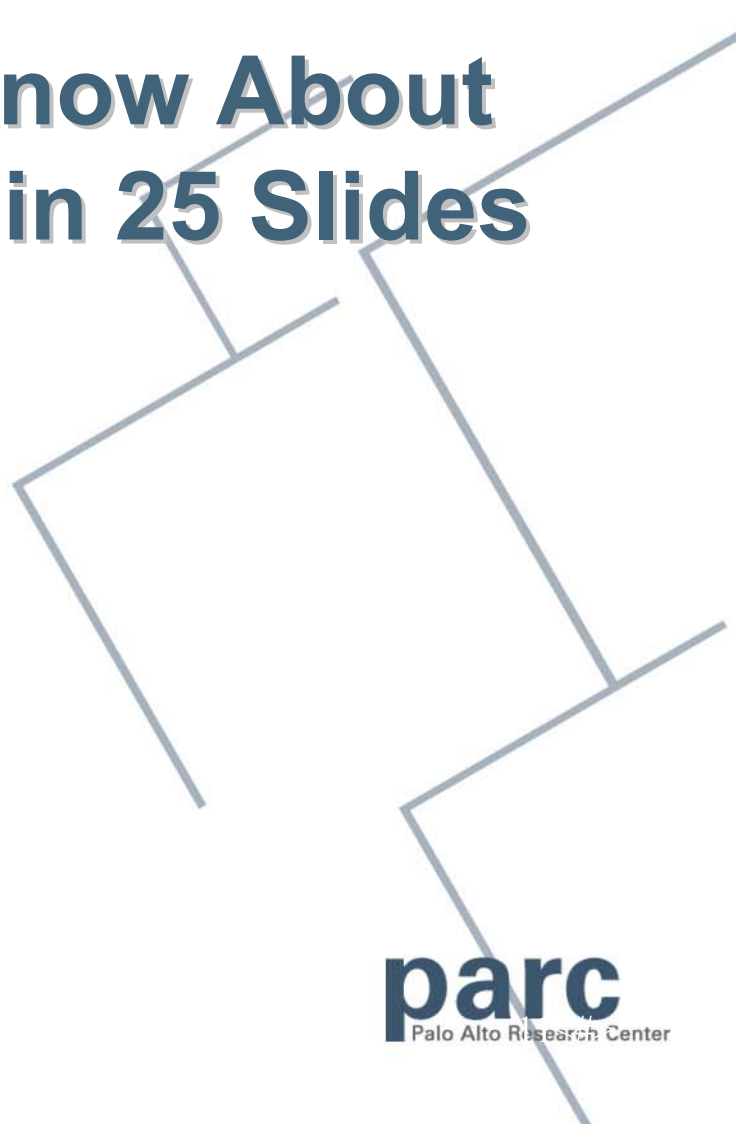


An Excellent, All-Around Resource



- High Quality, Free
- How-Tos, Mini-Tutorials
- http://www.usabilitynet.org

All You Ever Need to Know About User Research Design in 25 Slides or Less

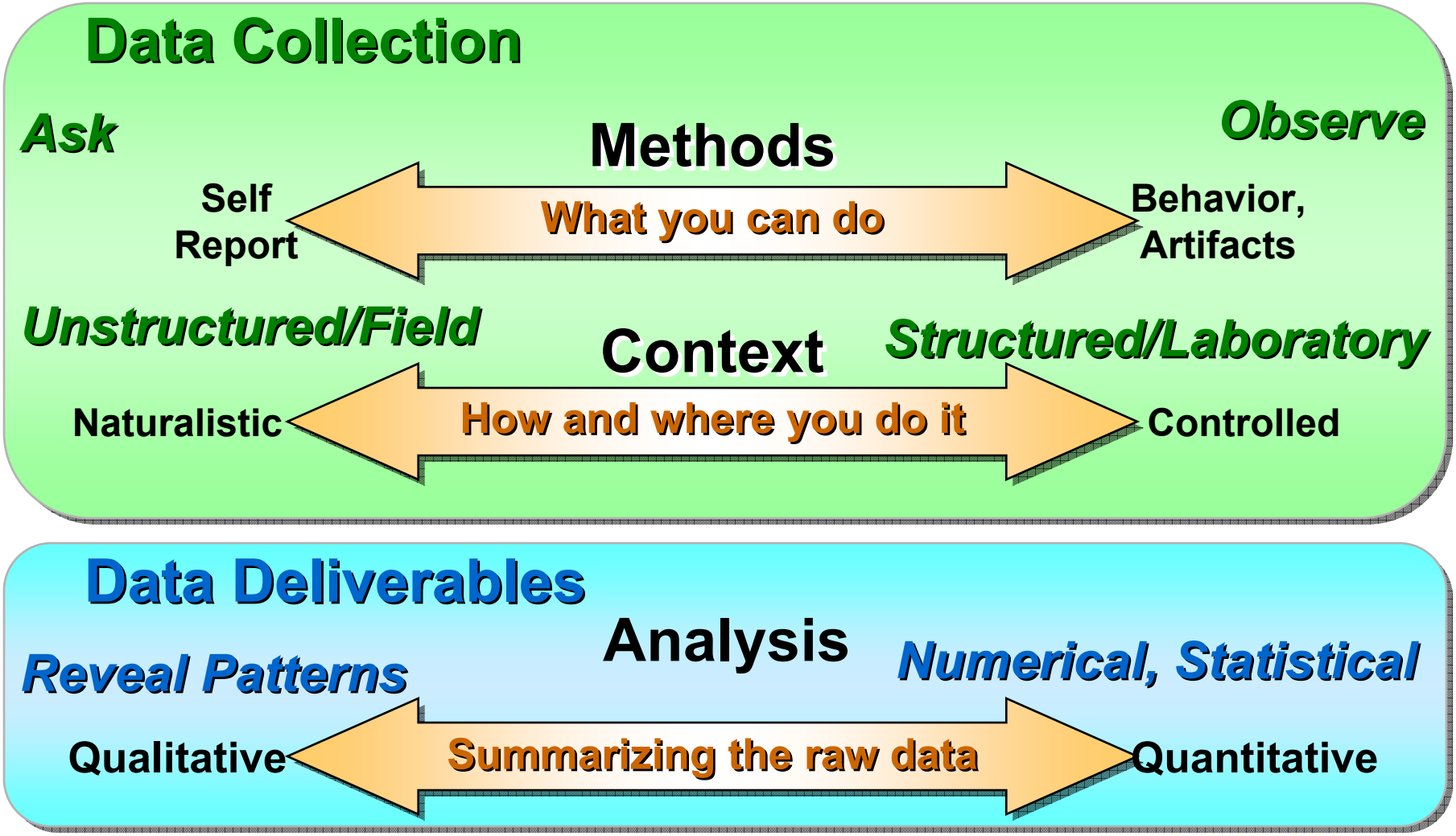


parc
Palo Alto Research Center

Overview of the Research Process

- Clarify, simplify, prioritize your research questions
  - Focus on what you really want to learn
  - What evidence would convince you? Why?
- Design studies using appropriate methods
  - Research principles & pragmatics
- Conduct the study appropriately
  - Avoid bias
- Analyze & interpret findings responsibly
  - Use caution; qualify as needed
- Communicate your findings effectively
  - Appropriate deliverables

Overview of User Research Design



Choice of specific data collection method & context is typically made with data analysis approach in mind.

Validity

*Reliability, Generalizability**

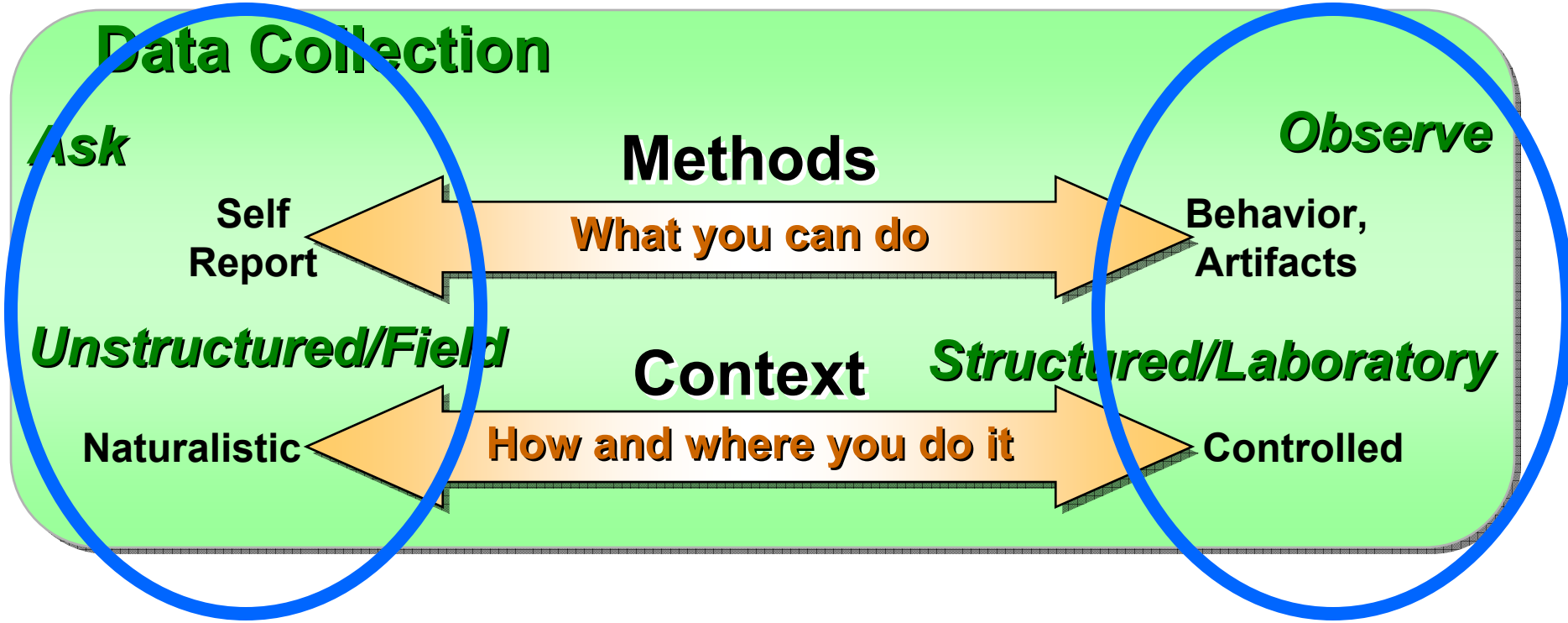
Methods

- Ask →Self-Report
  - Explanations: Meaning, salience, satisfaction
  - Feellings, opinions, preferences priorities
  - Other otherwise unobservables (use w/ caution!)
  - E.g., interviews, surveys, verbal protocols, focus groups
- Observe
  - "Naturalistic" behavior, artifacts
    - As selected, recorded
  - Task performance as controlled observation
  - E.g., behavior sampling (counts), recordings, clickstream & logfile trails, speed/accuracy of test performance

Methods

- Wide Variety of Possibilities
- Highly related to Context, Intended Analyses
- Relative Advantages & Disadvantages
- Two Distinct Classical Approaches

Two Distinct Research Approaches



Qualitative/ Naturalistic

Quantitative/ Controlled

Qualitative/Naturalistic Methods

- Why? How? Questions
- Use & Usefulness Concerns
- Tend towards More Naturalistic Contexts
- Focus on Revealing Patterns
- Emphasis on Research Validity

- **Ethnography (Anthropology)**

Classic Ethnography

- Understanding Usefulness and Use
  - –Detailed, extended observation of behavior and artifacts ***in context***.
  - –In conjunction with rich self-report (esp. extended, multiple interviews) & often participant observation/design

- Ethnographic Core Concepts (Nardi)
  - –Holism (considering the person/community/system as a whole)
  - –Natives' point(s) of view (& often, feedback & participation)
  - –Natural context
  - –History (extended, repeated contact)

Example of Ethnographic* Research

Blogging by the Rest of Us

Diane J. Schiano[1], **Bonnie A. Nardi**[2], **Michelle Gumbrecht**[1] and **Luke Swartz**[1]
[1]Stanford University
Stanford CA 94305 USA
<schiano@acm.org, nardi@ics.uci.edu,
[2]University of California at Irvine
Irvine, CA 92697 USA
mgumbrec@psych.stanford.edu, lswartz@stanford.edu>

ABSTRACT
Weblogs (or *blogs*) are frequently updated webpages with posts typically in reverse-chronological order. Blogging is the latest form of online communication to gain widespread popularity and it is rapidly becoming mainstream. Media attention tends to focus on "heavy-hitting" blogs devoted to politics, punditry and technology, but it has recently become apparent that vast majority of blogs are written by ordinary people for much smaller audiences, and on largely personal themes. Surprisingly little is known about this "blogging by the rest of us", especially from the blogger's point of view. This paper presents the preliminary results of an ethnographic study of blogging as a form of personal expression and communication. We characterize a number of blogging practices, and then consider blogging as personal journaling. We find blogging to be a surprisingly versatile medium, with uses similar to an online diary, personal chronicle or newsletter, and much more. The next few years should provide a fascinating opportunity for research and design as blogging tools improve and blog usage evolves and flourishes.

multimedia content. Most are interlinked in that they provide links to other sites on the Internet. Many are interactive, in that they invite and post commentary on their contents. Blogs are the latest form of online communication to gain widespread popularity, and their use is rapidly becoming mainstream. Current estimates place the number of sites calling themselves "blogs" at over 1.3 million, of which about 870,000 are actively maintained [6]. Ex

