DEFENCE R&D DÉFENSE

Incident Management Systems Evaluation and Usability Assessment

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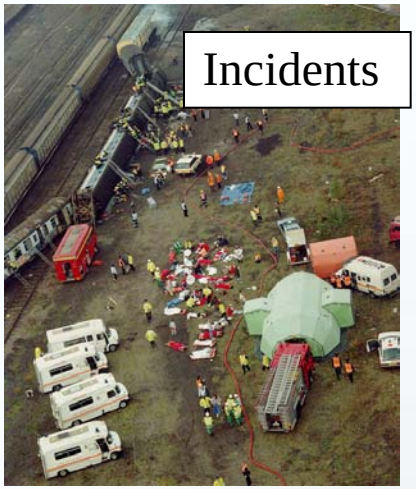
Incident Management Systems (IMS)

- Track, log and organize…

People & Contacts



Incidents

Tasks

Resources

- Send/Receive…

Mail

Notifications

- Share…

Common Map

Setting the Stage

- IMS systems are:
  - typically used in times of emergency
  - designed with the expectation that data will be entered and consumed by multiple people
- Users may have various backgrounds and opportunities
  - In addition to providing features necessary to meet the *organization's requirements*, the system should be *easy to use*

Organizational Requirements

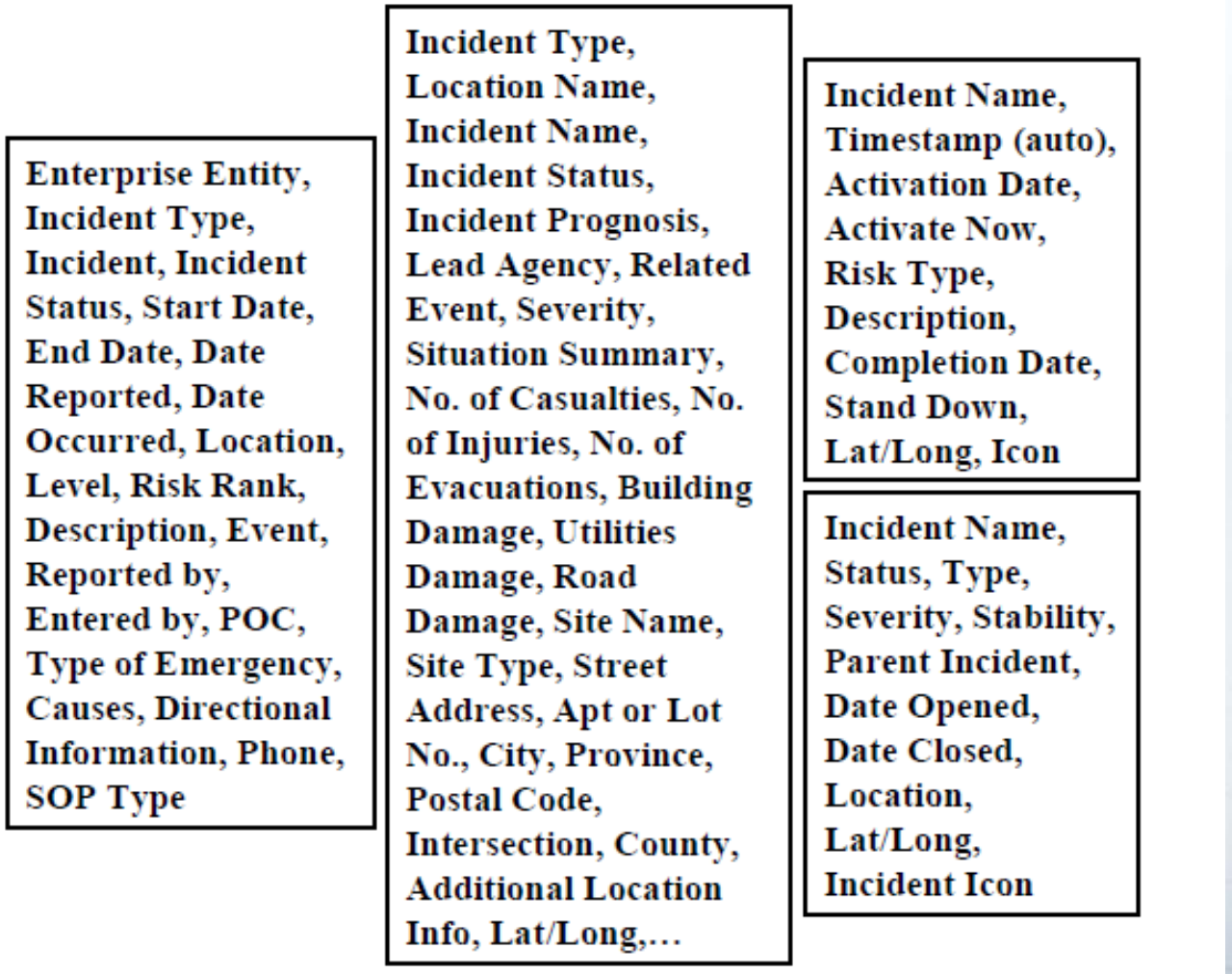
- Gather *organizational requirements* from ALL stakeholders
  - goal-focused functional requirements
  - non-functional requirements
- Requirements gathering process
  - user surveys
  - focus groups
  - scenario and use case discussions
  - ‘future workshops’

