

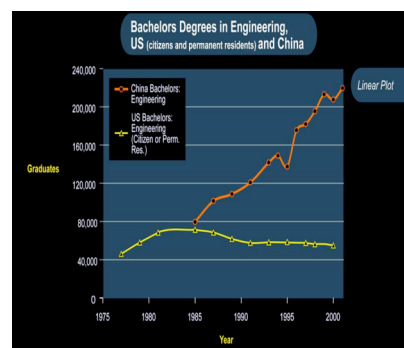
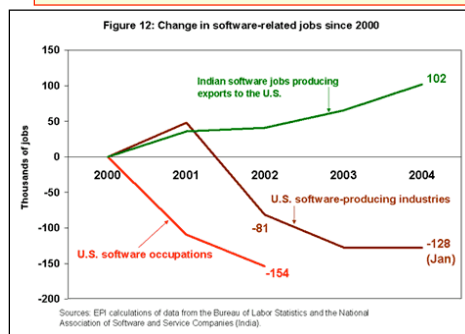
Information-Seeking in Global Software Teams

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Global Software Development

- Members Of The Software Industry Within the US Show Extensive Diversity
- Development Involving Remote Teams In Multiple Countries has Increased
- Offshore Software Outsourcing Of Software has Increased



Global Software Development Characteristics

- Distance
- Time
- Organization
- Team Composition
- National Culture

Potential Differences in National Culture

Hofstede (1977)

- Individualism vs Collectivism
- Power Distance Index
- Masculinity
- Uncertainty Avoidance Index
- Long-Term Orientation

Nisbett (2003)

- Analytic vs. Holistic Problem Solving
- Focus on Objects vs Relationships
- More vs Less Context Dependence
- Element-causality vs Field Causality

Hall (1965)

- Space
- Material Goods
- Friendship
- Time
- Agreement

Information Seeking by Software Engineers

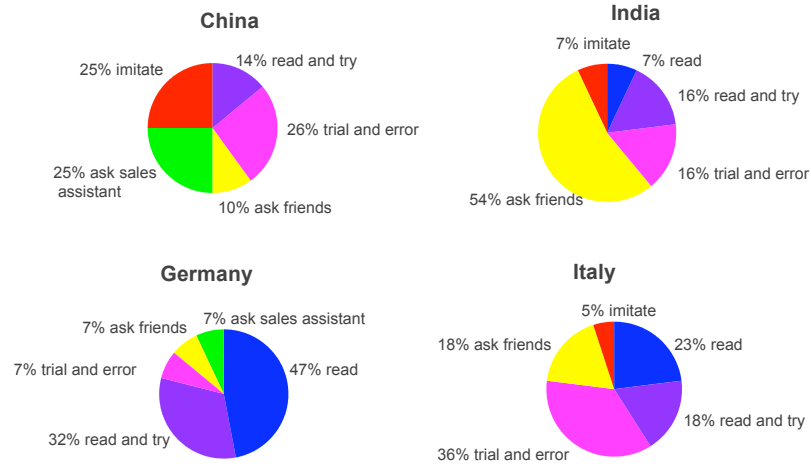
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- “Ninety-Foot” Rule
- Social Sources preferred
- Least effort Principle: availability and “cost”
- Source Relevance, Quality, Familiarity
- Trust
- Task: Non-Social sources during early project phases and for technical facts, social sources for feedback and exploration.
- *“Engineers around the world are more alike than different...If technology access is optimized and equalized, the similarities across engineers around the world may far outweigh any cultural or geographic differences” (Tenopir and King, 2004)*

Cultural Differences in Information-Seeking

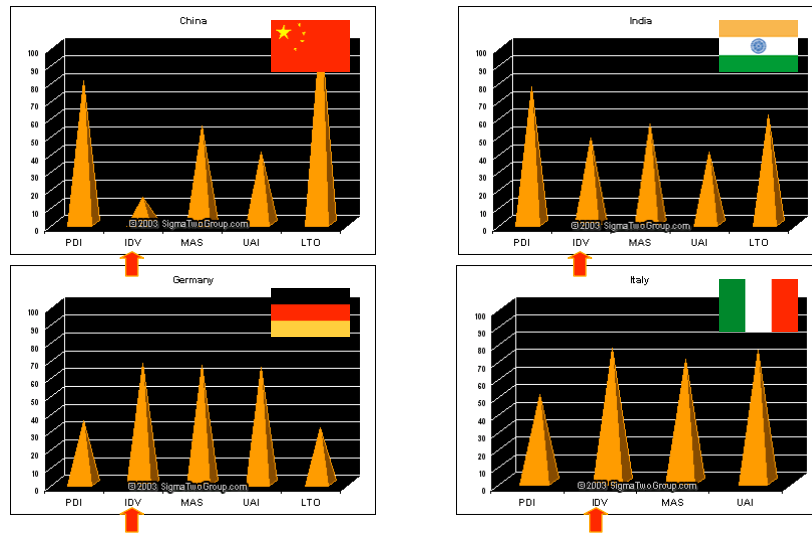
- Not well studied: Komlodi (2004)
- Honold (1999, 2000)
 - focus groups, ethnographic interviews, product usability testing of appliances and telecommunications products
 - German consumers prefer formal documentation (e.g. instruction manuals)
 - Chinese consumers prefer social interaction with peers and sales people
 - Indian consumers also showed preference for social sources (though complicated by cultural sex role issues)