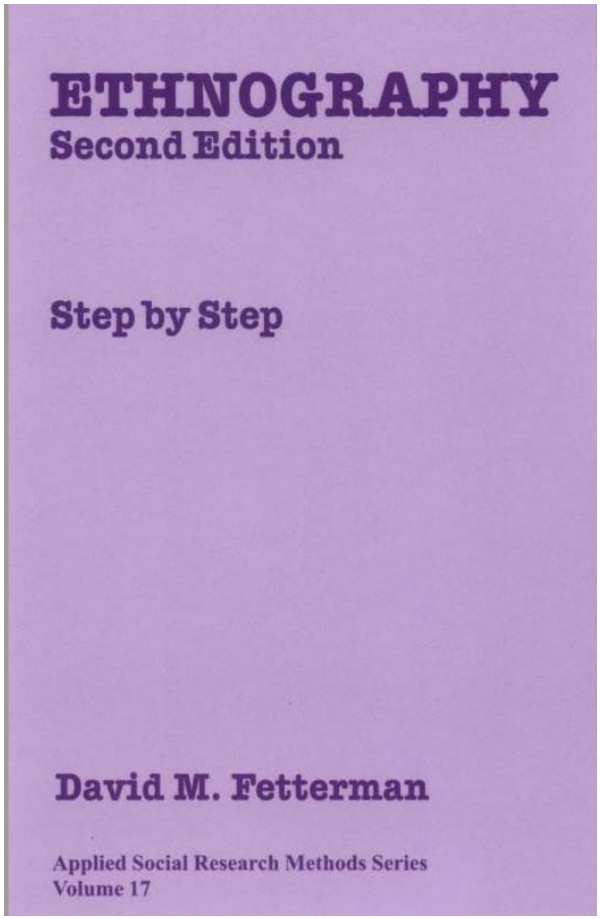
See also LambdaMoo Project

im

Blogs in their current format started around 1997, with Dave Winer's *Scripting News*, a web record of Winer's reflections and commentaries on a wide range of topics; it is currently the longest-running blog on the Internet [2]. In recent years, tools such as Blogger have made blogging much easier and more widely accessible, effectively (as they advertise) "pushbutton publishing for the people" [1]. Blogs vary greatly in nature and content. Most are unabashedly partisan, infused with personal perspective and attitude. Major blog sites devoted to politics and punditry

Resource on Ethnographic Research

- ***Ethnography: Step-by-Step*** **(Fetterman)**



Quantitative/Controlled Methods

- How fast/accurately/often/much? Questions
- Tend towards More Controlled Contexts
- Focus on Numerical & Statistical Representations
- Emphasis on Research Reliability

- **Human Factors, Usability Testing (Experimental Psychology)**

Classic Human Factors/ Usability Testing

- Observing Task Performance
  - Speed & accuracy for varying test conditions
  - Assessment, validation & comparison tests (Rubin)

- Highly Controlled Tasks, Laboratory Context
  - Aids direct comparisons, ease of analysis, statistical reliability
  - May hinder validity, generalizability

Example of Human Factors* Research

Schiano, D.J., Ehrlich, S.M., Rahardja, K. & Sheridan, K. (2000). Face to interface: Facial affect in (hu)man and machine. *Proceedings of ACM CHI 2000 Conference on Human Factors in Computing Systems* (pp. 193-200). NY: ACM.

Face to InterFace:
Facial Affect in (Hu)Man and Machine

Diane J. Schiano, Sheryl M. Ehrlich, Krisnawan Rahardja & Kyle Sheridan
Interval Research Corporation
1801 Page Mill Road, Palo Alto, CA 94304
+ 1 650 842 6099
{schiano, ehrlich, rahardja, sheridan}@interval.com

ABSTRACT
Facial expression of emotion (or "facial affect") is rapidly becoming an area of intense interest in the computer science and interaction design communities. Ironically, this interest comes at a time when the classic findings on perception of human facial affect are being challenged in the psychological research literature, largely on methodological grounds. This paper presents two studies on perception of facial affect. Experiment 1 provides new data on the recognition of human facial expressions, using experimental methods and analyses designed to systematically address the criticisms and help resolve this controversy. Experiment 2 is a user study on affect in a prototype robot face; the results are compared to the human data of Experiment 1. Together they provide a demonstration of how basic and more applied research can mutually contribute to this rapidly developing field.

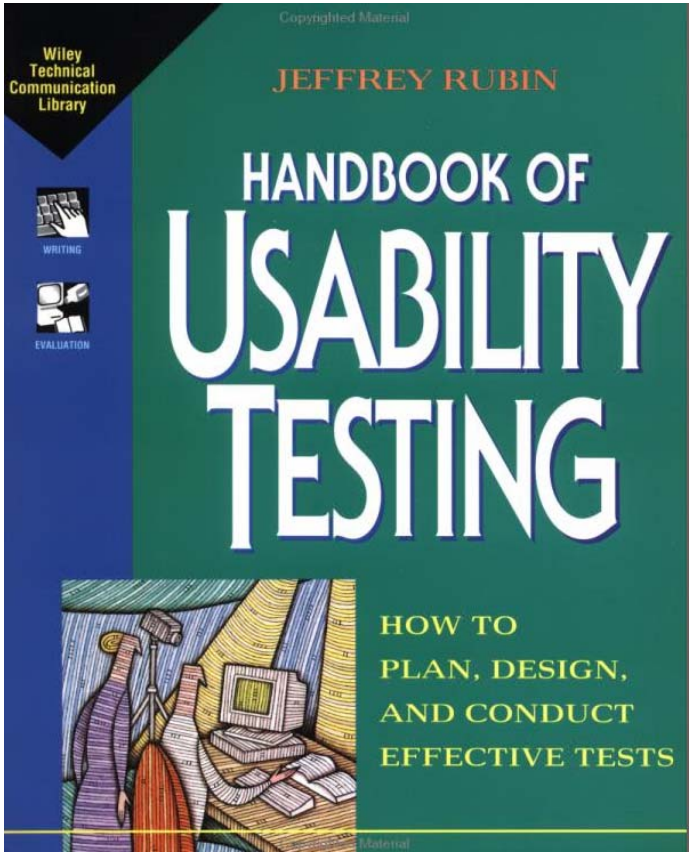
the design of affect-based computer interfaces [9, 13].

The question of how to best characterize perception of facial expressions has clearly become an important concern for many researchers in affective computing. Ironically, this growing applied interest is coming at a time when the established wisdom on human facial affect is being strongly challenged in the basic research literature. In particular, recent methodological criticisms have thrown suspicion on a large body of long-accepted data.

The classic psychological research on facial expression of emotion was performed by psychologist Paul Ekman and colleagues, beginning in the 1960s [see 5 for a review]. A substantial body of evidence has been gathered in over three decades, identifying a small number of so-called "basic" emotions: anger, disgust, fear, happiness, sadness and surprise (contempt was tentatively added only recently). In

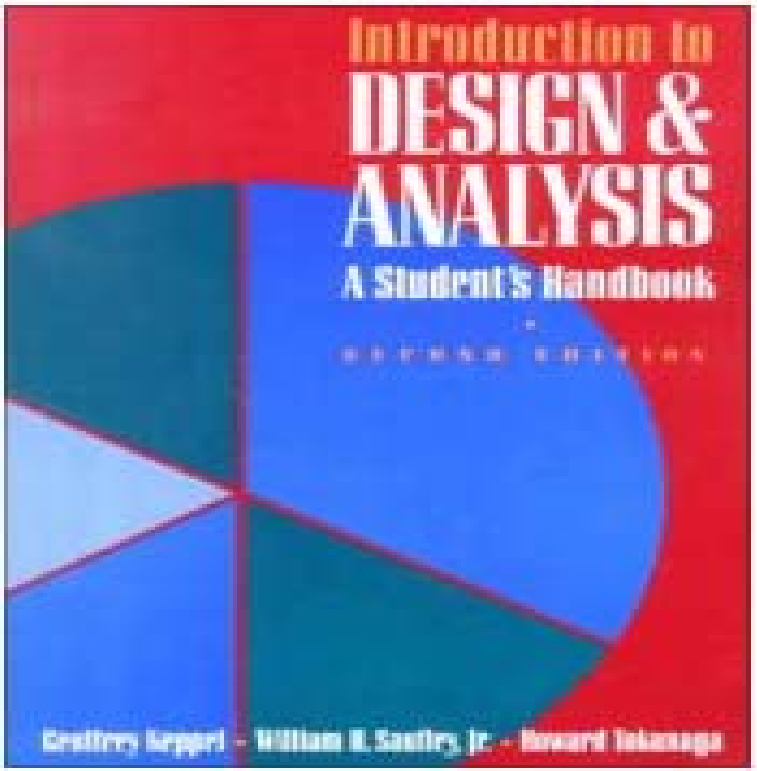
Resource on Usability+ Testing

- ***Handbook of Usability Testing: How to Plan, Design, and Conduct Effective Tests*** **(Rubin)**



Resource on Quantitative Research

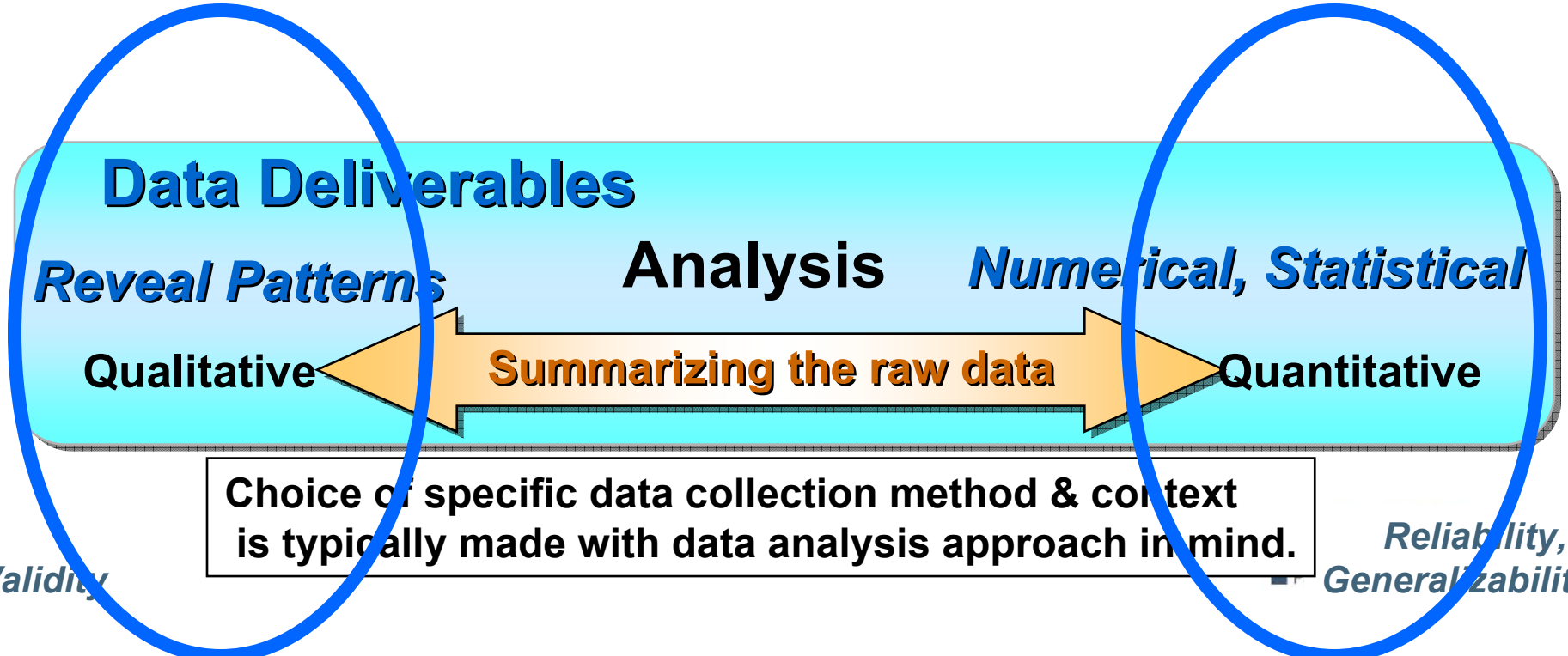
- ***Introduction to Design and Analysis: A Student's Handbook*** **(Tokunaga, Keppel and Saufley)**



Distinct Data Deliverables

Qualitative/Naturalistic

Quantitative/Controlled



Qualitative Deliverables

- Narratives, Summaries with…
  - Notes & Quotes
  - Photos, Video clips
- Structured Products to Inform Design (of Products or Processes)
  - Requirements documents
  - Personas, Use Cases
  - Affinity Clustering
  - Workflow Diagrams & Other Graphical Representations
- User Advocacy in Design

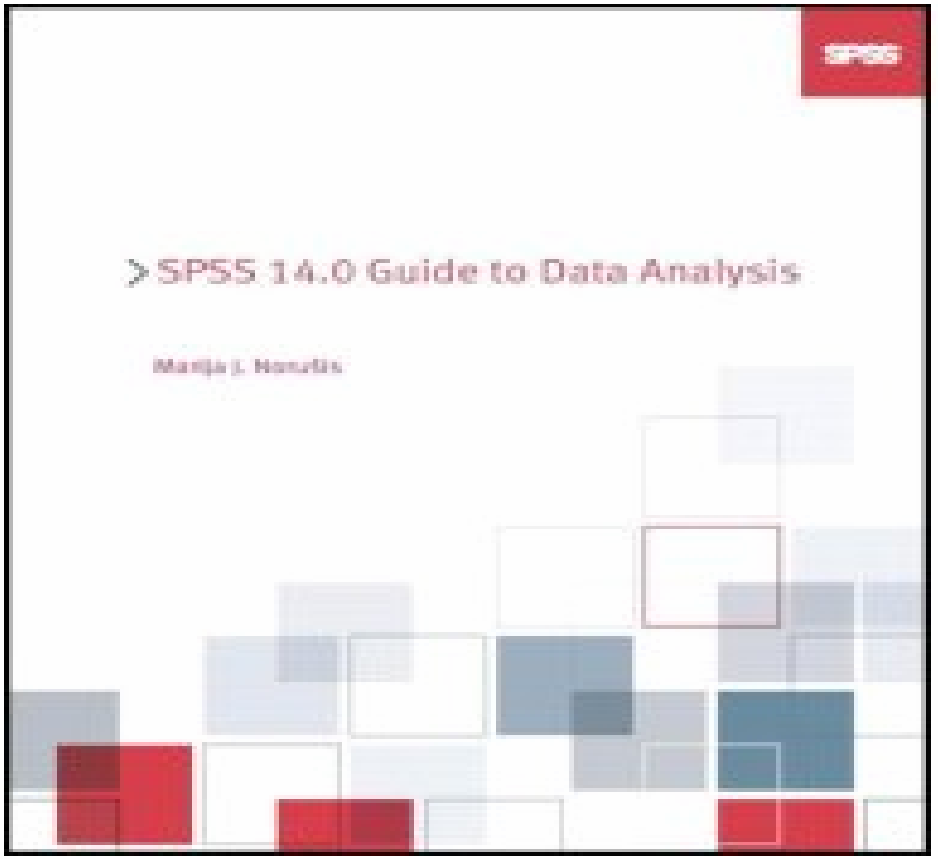
parc
Palo Alto Research Center

Quantitative Deliverables

- Statistics estimate magnitude and reliability of effects
  - Can also look for differences, trends, correlations, etc.
- Graphs & related summary representations
  - Promote comprehension