System Requirements

- To set reasonable requirements, we:
  - Need to understand the capabilities provided by existing IMS systems
  - Re-examine feasibility of organizational requirements
- To set meaningful requirements, we:
  - Need to understand how features vary across implementations
  - 2 quick examples...

Variation in Features

- Example 1: Different Interpretations of Incident Structure



Variation in Features

- Example 2: Different Interpretations of Alerts

12:25 19-Jan-11 Large Explosion at DRDC Atlantic

vs

Variation in Features

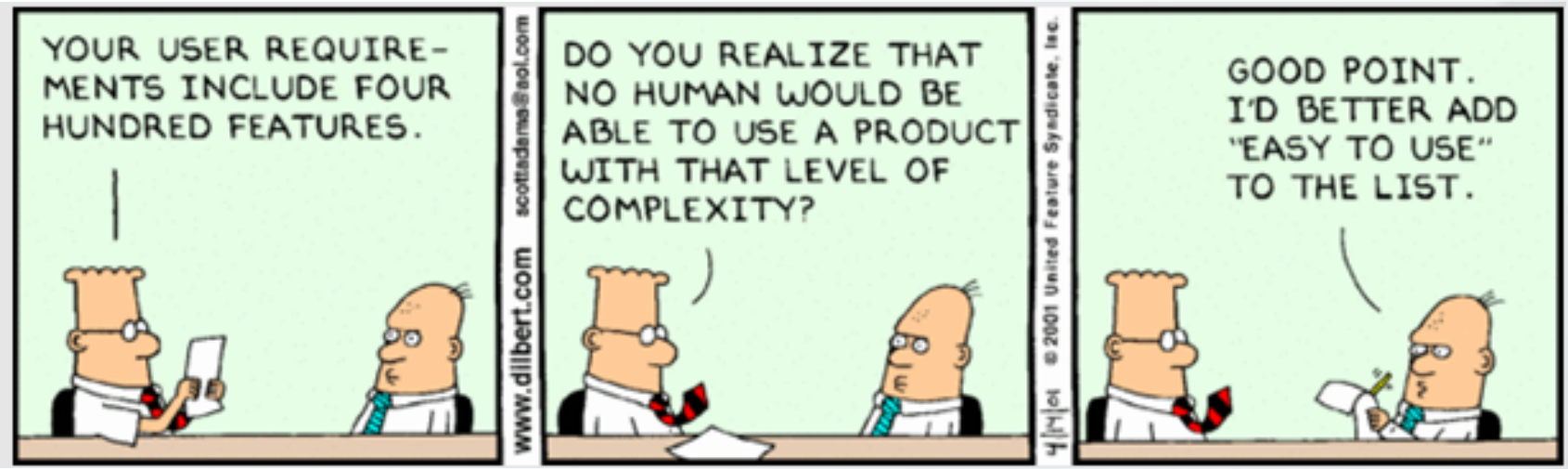
- So, generic requirements such as:
  - ‘Incident recording’ and an ‘alerting capability’ may not result in the desired capability
  - enough detail must be provided to allow differentiation between implementations which are acceptable and those which are not

Ease of Use

- A non-functional requirement that ‘goes without saying’, yet it needs to be said
- Examples of IMS System Usability Issues:
  - no indication of required fields
  - inconsistencies within the product
  - actual errors or bugs
  - clunky maps
  - unnecessarily long navigation paths
  - unclear rules

Ease of Use

- Have you ever seen or put the requirement “Easy to use” in a statement of a requirements (SOR)?
  - How effective is that?