Siemens Corporate Research Study: Cultural differences in mobile phone usage



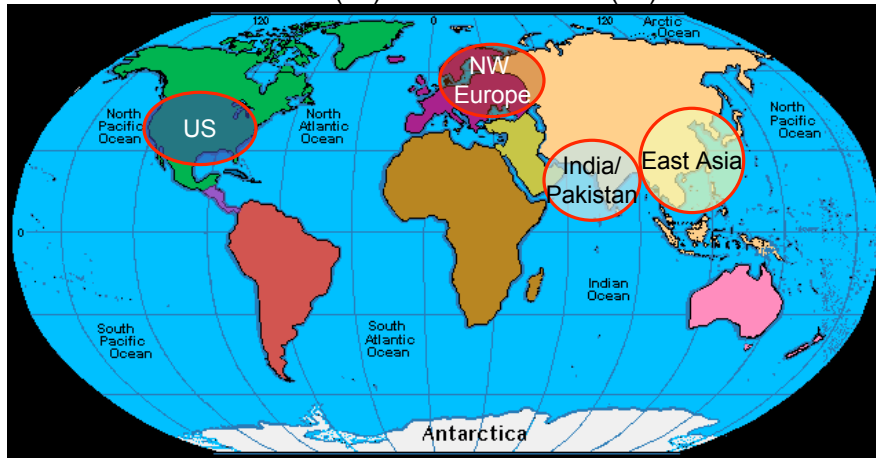
What do users do while learning to use a mobile phone?

Cultural Dimensions



Geographic Groups

Software Engineers/Developers from US(24), NW-Europe(21), East-Asia(15) and India-Pakistan(24)



Scenarios

- Ask Friends /Coworkers
- Read Book
- Browse Web
- Read printed Documentation
- Search/post-to a Newsgroup
- Contact Support Organization
- Take Course

Language:

Suppose you were given a software development task and the requirements specified that it be written in a language that you had never used before (e.g. Java, C++, Perl). Where would you go to find out enough to start your design?

Platform:

Suppose you were given a software development task and the requirements specified that it be written on a platform that you had never used before (e.g. Win, Linux) . Where would you go to find out enough to start your design?

Library:

Suppose you are in the middle of detailed design of a project. You are using a class library and are unsure about some of the methods associated with a class. Where would you look to get more information?

Compile:

Suppose you have built a software application and it displays compiler errors that you cannot figure out by yourself. Where would you look for information about this problem?

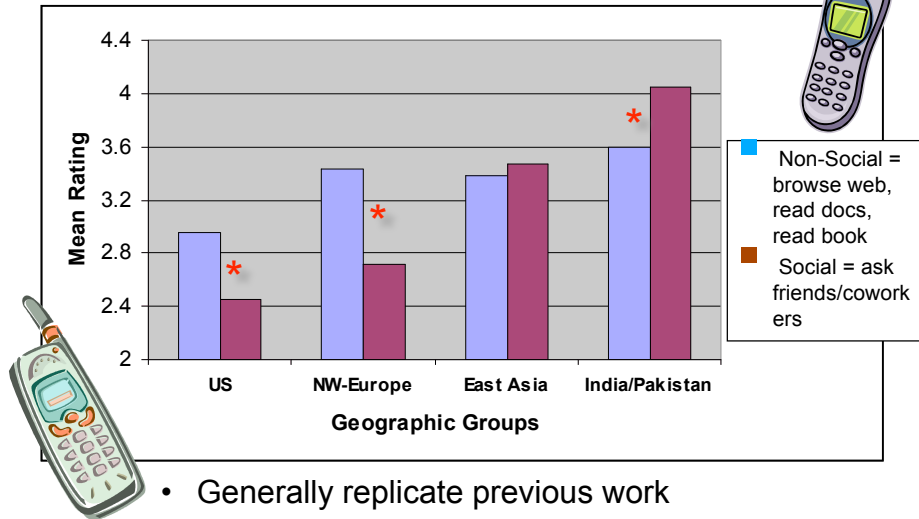
Test:

Suppose you have built a software application and it fails to work as you expected. There are no compiler errors. You've reviewed the logic and it appears sound. Where would you look for information about this problem?