Quantitative Data Analysis

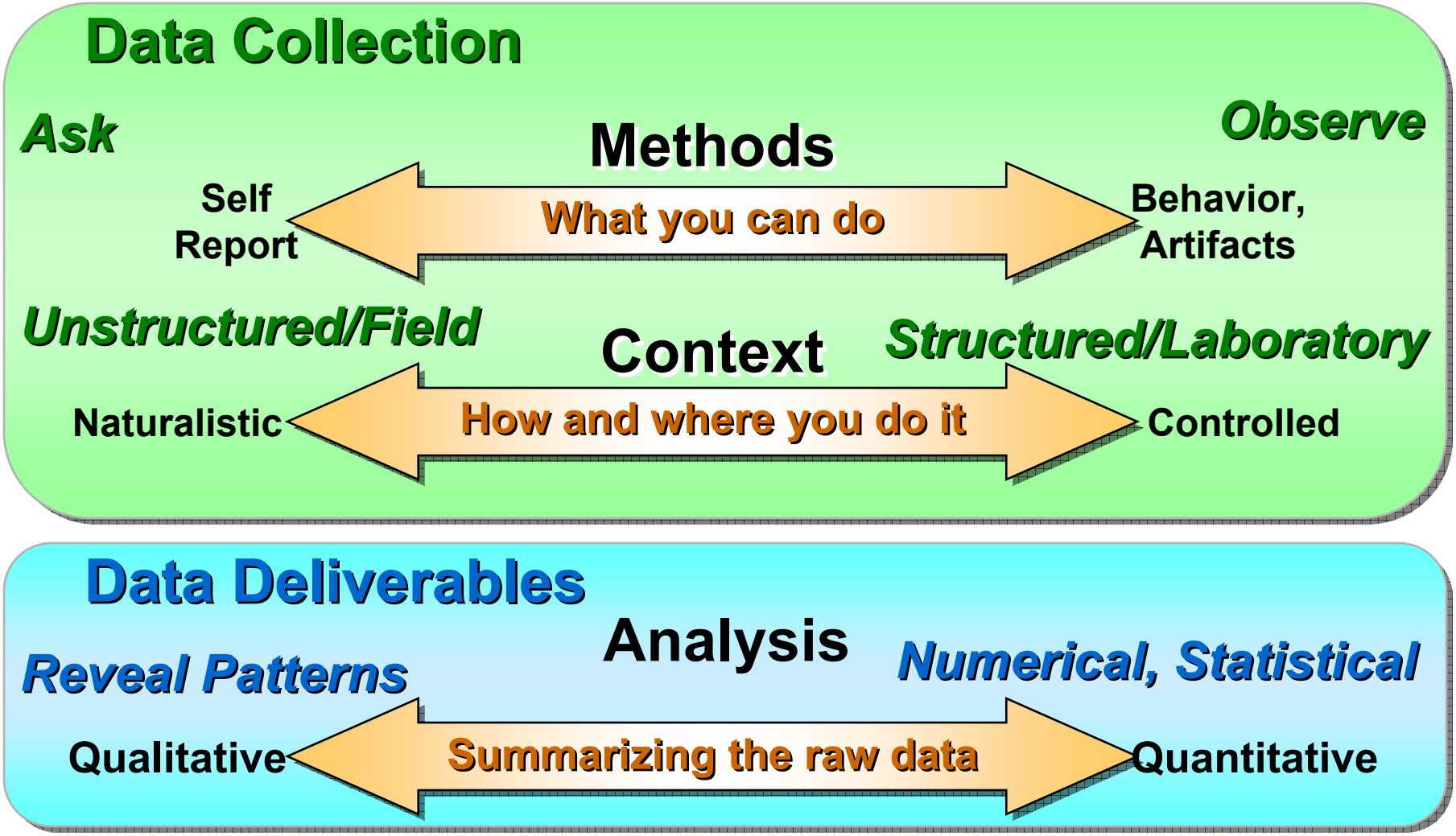
- ***SPSS Guide to (Advanced) Data Analysis*** **(Norusis)**



Consider

- Advantages & Disadvantages of the Two Classical Approaches
  - Principled & Pragmatic
    - » E.g., Qualitative approaches are richer, truer to real use contexts, but can be difficult to collect, code & analyze. Quantitative results may be easier to deal with, more reliable.
- Recent Developments (Esp. in Social Technologies) Suggest A New Approach
  - Decoupling Methods & Context , Data Collection & Analysis in a Principled Way.
  - Convergent Approach

Wait! It's a False Dichotomy!



Choice of specific data collection method & context is typically made with data analysis approach in mind.

Validity

*Reliability, Generalizability**

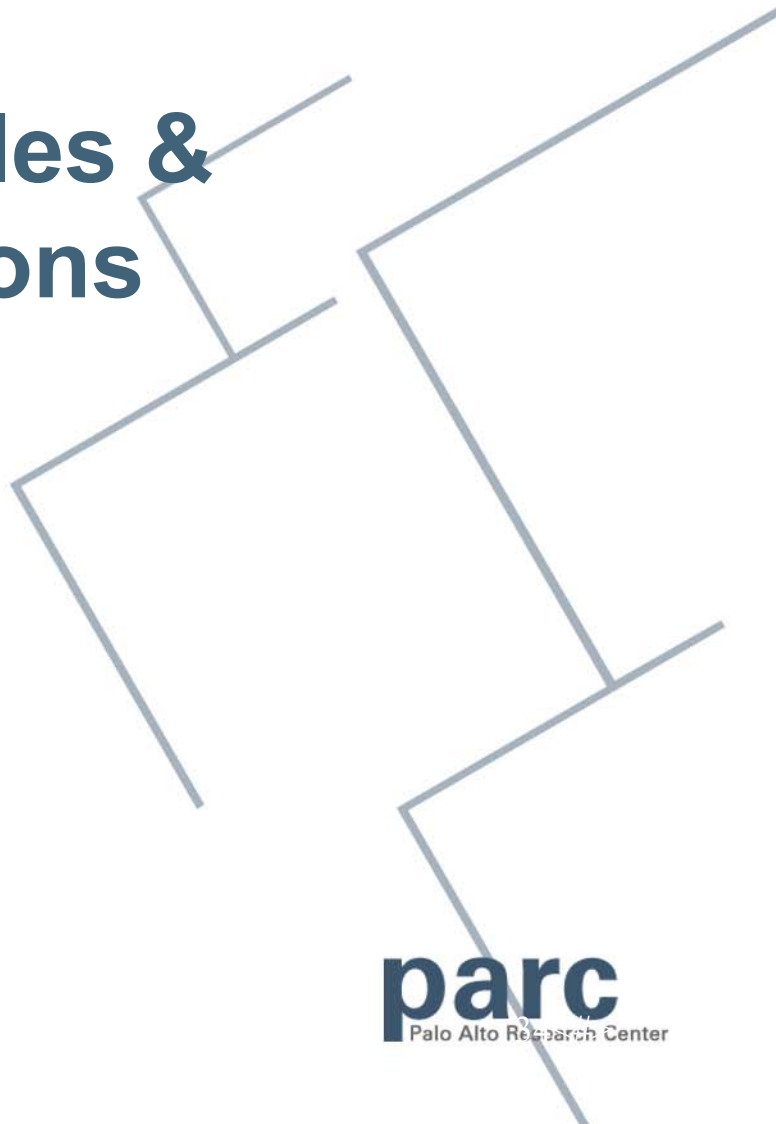
Convergent Approach

- Use multiple techniques, drawing from both qualitative and quantitative approaches, driven by research questions & situation at hand.
- Very powerful & informative
  - Quantification of qualitative data
  - Consistent findings from converging methods can outweigh a multitude of research design "sins"
- The "*best of both worlds*" if applied appropriately…the "*worst of both worlds*" if not!
  - Still need to understand research design principles to apply them appropriately

Convergent Research Examples

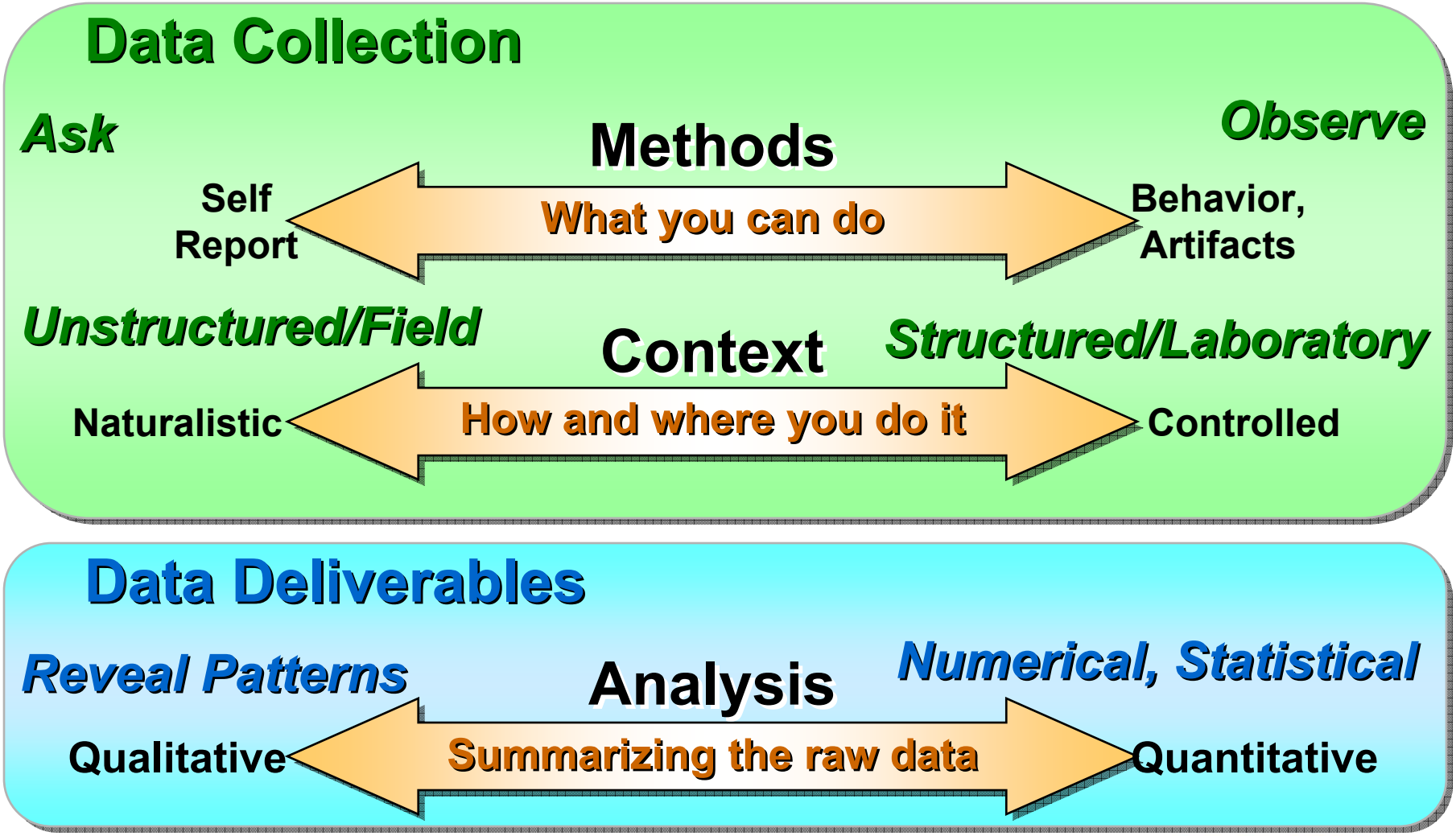
- Quantitative Analyses of Qualitative (& Quantitative) Data
  - Workplace IM Study
- Evaluating a Mixture of Qualitative & Quantitative Findings
  - LamdaMOO Study
- We can discuss these in the second hour
  - For a sense of issues and trade-offs in choosing specific methods, contexts & approaches to analysis
    - » See also recommended resources

Core Research Principles & Pragmatic Considerations



parc
Palo Alto Research Center

Overview of User Research Design



Choice of specific data collection method & context is typically made with data analysis approach in mind.