- Usability requirements are much harder to effectively specify and measure

Types of Usability Requirement Specifications

- Performance Style:
  - Demonstrate that 75% of untrained, inexperienced users are able to enter a new incident within 5 minutes
- Defect Style:
  - Demonstrate that no more than 20% users will fail to enter a new incident on their first attempt
- Subjective Style:
  - Demonstrate that 75% of new users score at least a 60 on the System Usability Scale (SUS) questionnaire
- *BUT, where do these numbers come from? How do we even know what to ask for? And then, how is it measured?*

IMS Usability Experimentation at DRDC

- Aims to examine a number of commercial IMS systems in order to:
  - specify reasonable usability requirements (based on knowing what is obtainable)
  - frame expectations for IMS system usability in general
- So far, we've assessed two systems and have some preliminary results (which will be discussed)
- First, the experimental procedure…

Usability Testing Procedure (1 of 2)

- System evaluation by each participant included:
  - Performing 4 core tasks
    - creating an incident
    - assigning a resource
    - modifying an incident
    - obtaining information from the map
  - Answering a post-task questionnaire with 3 questions:
    - “For each step of this task it was clear what I needed to do next”
    - “Navigation through this system was straightforward”
    - “The number of steps required to accomplish this task was reasonable”

Usability Testing Procedure (2 of 2)

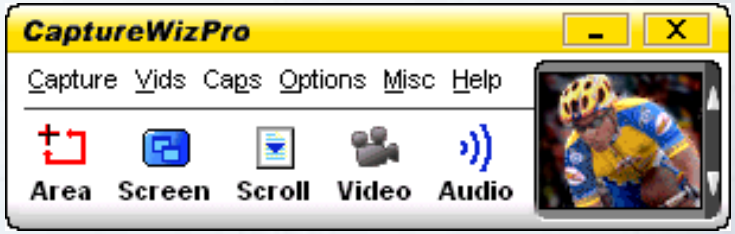
- System evaluation by each participant also included:
  - a final, overall questionnaire for each system (using the System Usability Scale (SUS)):
    - 10 statements, alternating from positive to negative
    - indicate agreement level from 1 to 5
    - final score out of 100
- Reading a list of 50 adjectives and iteratively narrowing down the selection to exactly 5 words that best apply to the system

Other Data Collected

- Number of mouse-clicks per task

- Time it takes to complete each task (both times)