Consumer Mobile:

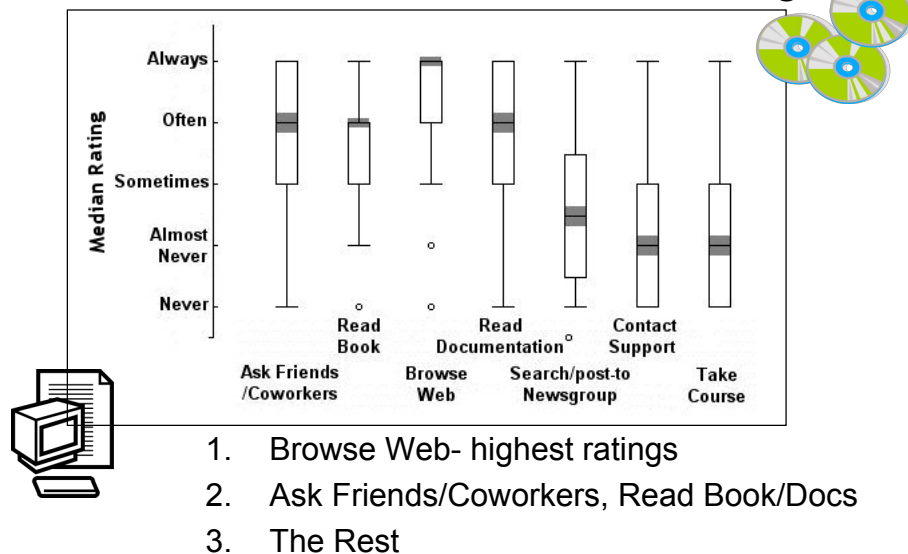
Suppose you have just purchased a new mobile telephone for personal use and cannot figure out how to use some of its features. How would you find out about these features?

Consumer Mobile Telephone

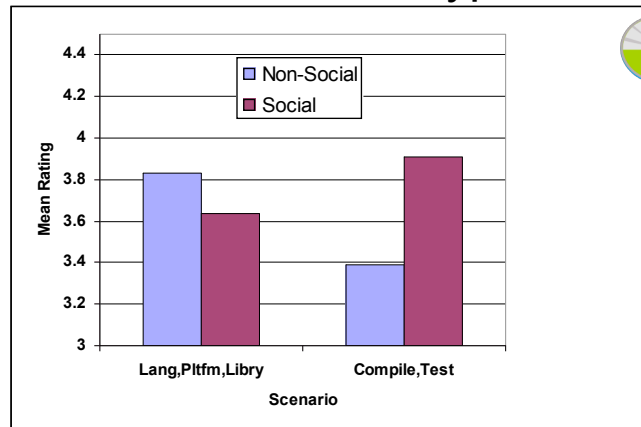


- Generally replicate previous work
- Social/non-Social Sourcing consistent with IDV

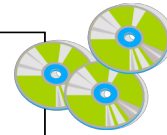
Software Engineering- Overall Information Source Ratings



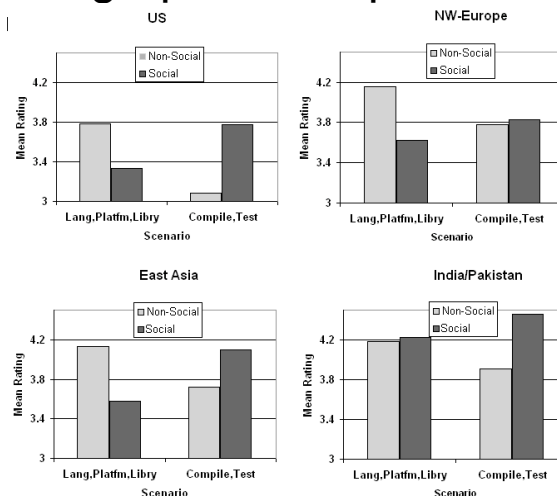
Software Engineering- Effect of Task Type