Validity

*Reliability, Generalizability**

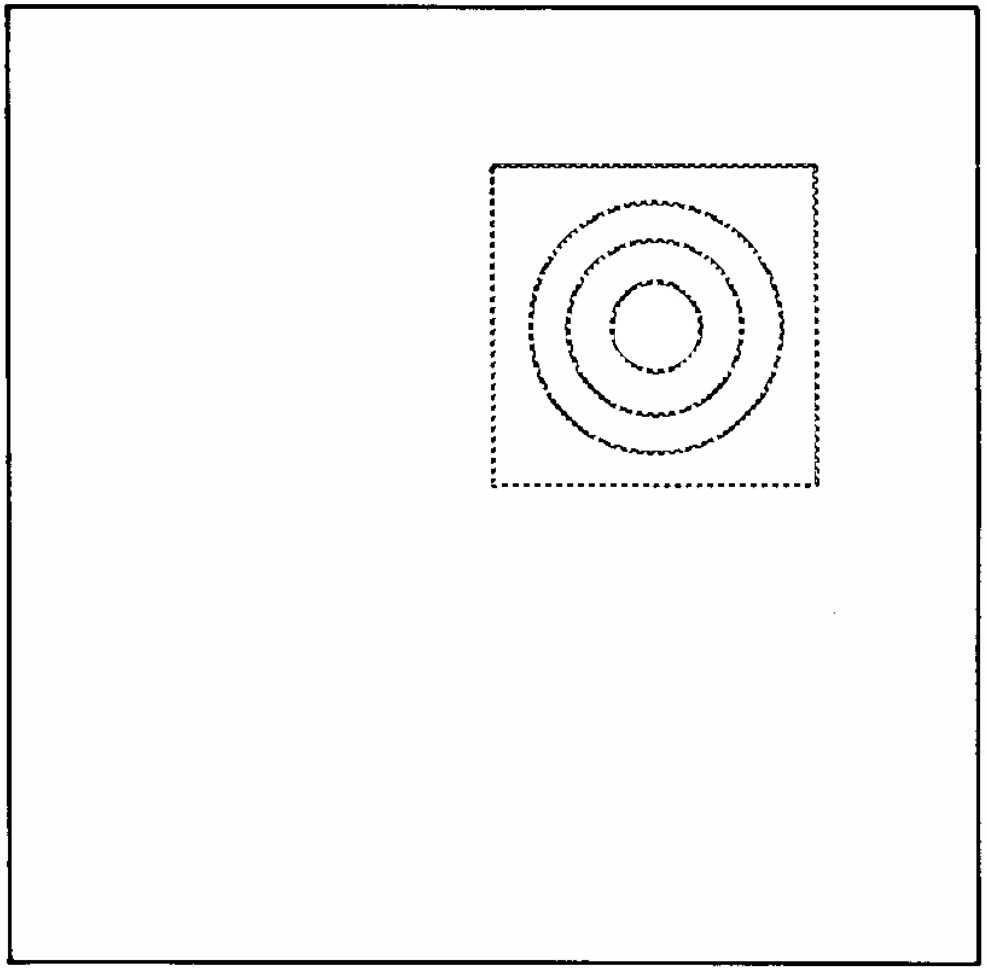
Core Principles of Research Design

Core Principles of Research Design

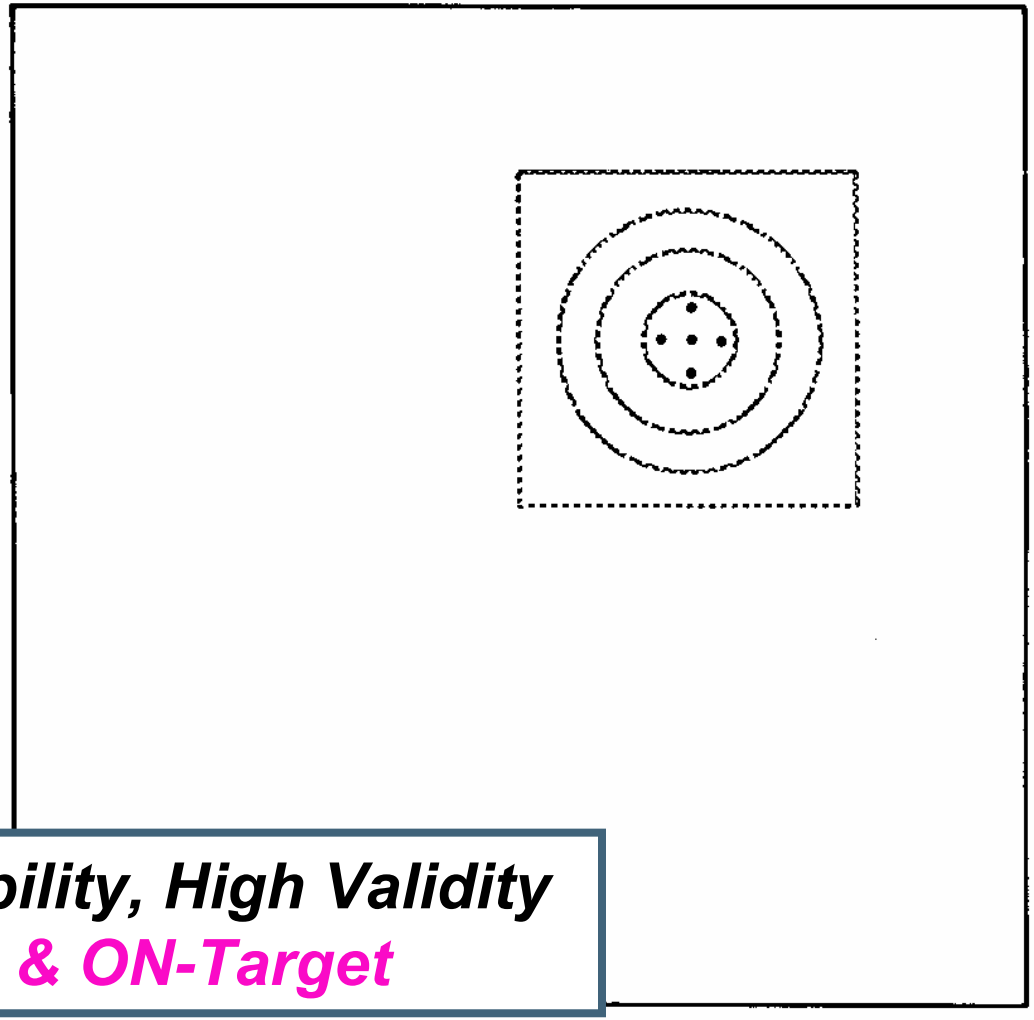
- Essential to all research approaches
- See recommended resources to learn more
- Experience helps

Core Principles of Research Design

- **Validity ("Internal Validity")**
  - Am I really studying what I think I am? Without bias?
  - "On Target" (Relevance)
  - Strength of Qualitative Approach
- **Reliability**
  - Will my findings be repeatable?
  - Consistency
  - Statistical Significance: Quantitative Strength
- **Generalizability ("External Validity")**
  - Do my findings apply broadly?
  - Applicability
  - Not Classic Qualitative Strength; but see "Triangulation", etc.

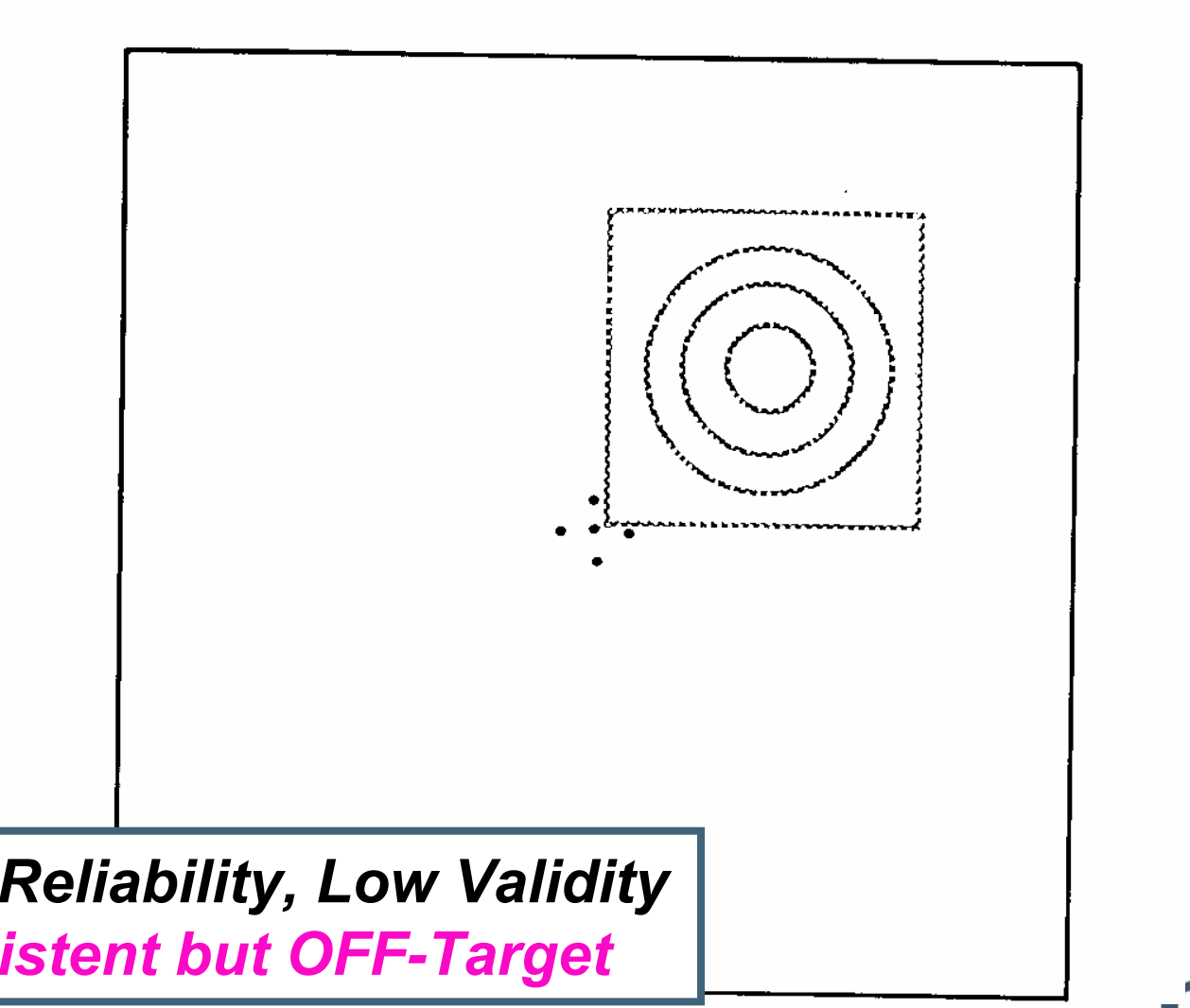


Validity & Reliability



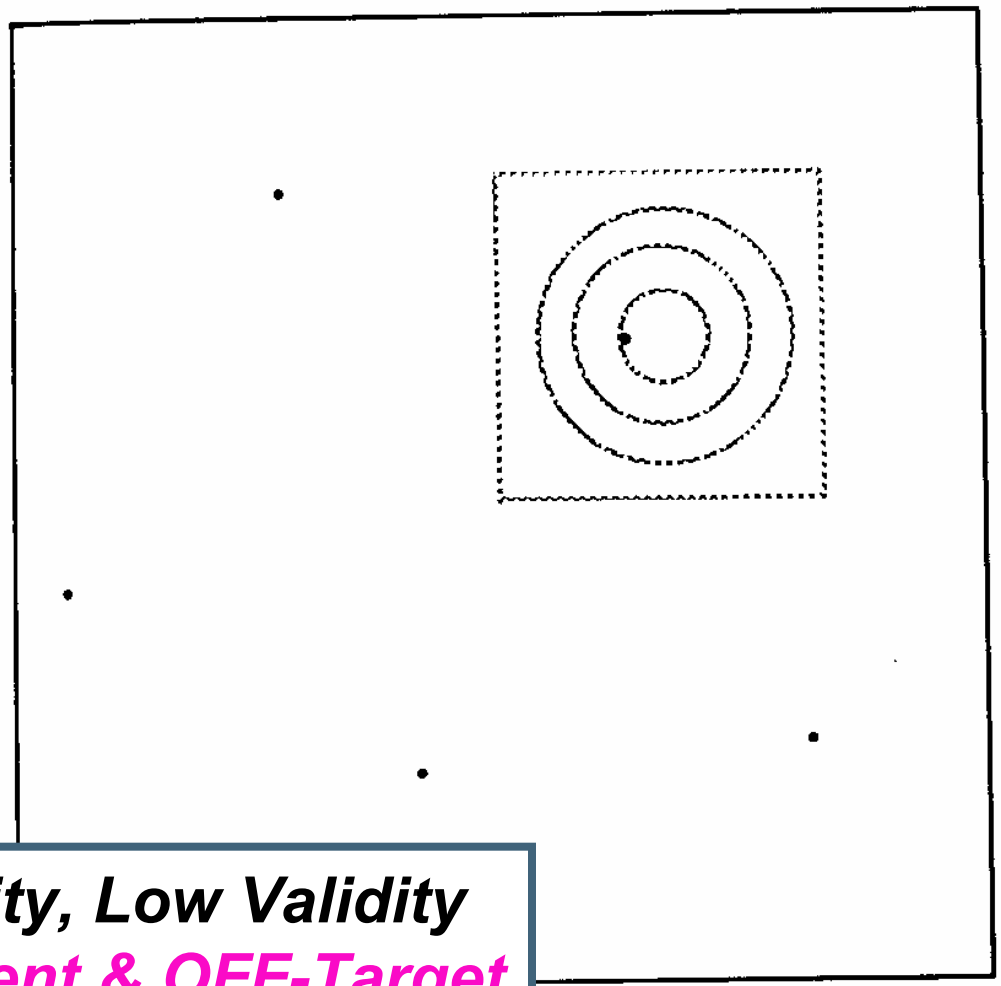
High Reliability, High Validity
Consistent & ON-Target

Validity & Reliability



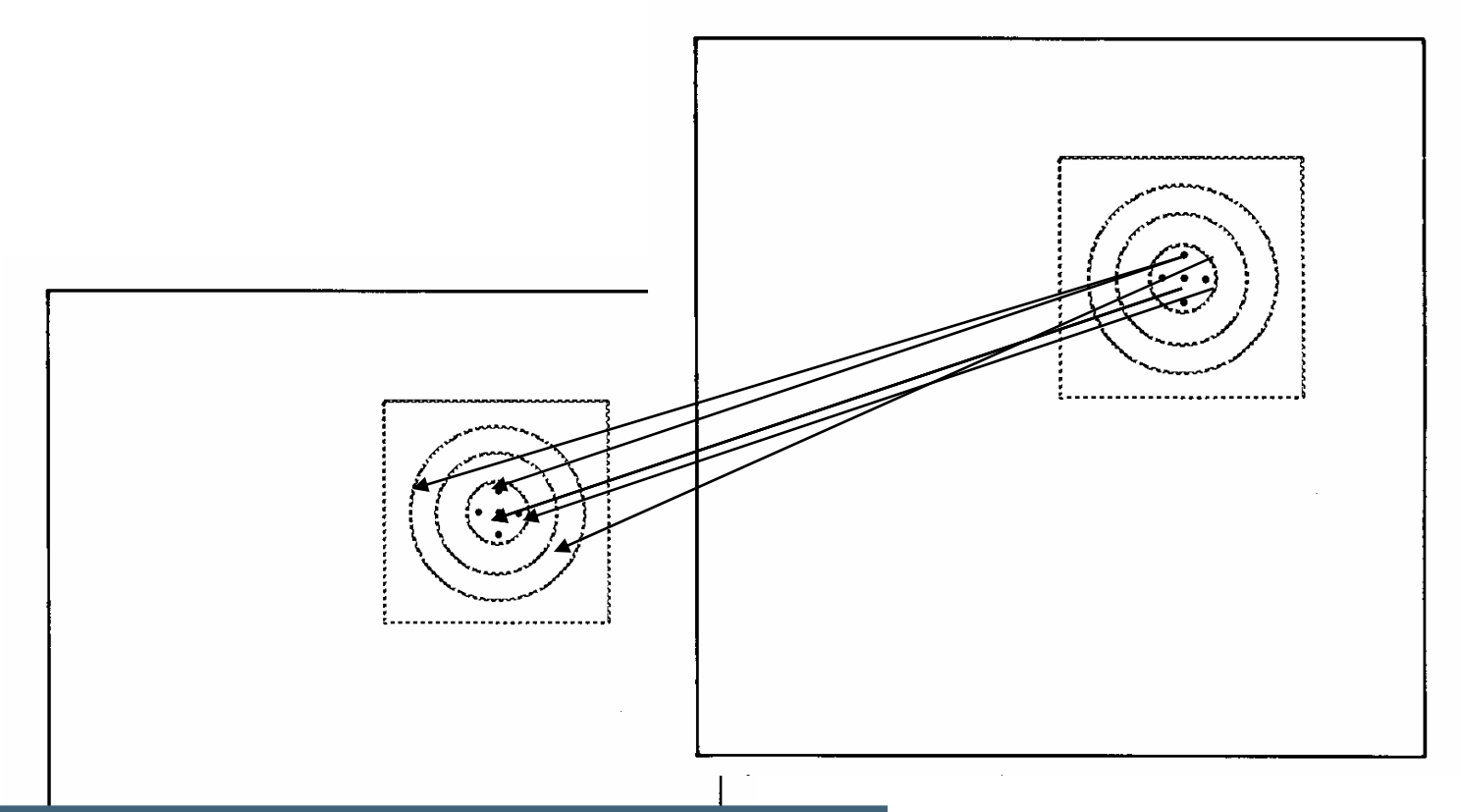
High Reliability, Low Validity
Consistent but OFF-Target

Validity & Reliability



High Reliability, Low Validity
NOT Consistent & OFF-Target

Generalizability



External Applicability

"Throughput" to Related Target(s)

Core Principles of Research Design

- Validity
- Reliability
- Generalizability

These 3 principles may seem simple, but they are profound.