- A video screen capture of all activity

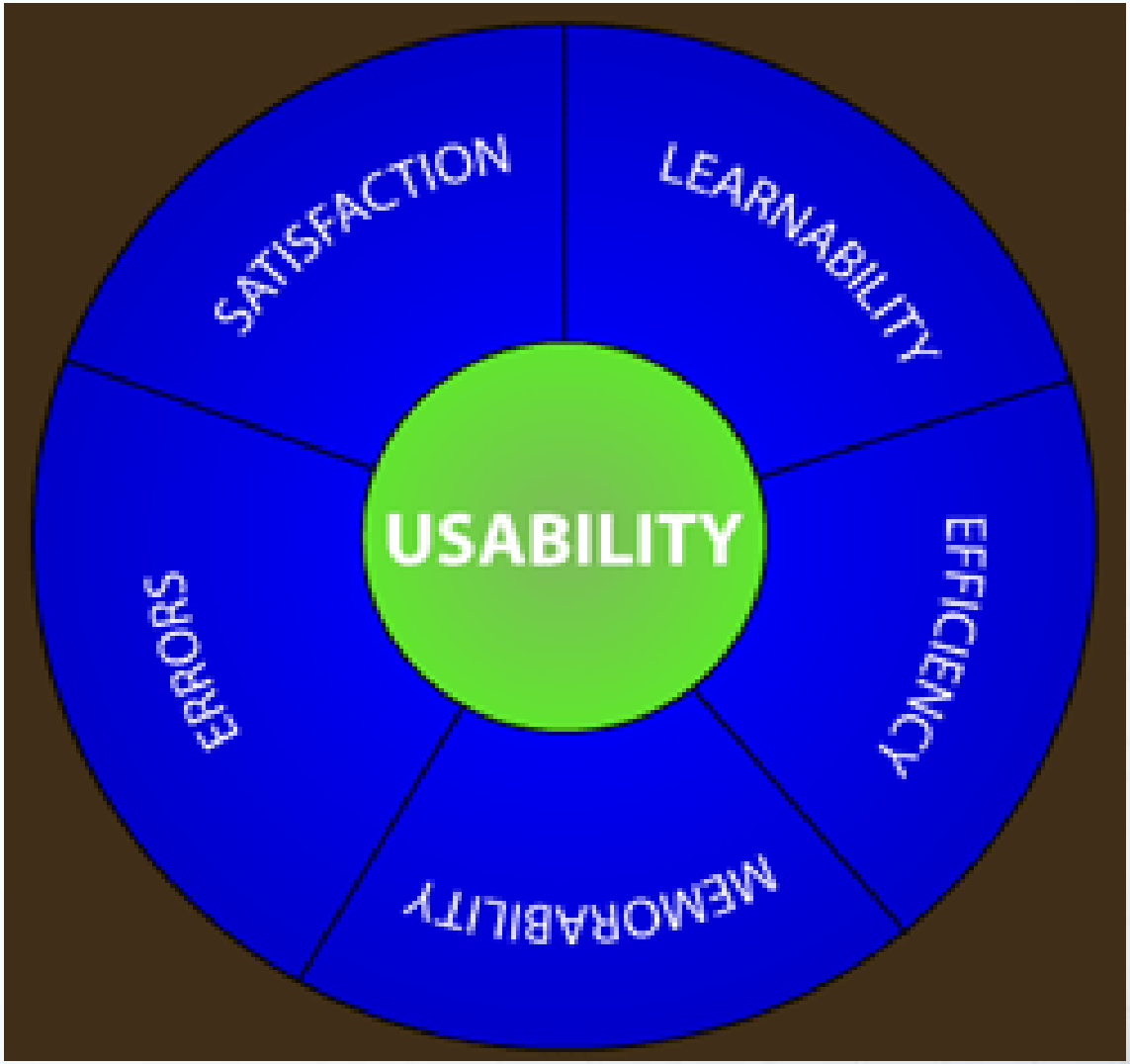


- Comments

Data Analysis Expectations for each system

- Mean time to complete each task without prior experience,
- Mean time to complete each task once learned,
- Mean number of unproductive mouse clicks for each task without prior experience,
- Mean number of task failures for each task per user without prior experience,
- Mean rating for each question of the Post-Task questionnaire for each task,
- Mean SUS score (between 0 and 100),
- Usability Word Cloud,
- Identification of troublesome design features

Usability Component Coverage



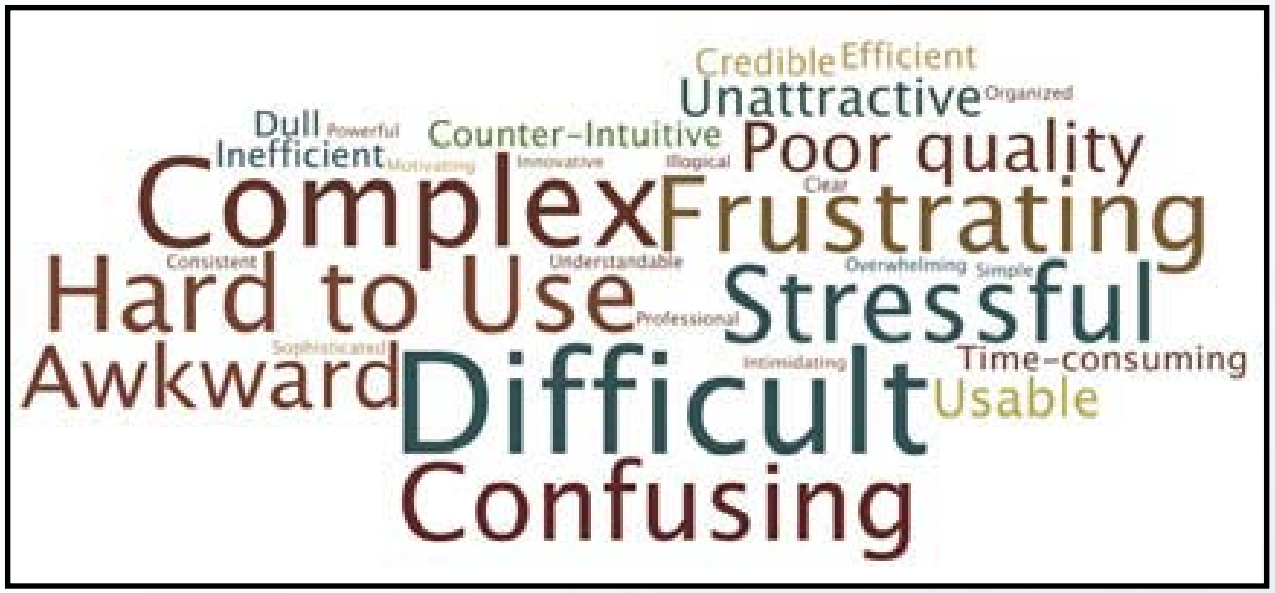
Preliminary Results – System 1 / System 2