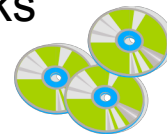
- Non-Social Sources preferred for “Factual” Tasks
- Social Sources preferred for “Diagnostic” Tasks
- Consistent with previous work on Engineers



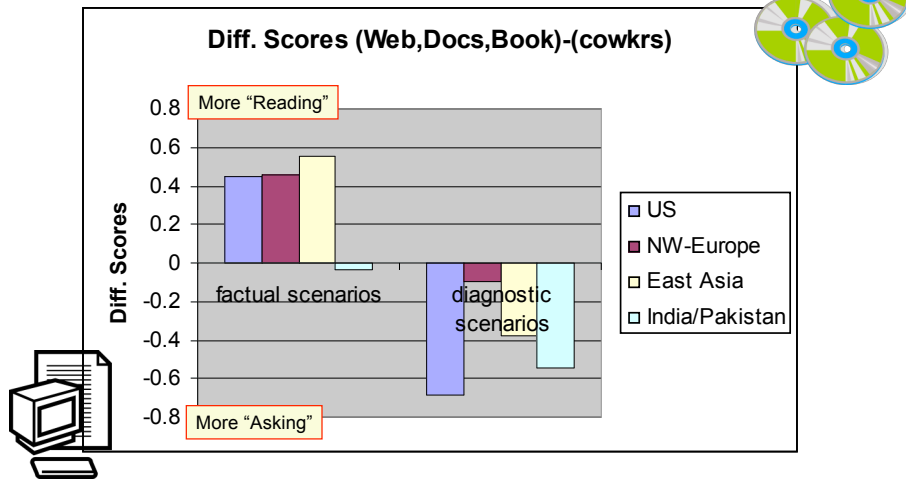
Software Engineering- Geographic Groups and Tasks



- NW-Europe and India/Pakistan break this pattern



Software Engineering- Geographic Groups and Tasks



- NW-Europe and India/Pakistan more consistent with IDV

Problems with Cultural Dimensions Explanation

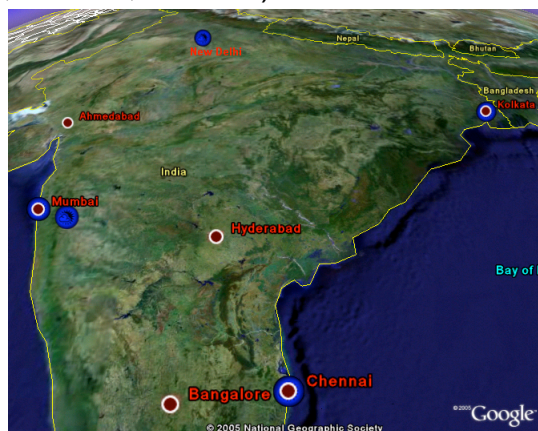
- Inconsistencies
 - East-Asian group, high in Collectivism, rate non-social sources high for the factual tasks
 - US group, high in Individualism, rated social sources high for the diagnostic tasks
- Hofstede's Cultural Difference Framework has been Criticized
 - Not consider Organizational & Occupational Cultures
 - Consumers (Mobile Telephone) vs Software Engineers
 - Sampling Errors Possible

Availability?

- Tenopir and King (2004) claim availability of technology is the only difference between geographic groups of SE
- All four geographic groups fall in the top twenty of countries with high internet usage per capita
 - India (3.6%)
 - China (7.9%)
 - US (69%)
 - Germany (57%) (*Internet World Stats, 2005*).

Availability?

- Geographic analysis of Indian/Pakistan respondents' IP addresses shows concentration close to four major cities (New Delhi, Chennai, Kolkata, Mumbai)
- These 4 cities account for more than 50% of country's internet usage
- Respondents' occupation would tend to increase likelihood of internet access compared with general population



Summary

- Clear Effects of Task on Information-Seeking
- Indications of Web's growing significance
- Replication of previous Consumer Information-seeking Results
- Possibly, some evidence that Cultural Dimensions influence SE Information Seeking Strategies
 - Complex interaction with Task Differences

Does this matter?

- Need to measure behaviors, not just preferences in imagined scenarios
- Management Strategy: assign work based on abilities and work habits
- Engineering Project Strategy: assign tasks based on locale and expertise

Flexible Tools ...?

	Social Source	Non-Social Source
Support	Realtime, face-to-face tools...	Content management, Wikis...
Translate to	Social tagging and bookmarking...	Newsgroups, Automated Referral-chaining for expertise-location....