They provide a foundation for evaluating *ALL* user research—qualitative, quantitative or convergent.

  – *Different approaches may use different methods, but all strive for validity, reliability, generalizabilty.*

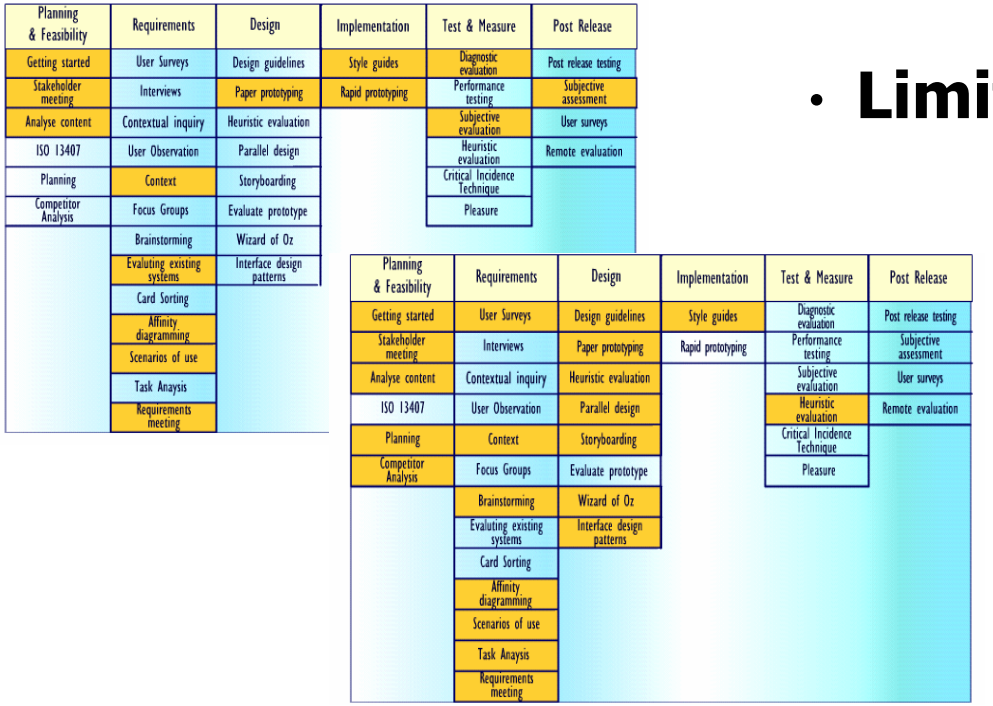
  – *See recommended resources, learn from experience.*

Pragmatic Considerations

Pragmatics Provide Design Priorities & Constraints

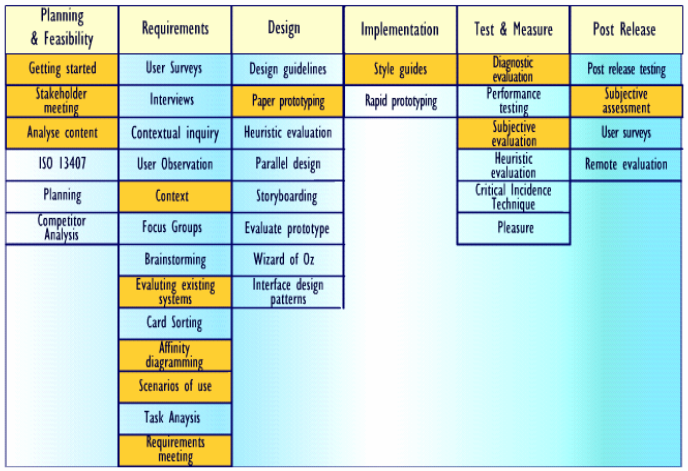
- **Complexity**
  - Of product/design/system
- **Your Deliverables**
  - Design recommendations? Presentation? Paper?
- **Time Frame**
  - Product deadlines, readiness, design cycle stage
- **Cost**
  - Time, money, infrastructure, personnel
- **Other Issues**
  - Availability of participants, prototypes, tools
  - Your skills, expertise & interests
  - Organizational & political priorities
  - Etc.

Pragmatic Advice from UsabilityNet



- **Limited Time & Resources**

- **No Direct User Access**



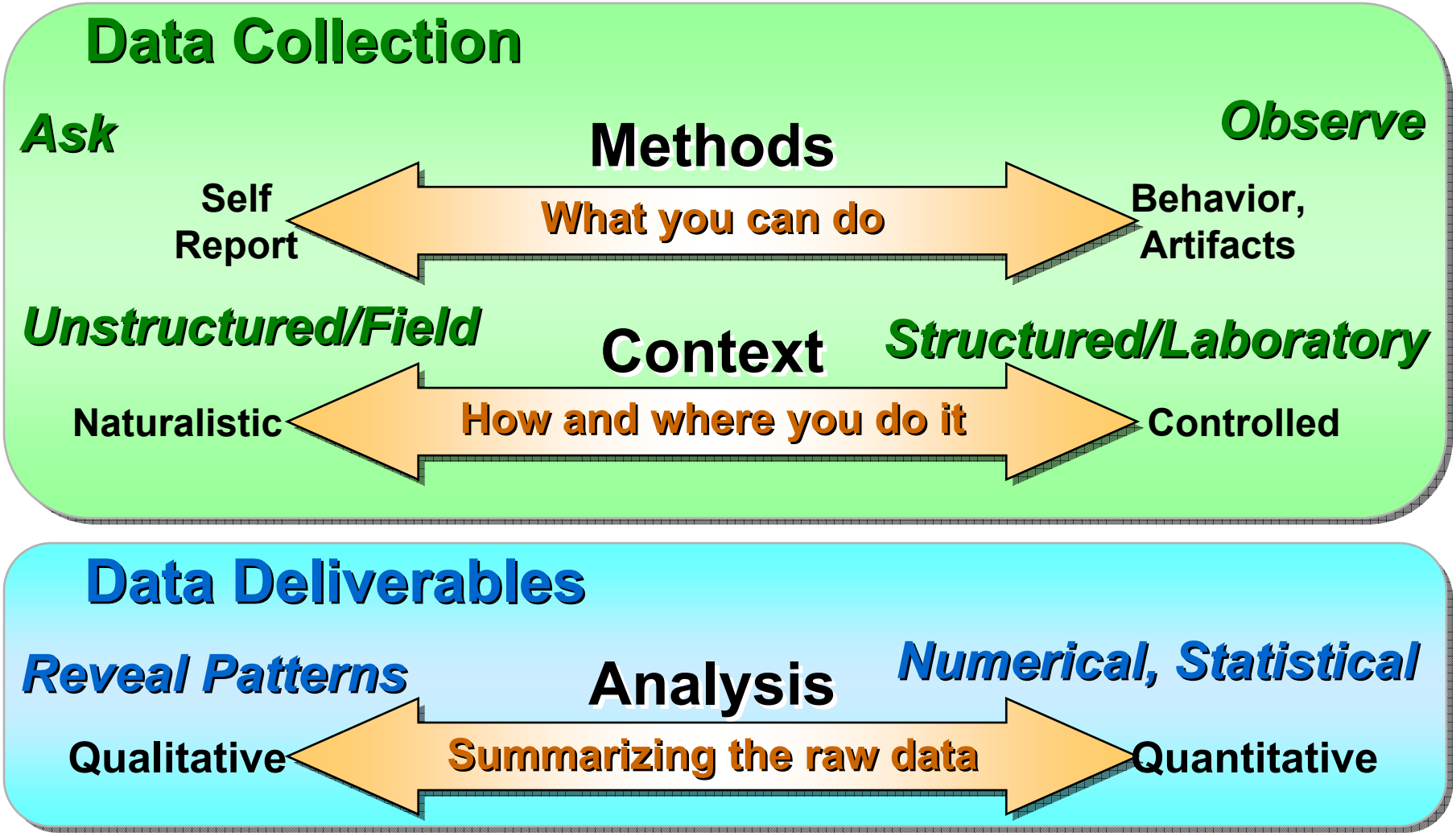
- **Limited Skill, Expertise**

http://www.usabilitynet.org

Principles, Pragmatics and the Art of User Research Design

- Make principled decisions given pragmatic constraints
  - Use methods, contexts & analysis techniques to optimize validity, reliability, generalizability
- **Optimize given conditions at hand**
  - Look for robust (strong) effects
  - Focus on issues of major impact
  - Consider convergent trade-offs
- Be creative!
  - But principled

Overview of User Research Design



Choice of specific data collection method & context is typically made with data analysis approach in mind.