- 16 participants trialed each of the systems, in alternating order
- Average time to
  - add a new incident: 10m35s / 7m29s
  - modify an incident: 1m14s / 2m03s
  - assign a resource: 9m27s / 3m48s
  - obtain basic information from the map: 3m37s / 3m31s

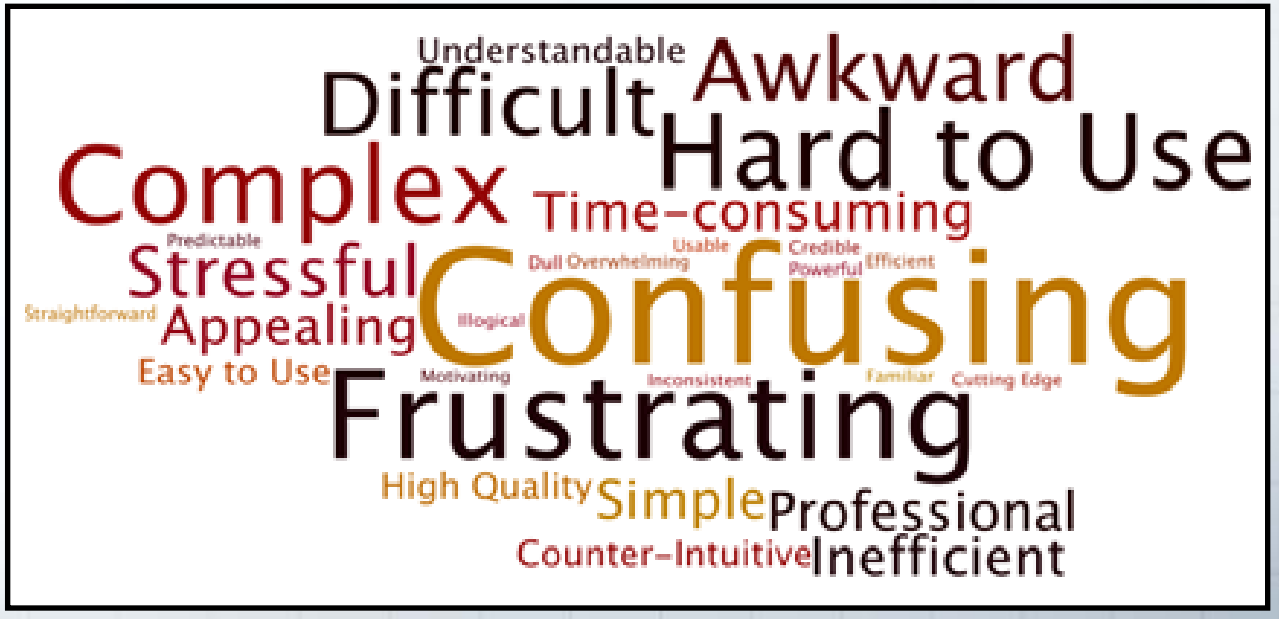
  on first attempts (based on participants that claimed to complete the task),
- Average responses to Post-Task questions 1-3 during the first round were 3.6, 2.6, 3.1 / 3.2, 2.7, 3.2; overall 'Neutral' responses, and
- The average SUS score was 58 (out of 100) for both systems!

Usability Word Clouds

- System 1



- System 2



It’s too early for solid conclusions…

- Two systems do not ‘a marketplace make’
  - However, we do not expect to be surprised by further tests
- These results do illustrate the importance of considering usability requirements
- Regardless of the chosen system,
  - training, guides/cheat sheets, short video tutorials and context-sensitive help systems will remain important
    - we can only minimize their importance by considering usability in the selection process
  - effective and efficient use of IMS systems by *untrained* users remains a concern

Questions

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