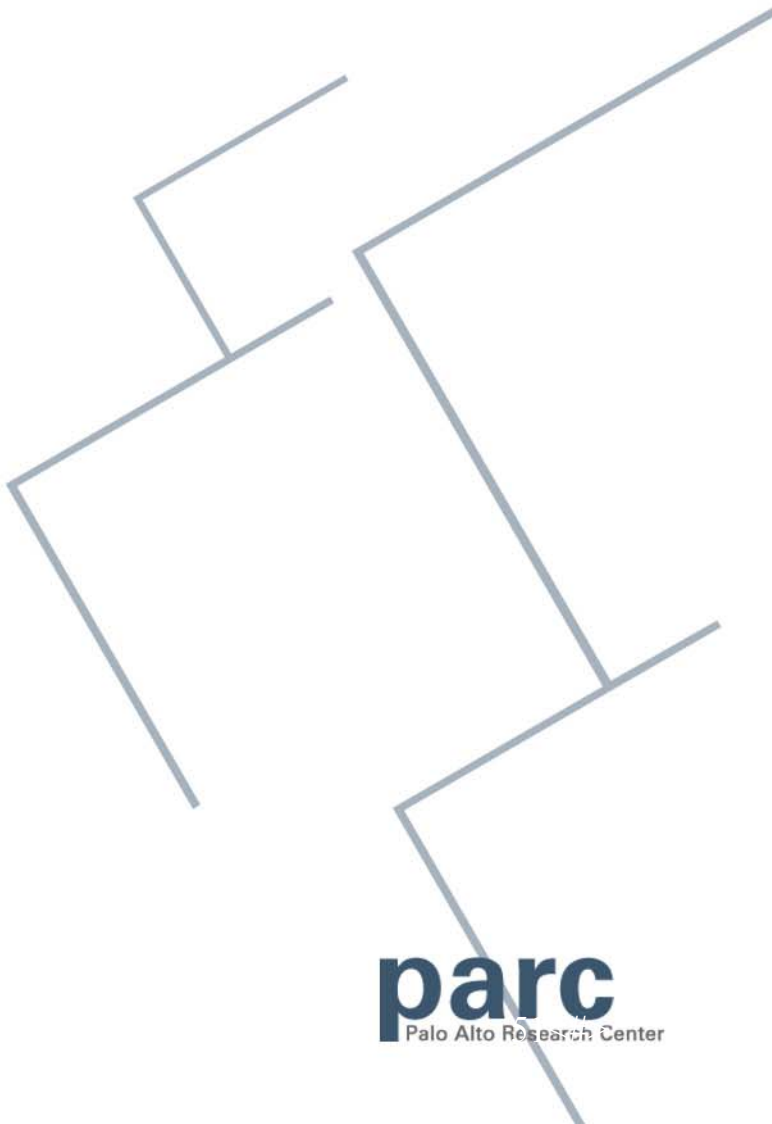
Validity

*Reliability, Generalizability**

Overview

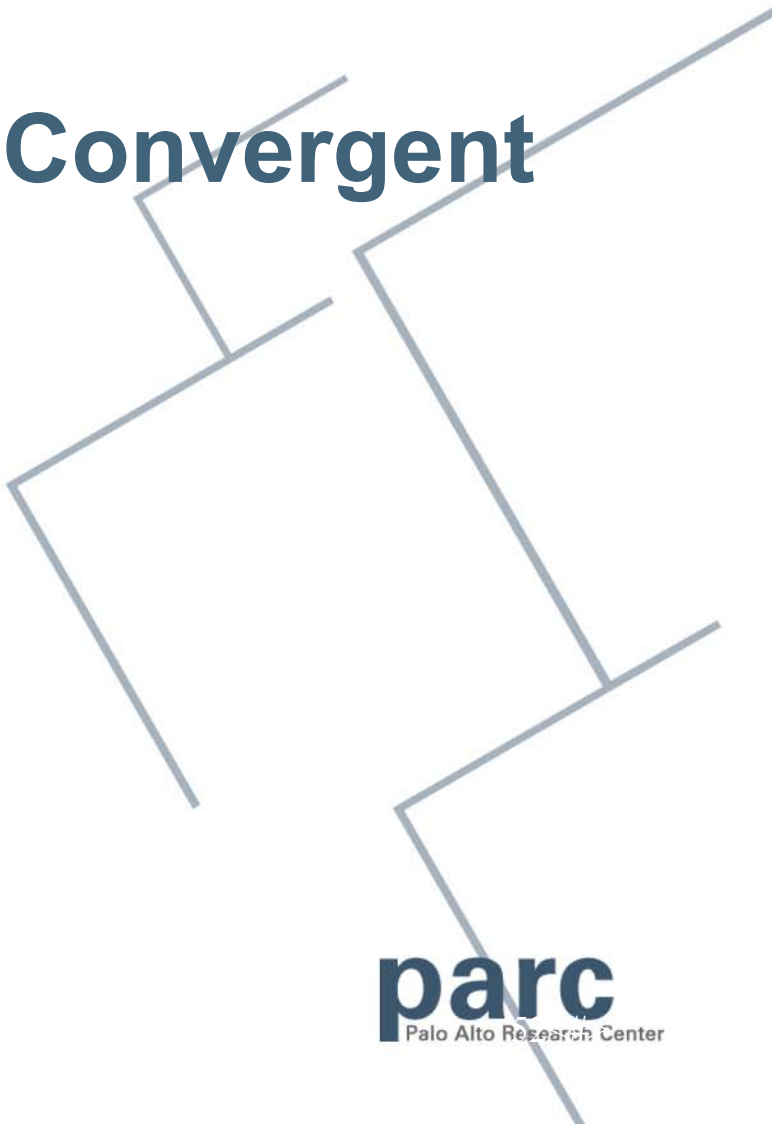
- Three “U”s of User Studies
  - Usefulness, Usability and Use
- All You Ever Need to Know About User Research Design in 25 Slides or Less
  - Overview of Research Design
    - » Two Distinct Approaches…& Convergence
      - Qualitative & Qualitative Methods & Deliverables
    - » Core Research Principles & Pragmatic Considerations
- Discussion Options
  - Extended Examples of Convergent Approaches
    - » Quantitative Analysis of Qualitative (& Quantitative) Research (Workplace IM Study)
    - » Evaluating a Mixture of Qualitative & Quantitative Findings (LambdaMOO Project)
  - Research Design Clinic

Discussion



parc
Palo Alto Research Center

Extended Examples of Convergent Approaches



parc
Palo Alto Research Center

Example of Quantitative Analysis of Qualitative (& Quantitative) Data

From a Study of Workplace Instant Messaging

```
[2000-1208-13:23:30] IDLE: Donna
[2000-1208-14:52:59] ACTIVE: Wally
[2000-1208-14:53:45] CLE: [Wally @ [Home, 650 123 4567]] moved focus
into TIM with Donna (uid: 2)
[2000-1208-14:54:05] CLE: [Donna @ [972 999-1234]] moved focus into TIM
with Wally (uid: 1)
[2000-1208-14:54:05] TEXT: [Wally @ [Home, 650 123 4567] => Donna] [Wow,
Edith left me a message saying that the ABX thing went well and that
they want "to go to the next step".]
[2000-1208-14:54:06] CLE: [Donna @ [972 999-1234]] moved focus out of
TIM with Wally (uid: 1)
[2000-1208-14:54:13] TEXT: [Wally @ [Home, 650 123 4567] => Donna]
[Interesting...]
[2000-1208-14:54:15] CLE: [Wally @ [Home, 650 123 4567]] moved focus out
of TIM with Donna (uid: 2)
[2000-1208-14:59:44] IDLE: Wally
[2000-1208-15:17:48] CLE: [Donna @ [972 999-1234]] moved focus into TIM
with Wally (uid: 1)
[2000-1208-15:17:55] CLE: [Donna @ [972 999-1234]] moved focus out of
TIM with Wally (uid: 1)
[2000-1208-15:18:00] ACTIVE: Donna
[2000-1208-15:19:13] CLE: [Donna @ [972 999-1234]] moved focus into TIM with Wally (uid: 1)
```

The Character, Functions, and Styles of Instant Messaging in the Workplace

Ellen Isaacs, Alan Walendowski, Steve Whittaker, Diane J. Schiano & Candace Kamm

AT&T Labs, 180 Park Ave., Florham Park, NJ 07932
ellen@izix.com, walendo@bitsmith.com, stevew@research.att.com, schiano@acm.org, cak@research.att.com

ABSTRACT

Current perceptions of Instant Messaging (IM) use are based primarily on self-report studies. We logged thousands of (mostly) workplace IM conversations and evaluated their conversational characteristics and functions. Contrary to prior research, we found that the primary use of workplace IM was for complex work discussions. Only 28% of conversations were simple, single-purpose interactions and only 31% were about scheduling or coordination. Moreover, people rarely switched from IM to another medium when the conversation got complex. We found evidence of two distinct styles of use. Heavy IM users and frequent IM partners mainly used it to *work together*: to discuss a broad range of topics via many fast-paced interactions per day, each with many short turns and much threading and multitasking. Light users and infrequent pairs mainly used IM to *coordinate*: for scheduling, via fewer conversations per day that were shorter, slower-paced with less threading and multitasking.

Keywords: Instant messaging, workplace collaboration, informal communication, multitasking, media switching.

INTRODUCTION

Informal face-to-face (FTF) communication has been shown to serve many important functions in organizations, including complex coordination, problem solving, and social learning [9, 10, 11, 21]. Early attempts to build tools to support informal communication focused on audio and video environments [1, 4, 7, 19]. However, these attempts have not been widely adopted for several reasons, including the lack of support for core user tasks, cost, privacy concerns, and implementation difficulties [1, 9, 10, 20].

Instant Messaging (IM), in contrast, has become of great interest to the CSCW community because it is a tool that successfully supports informal communication [5, 6, 13, purposes: It has been widely adopted by teenagers for socializing, and by adults for both social and work purposes [5, 14]. This suggests that IM merits detailed study. A better understanding of the properties of IM that enable it to support informal communication would help in the design of other novel technologies for supporting informal communication.

Most of our initial understanding of the use of instant messaging comes from self-reports, primarily interview studies [3, 5, 6, 13, 14] or marketing surveys [12, 15, 16]. While helpful for getting a sense of IM practices, these studies usually have been based on relatively small sets of users and little direct observation of instant messaging activity. We were in the fortunate position of being able to collect a large sample of direct observations: over 21,000 IM conversations by 437 users. This should enable us to provide a more accurate picture of IM usage characteristics. We also evaluated these IM conversations qualitatively to refine our understanding of IM functions. We begin by summarizing previous findings.

Current claims about IM usage

Descriptions of IM from prior studies fall into three areas: (1) the *character* or properties of IM conversations, (2) the *functions of IM,* i.e. the tasks it is used to support, and (3) the *pattern of IM use*, i.e. how frequently people use IM and with whom.

Conversational Character. Three main observations are made about the character of IM, namely (a) that IM conversations are *brief,* (b) that *media switching is prevalent,* and (c) that *multitasking is common* while conversing in IM [3, 5, 6, 12, 13, 14, 15, 16]. The first observation about the character of IM is that conversations are *brief, addressing a single purpose*. They focus on rapid exchanges (e.g., questions and answers) and brief

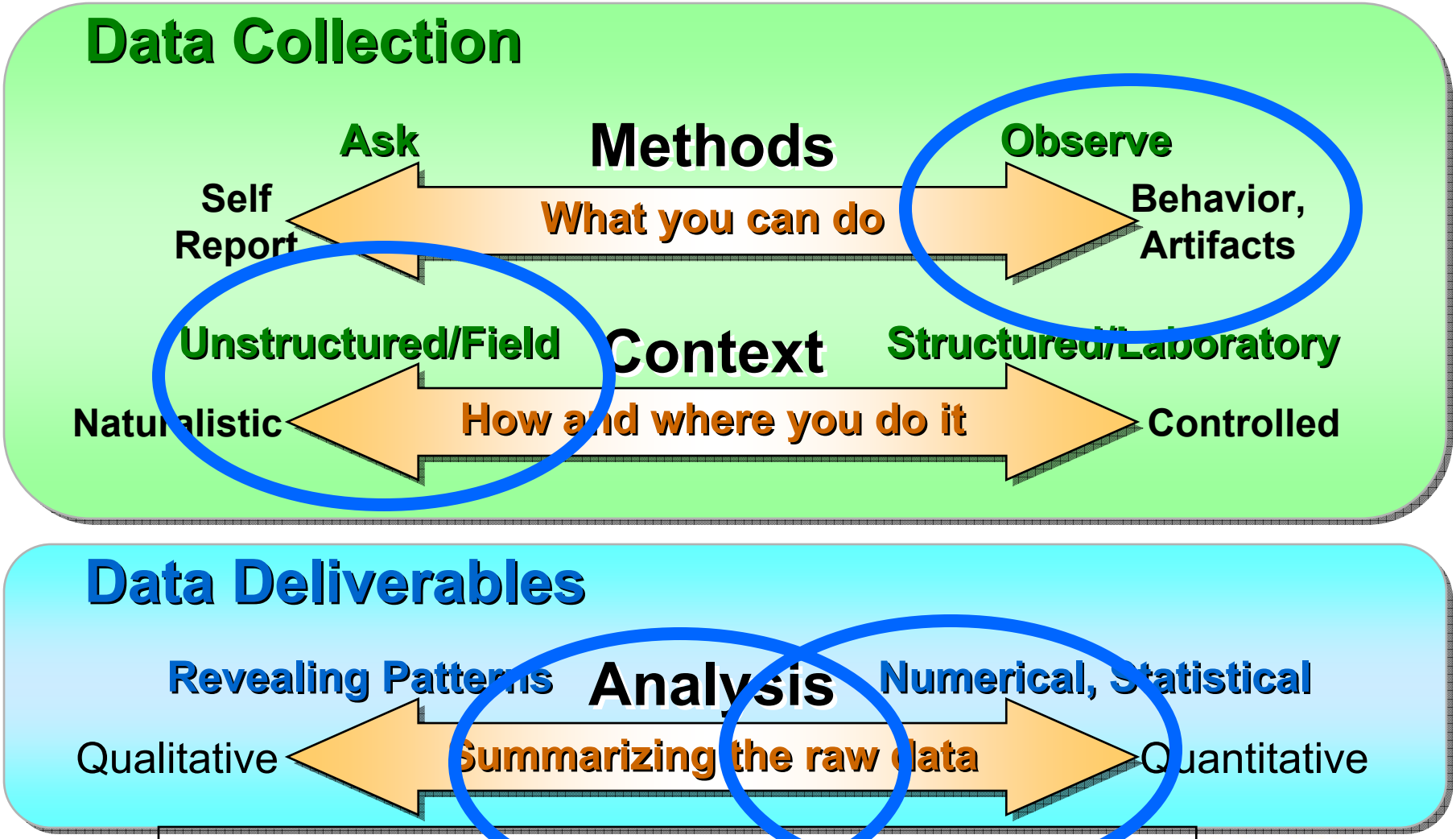
Workplace IM Study

- **A Mediated Naturalistic Observation**
- A sample of **500 workplace IM conversations** (from several thousand) logged across several work groups and locations in a large company for over a year.
  - **Raw data** included the **typed conversations themselves** as well as some other information available to the system (timing, the specific pairs of people involved, their locations, etc.)
  - **Parsing and coding were required to structure** the qualitative raw data (the content of the IM messages). This was done based on our prior understanding of conversational interactions and driven by our specific motivating questions about IM conversations.
  - **Coding allowed estimates of frequency of occurrence**, and this quantification permitted statistical analysis of the qualitative conversational data.

Workplace IM Study

- Major goals of the study included:
  - Characterizing quantitative and qualitative workplace IM use patterns, including:
    - » Message frequency and duration, turn-taking, etc. (Quantitative data)
    - » Whether the topic of conversations tends to be primarily work-related or not, etc. (Qualitative data)
    - » Many other questions about how IM conversational characteristics may vary with messaging pairs:
      - Whether the pairs are frequent IM partners or not
      - Whether each member of a pair is a heavy user of IM or not, whether the pairs are co-located or remote, their relative work positions, etc.

Overview of User Research Design



Validity

*Reliability, Generalizability**

Steps in Quantifying Analysis of Workplace IM Data

- Collect raw data
  - Transcripts and some quantitative data available in system logfiles

```
[2000-1208-13:23:30] IDLE: Donna
[2000-1208-14:52:59] ACTIVE: Wally
[2000-1208-14:53:45] CLE: [Wally @ [Home, 650 123 4567]] moved focus
into TIM with Donna (uid: 2)
[2000-1208-14:54:05] CLE: [Donna @ [972 999-1234]] moved focus into TIM
with Wally (uid: 1)
[2000-1208-14:54:05] TEXT: [Wally @ [Home, 650 123 4567] => Donna] [Wow,
Edith left me a message saying that the ABX thing went well and that
they want "to go to the next step".]
[2000-1208-14:54:06] CLE: [Donna @ [972 999-1234]] moved focus out of
TIM with Wally (uid: 1)
[2000-1208-14:54:13] TEXT: [Wally @ [Home, 650 123 4567] => Donna]
[Interesting...]
[2000-1208-14:54:15] CLE: [Wally @ [Home, 650 123 4567]] moved focus out
of TIM with Donna (uid: 2)
[2000-1208-14:59:44] IDLE: Wally
[2000-1208-15:17:48] CLE: [Donna @ [972 999-1234]] moved focus into TIM
with Wally (uid: 1)
[2000-1208-15:17:55] CLE: [Donna @ [972 999-1234]] moved focus out of
TIM with Wally (uid: 1)
[2000-1208-15:18:00] ACTIVE: Donna
[2000-1208-15:19:13] CLE: [Donna @ [972 999-1234]] moved focus into TIM with Wally (uid: 1)
```

Steps in Quantifying Analysis of Workplace IM Data

- Collect raw data
  - Transcripts and some quantitative data available in system logfiles
- Parse raw data
  - Determine meaningful units of analysis (e.g., conversational chunk)

Units of Analysis
- "Conversational chunk"
  - »IM activity separated by > 5 min idle time
- Conversational pair characteristics
  - »E.g., Frequent (1+ conversations per day) v Infrequent Pair

How this is done is dependent upon researchers' prior knowledge and their largely qualitative assessments of the situation at hand and the questions of interest.

Steps in Quantifying Analysis of Workplace IM Data

- Collect raw data
  - Transcripts and some quantitative data available in system logfiles
- Parse raw data
  - Determine meaningful units of analysis (e.g., conversational chunk)
- Code raw data
  - Classify conversational content & interactions
  - Ensure inter-coder reliability

Measures

–Some Inherently Quantitative Measures

» E.g., Duration, frequency of messages

–Interpretive Coding of Qualitative Data for Quantitative Analyses

» E.g., Frequency of occurrence of general topics of conversations

» Using multiple coders & evaluating inter-coder reliability

Again, how this is done is dependent upon researchers' prior knowledge and their largely qualitative assessments of the situation at hand and the questions of interest

Initial Coding Template for Workplace IM Study

CHUNKSTATS: Donna,Wally,2000-1208-2,22,1208-15:19:24,2,1,1,1.00,N/A,22.00,0,idle,84,N/A,1180

******

"Objective" measures: Some inherently quantitative

Opening Negotiation: N / Y
Trigger: I / O / S / R
Reference to Previous Conversation in Day: N / Y
Explict Reference To Prior Communication In Other Medium: N / Y
Switch Media: A / E / N
Interaction Through Location Field: N / Y
Third Party Involvement: N / Y
Misunderstanding: N / Y
Explicit Interrupt: N / Y
Closing: N / Y
Content: W, S, R
Threads: N / Y
Topics: (list them)

Interpretive coding of qualitative data: Human judgment required. (2/3 judges agree)

Steps in Quantifying Analysis of Workplace IM Data

- Collect raw data
  - Transcripts and some quantitative data available in system logfiles
- Parse raw data
  - Determine meaningful units of analysis (e.g., conversational chunk)
- Code raw data
  - Classify conversational content & interactions
  - Ensure inter-coder reliability
- Quantitative analysis
  - Determine preponderance of coded phenomena

Analyzing Quantitative Characteristics

Characteristics	Frequent Pair	Infrequent Pair	All
Duration** (mins)	4:38	3:57	**4:23**
# Turns	18.4	15.2	**17.2**
# Text turns	16.6	13.0	**15.3**
# Sound turns**	1.8	2.2	**2.0**
Words per turn**	13.0	14.3	**13.5**
Turn gap (secs)**	25	22	**24**
Threading (% convs)**	41	26	**32**
Times moved out of window**	4.1	3.3	**3.8**

Table 3. Characteristics of IM conversations based on how frequently the pair interacted. **p<.001.

Analyzing Topics of Conversation

Function	Frequent Pair	Infrequent Pair	Total
Simple*	19.0	33.7	**27.8**
Sched/ Coord	31.0	30.7	**30.8**
Work	62.5	61.3	**61.8**
Personal+	17.5	10.0	**13.0**
Saying "hi"	3.0	7.0	**5.4**
No response*	16.5	28.0	**23.4**

Table 5. Percentage of conversations that included messages related to each function, based on frequency of pair interaction.

Descriptive Statistics

Steps in Quantifying Analysis of Workplace IM Data

- Collect raw data
  - Transcripts and some quantitative data available in system logfiles
- Parse raw data
  - Determine meaningful units of analysis (e.g., conversational chunk), based on our prior understanding and motivating questions.
- Code raw data
  - Classifying conversational content & interactions (again based on prior understanding and motivating questions)
  - Ensure inter-coder reliability
- Quantitative analyses
  - Determine preponderance of coded phenomena
    - » (E.g., frequency counts)
  - Mean (& variability) of quantitative measures
- Tests of statistical significance
  - Analyses of magnitude and reliability of effects (e.g., ANOVA)

Statistical Analysis of Topics of Conversation (by Pair IM Frequency)

Function	Frequent Pair	Infrequent Pair	Total
Simple*	19.0	33.7	**27.8**
Sched/ Coord	31.0	30.7	**30.8**
Work	62.5	61.3	**61.8**
Personal+	17.5	10.0	**13.0**
Saying "hi"	3.0	7.0	**5.4**
No response*	16.5	28.0	**23.4**

Table 5. Percentage of conversations that included messages related to each function, based on frequency of pair interaction. +p<.05, *=p<.01.

ANOVA for pair frequency effect: Inferential Statistics

Steps in Quantifying Analysis of Workplace IM Data

- Collect raw data
  - Transcripts and some quantitative data available in system logfiles
- Parse raw data
  - Determine meaningful units of analysis (e.g., conversational chunk)
- Code raw data
  - Classify conversational content & interactions
  - Ensure inter-coder reliability
- Quantitative frequency analysis
  - Determine preponderance of coded phenomena
- Tests of statistical significance
  - Analyses of size and reliability of effects, cross tabulations with pair characteristics of interest
- Iterative analysis, hypothesis building & testing
  - Develop deeper understanding to drive further analysis and/or research

Iterative Coding & Analysis of Work-Related Topics

	convs	% of work IMs	% of all IMs
Work Talk	154	49.8	30.8
Work-related	167	54.0	33.4
Doing Work	37	12.0	7.4
Any	309	100.0	61.8

Table 6. Frequency of types of work conversations. (Conversations could be in more than one category.)

Lessons from Workplace IT Study

- **Coding and quantification** of qualitative data can be very effective in helping to characterize the relative magnitude or predominance of patterns. Effects of other factors can also be examined, and statistical tests can be applied, as with inherently quantitative data.

- Very painstaking efforts are required to maximize validity, reliability and generalizability of results.
  - Extensive coding by multiple human coders & assessment of inter-coder reliability
  - Extensive, iterative hypothesis formation, coding & analyses

Examples of Evaluating a Mixture of Qualitative & Quantitative Findings

From the LambdaMOO Project

The First Noble Truth of CyberSpace: People are People (Even When They MOO)

Diane J. Schiano
Interval Research Corporation
1801 Page Mill Road
Palo Alto, CA 94304 USA
+1 650 842 6099
schiano@interval.com

Sean White
WhoWhere? Inc.
1675 N. Shoreline Blvd.
Mountain View, CA 94043 USA
+1 650 938 4400
swhite@cs.stanford.edu

ABSTRACT

This paper presents major findings from a large research project designed to carefully characterize what "life in LambdaMOO" (a classic social MUD) is like for many of its members. A "convergent methodologies" approach embracing qualitative and quantitative, subjective and objective procedures was used. A rich, extensive database was produced, from which robust patterns could emerge, be considered in context and assessed with some confidence. Results are discussed in terms of four broad categories of interest: 1) users and use, 2) identity 3) sociality and 4) spatiality. These data should help inform the discourse on, and design of, online communities in the future.

KEYWORDS

Virtual communities, MUDs, social computing, network community, identity, shared space, virtual worlds

INTRODUCTION

Imagine logging in to your network server and reading the following:

```
>You enter the Living Room.  It is very bright, open and airy here, with large plate-glass windows looking southward over the pool to the lush gardens beyond.  On the north wall, there is a roughly-hewn stonework fireplace.  The east and west walls are almost completely covered with large, well-stocked bookcases...
...An entrance in the northwest corner leads to the kitchen...
>You see the Cuckoo Clock, the Cockatoo, the Scrabble Game and a Map of LambdaMOO here...
>DreamWeaver, HardCore & CeLeRY are here...
>DreamWeaver looks your way and smiles
```

providing a richer sense of place and "presence" than conversational mechanisms (chat, email) alone can provide [10][11]. MUDs and MOOs ("MUDs, Object-Oriented"), typically still text-based, are shared, persistent, navigable virtual environments in which user-created characters and scriptable objects can interact with one another in surprisingly rich and compelling ways. MUDs now number in the hundreds, with tens of thousands of members world-wide [15]. The screenshot above was derived from LambdaMOO--one of the oldest, largest, and most well-known online communities in use today [4][5]. LambdaMOO is a purely "social"--as opposed to fantasy/adventure (e.g., TrekMUSE) or research/education (e.g., MediaMOO)--MUD [3]. Note how different the kinds of interaction suggested in the screenshot are from anything email or chat lines could easily afford.

A great deal of media attention--and social science research--has been focused on social MUDs recently, and some popular and even provocative claims have emerged. For example, MUD "addiction" (logging in for extremely extended periods of time) is assumed to be a widespread phenomenon [11][15]. Identity--and gender--play with multiple characters (or "morphs") has been portrayed as the primary preoccupation of MUDding, perhaps to the point of promoting a 'post-modern fragmentation of the psychological sense of self' [1][6][14][15]. Others view MUDs as a form of "great good place"[11]--a public, social alternative to home and work of the sort that the sociologist Oldenburg [12] considers essential to community development. Finally, it is commonly held that spatiality, the ability to navigate and explore, gives MUDs an especially compelling sense of place or "presence"[11].

Research reports in which such claims are made can be richly evocative, insightful--and often deeply critical of traditional "objective" psychological research methods [1][3][15]. However, the generality of these claims are

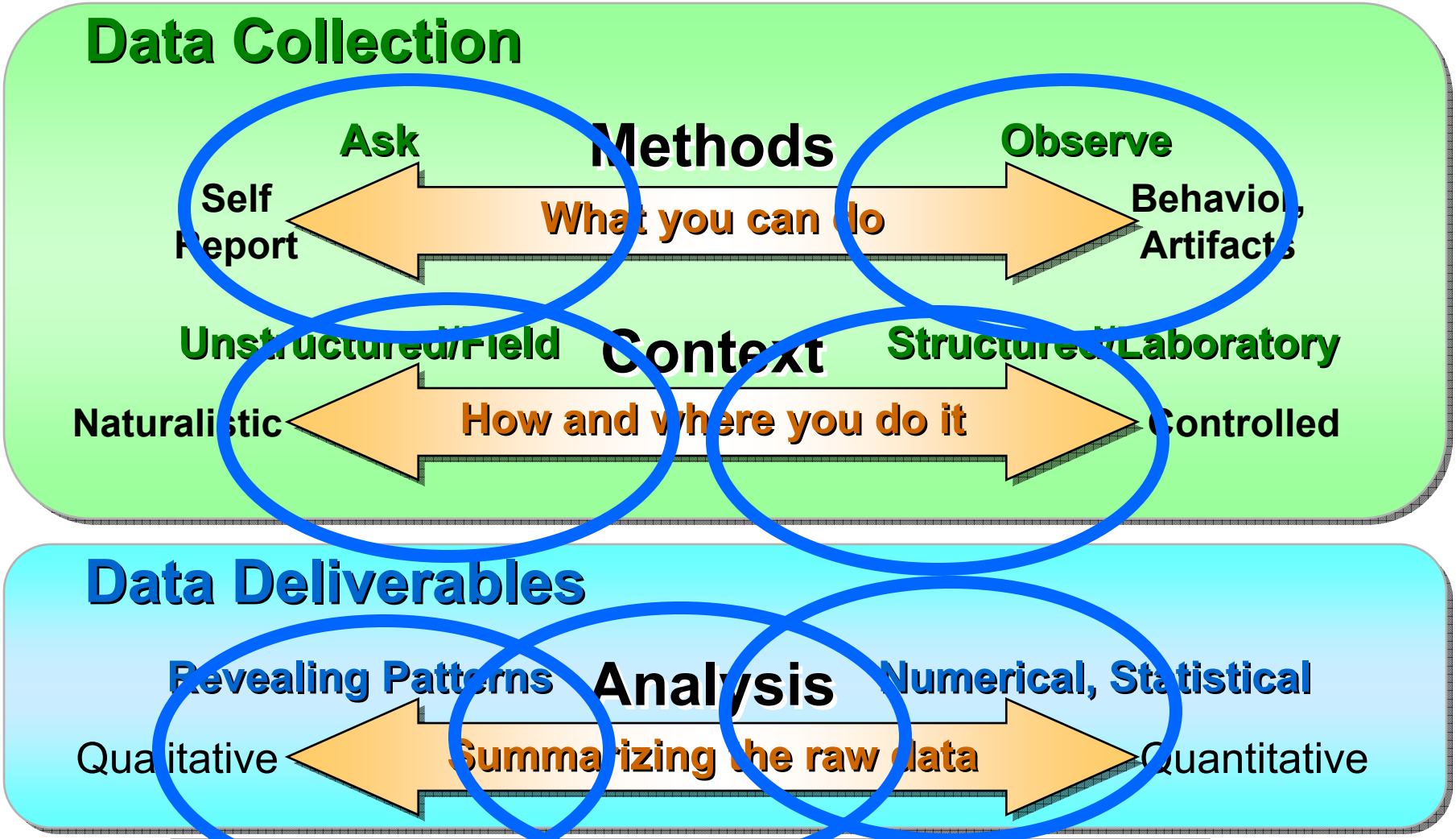
LambdaMOO Project

- One of the First Online Communities
  - Text-based, “spatial” (divided into “rooms”)
  - Created at PARC
- Target of a great deal of media “hype”.
- A large, multi-year project. Major goals included:
  - Characterizing online community use patterns
  - Assessing specific “*hype-otheses*”
    - » E.g., Addiction to LambdaMOO, Sociality in LambdaMOO
- Several studies, multiple methods, lots of other specific research questions.

LambdaMOO Project Methods

- **Survey (Self-Report)**
  - **1 Week Call upon Login; 581 Respondents**
  - **~ 30 Questions, Various Formats, Online**
- **Interviews (Self-Report)**
  - **12+ Real-Life, Long-Term Participants (Many IVR,etc)**
  - **1.5-2 hr In-Depth, Semi-Structured Interviews & Maps & Follow-ups**
- **Logging Studies (Naturalistic Observed Behavior)**
  - **Who/Where/When @ ~ 1min Intervals, 24 hr/day, ~2wks**
  - **Privacy Respected**
  - **Data on > 4,000 Users Obtained (Twice, ~ 6 Mo. Interval)**
- **And Much More...**
  - Participant observations, attending BayMOO mtgs, comparison studies, etc.

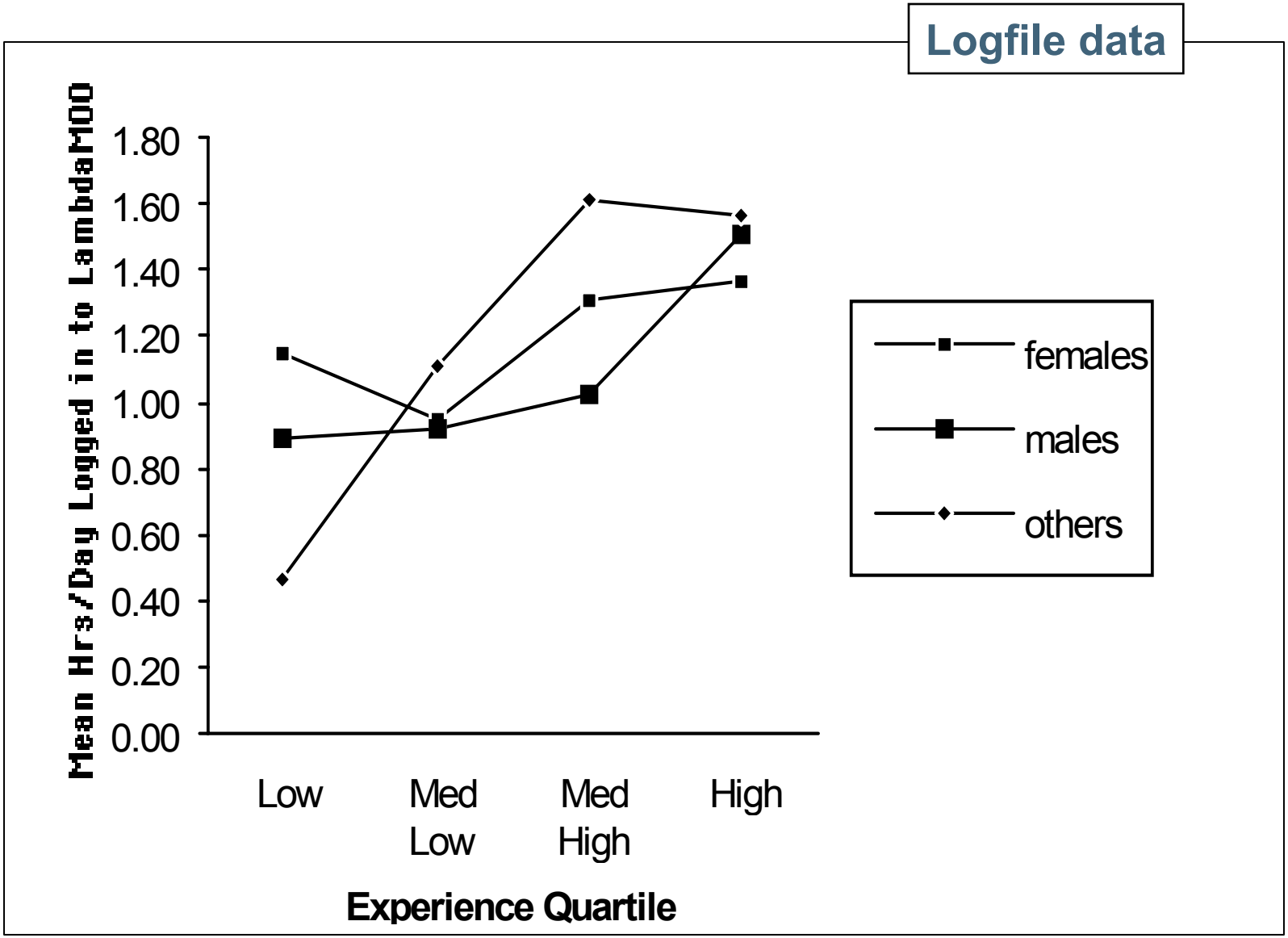
Research Design Dimensions



"Addiction" to LambdaMOO?

- Self-Report Use Estimates were Extremely High
  - Popular hype (even some research papers):
    - » **80 hrs/wk !!?**
  - Our interview findings not inconsistent
    - » "all the time", "all day, every day"
- Our Logfile Observations Differed Greatly
  - Mean ~ 8 hrs/wk (*with* multi-tasking & idle time!)
    - » **Mean=1.13 hrs/day; ~ 8 hrs/wk**
  - Less than 5% users on for 20 or more hrs/wk!

“Addiction” to LambdaMOO?



"Addiction" to LambdaMOO: NOT!

- People are notoriously inaccurate in estimating frequency and duration.
- While they may have *felt* like they were logged in "all the time", and while that's important to recognize in understanding their personal experience…
- We trusted the "objective", quantitative logfile data in estimating extent of actual use.
- (We also explored some further questions about psychological "addiction").

Another Example from LambdaMOO

Sociality in LambdaMOO?

- **Previous reports emphasized the importance of sociality in LambdaMOO .**
  - "Great good place" to gather >>> Virtual club or pub

- **Our survey and logfile data was mixed:**
  - Survey suggested most time was spent **socializing**.
    - » ~60% estimate plus some other data
  - Logfile analysis showed most time was spent **alone**!
    - » Most people spent most of their time alone
      - Increasingly with experience with LamdaMOO
    - » Modal # characters in a room = 1

Sociality in LambdaMOO?

Table I. *Most Actively Occupied Rooms in LambdaMOO*

	Percent of time occupied by 1 or more active users	Simultaneous active occupants (overall mean)	Simultaneous active occupants (mean when occupied)
Living Room	97%	6.01	6.19
Sensual Respites	84%	4.56	5.40
The Coat Closet	74%	3.70	5.01
The Hot Tub	70%	2.48	3.54
The Sex Room	44%	1.13	2.60

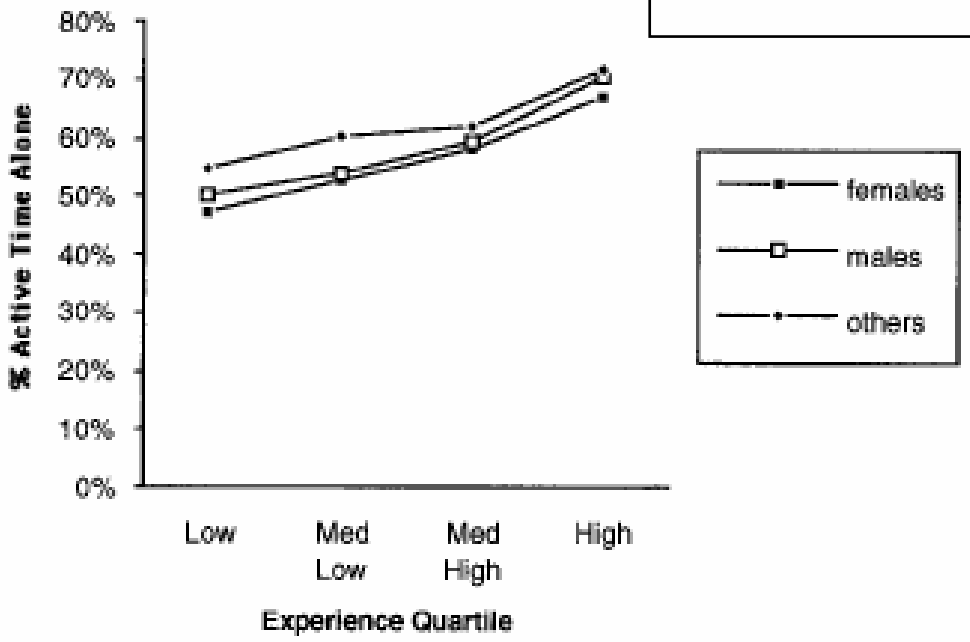


Figure 5. *Mean percentage of active time spent alone by experience level and MP gender.*

Logfile data

Sociality in LambdaMOO?

- **Interview data explained how BOTH the logfile and the survey data could be correct:**
  - Interviewees discussed spending most time:
    - » ***SOCIALIZING ALONE!***
      - Using remote messaging
        - Email and paging (similar to IM) within LambdaMOO
      - Typically alone, from their “home”
        - For security & multi- tasking reasons

Sociality in LambdaMOO: Communication!

- The qualitative data from the interviews allowed us to interpret the divergent quantitative logfile and survey data in a way that made sense and was consistent with our participants' experience.
- This in turn led to a new view of how people use LambdaMOO, and further research.
- It also led to some innovative technology product ideas.

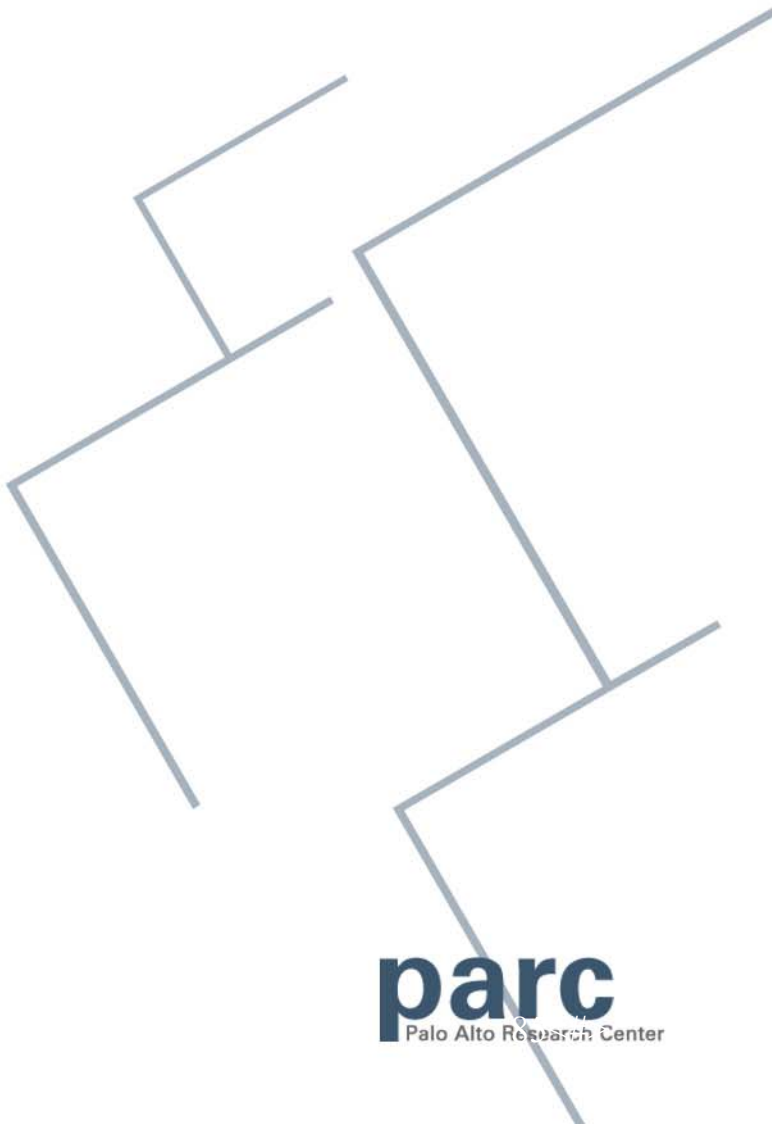
Lessons from LambdaMOO

- **Both** quantitative and qualitative methods **and** analyses are sometimes needed to really understand what is going on in a given situation.
- Very painstaking can be required to optimize validity, reliability and generalizability of results.
  - Multiple kinds of studies
  - Multiple kinds of analysis
  - Skilled evaluation of a large set of heterogeneous findings

Overview

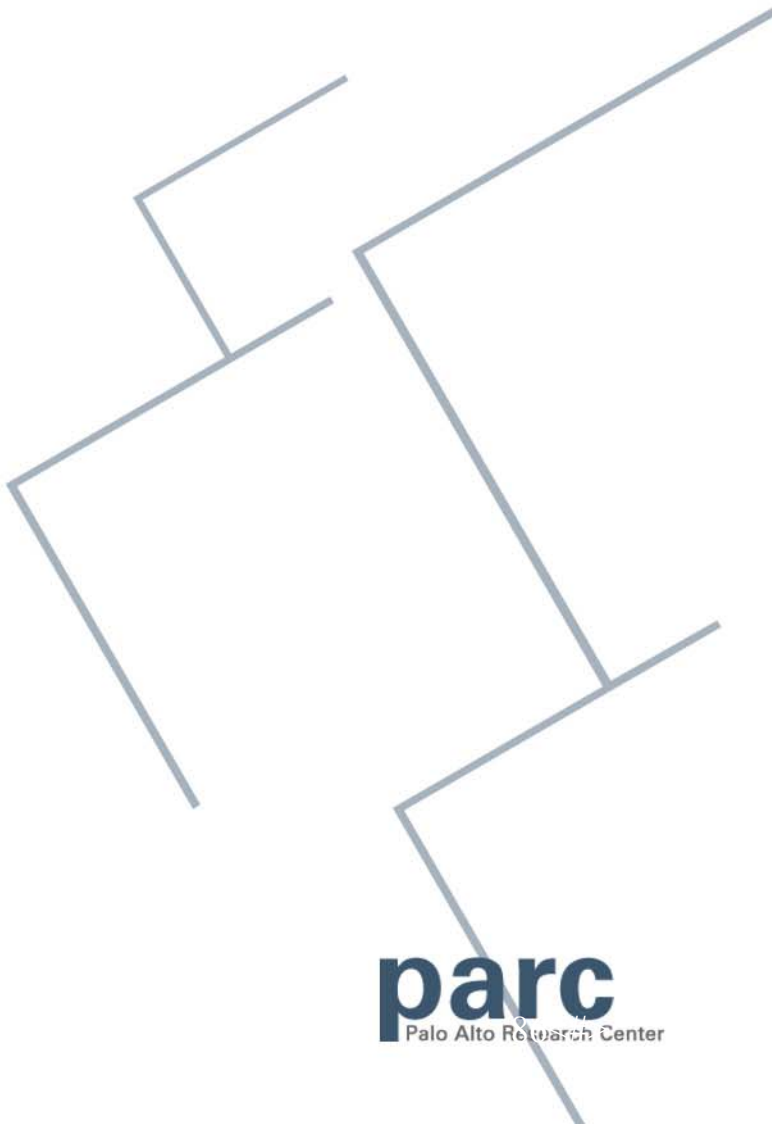
- Three “U”s of User Studies
  - Usefulness, Usability and Use
- All You Ever Need to Know About User Research Design in 25 Slides or Less
  - Overview of Research Design
    - » Two Distinct Approaches…& Convergence
      - Qualitative & Qualitative Methods & Deliverables
    - » Core Research Principles & Pragmatic Considerations
- Discussion Options
  - Extended Examples of Convergent Approaches
    - » Quantitative Analysis of Qualitative (& Quantitative) Research (Workplace IM Study)
    - » Evaluating a Mixture of Qualitative & Quantitative Findings (LambdaMOO Project)
  - Research Design Clinic

Any Questions?



parc
Palo Alto Research Center

Thank You!



parc
Palo Alto Research Center