Connecting with End Users

Mike Chapman
Research Applications Lab
Why is this topic important?

• Connecting science to society – **We want our work to be useful**
• New technology and research falling through the cracks
• Developers have traditionally not been well connected to end users
• Learning how to engage end users is critical for advancing technology – **We need help!**
What is being done?

• American Meteorological Society has goal to reduce the gap between end users and the weather and climate enterprise

• More companies and research organizations are engaging end users directly

• Applied research is getting more emphasis… but many still don’t know we exist

• WAS*IS
Decision Support Systems

What is a decision support system?

a) Human - Weather Service and/or Media Forecasts?
b) An automated system that helps with decision making?
c) A handbook of recommended practices?
d) An software program assessing risk to infrastructure

Answer: All the above!
Who is the user?

- **Private sector world** – the client
- **Applied research world** – society* and the client
- **Private media world** – the general-public and the government
- **Government weather world** – the general-public, society* and the media

* Including non general-public entities which funnel information to the general public
Assessing the User’s Needs – from an applied science perspective

- It is imperative that you develop a relationship of trust with the client (sponsor and users) in any development process.
- Patiently listening to their needs is a critical first step.
- You need to understand their world.
Assessing the Culture

Before one can consider developing or implementing a Decision support system (DSS), action needs to be taken to assess the client’s culture.
First Question:

1) **What problem(s) are you trying to solve?**

Probing questions must be asked several different ways before a potential answer or solution may emerge. **Experience with the user is a necessity.**

Problem... I am a weather geek meteorologist not the great communicator
2) **What is the culture of the user’s organization?**

- Would the new technology be seen as threatening?
- Does automation pose problems?
- Are general support tools viewed positively?
Assessing the Problem

3) **What actual tasks and/or decisions could be or need to be supported?**

- Routine or mundane tasks (e.g., data analysis)
- High-level analytical tasks (e.g., information assimilation)
- Critical decisions (e.g., impacting lives or costs)
4) What technical capabilities exist?

- Network system (external & internal)
- Desktop computers for end-users
- Remote field communications (PDAs)
- Database of pertinent operations data
5) **What are the potential benefits?**

- Safety
- Property Protection
- Productivity
- Risk Reduction
- Saving money
- A new one...
6) **Who will champion the technology?**
   - Management vs. staff
   - Technology push (by management) or pull (from staff)?
7) What are the users’ expectations?

It is critical that users expectations are at the appropriate level when new technologies are introduced. It is always better to error on the side of caution and let the users be creative on how they utilize new capabilities.

Don’t assume everyone will use system or forecast the same way…
Decision Support Systems

• There are no off-the-shelf plug and play DSSs that can fully address the needs of all end-users. There are no “one-size-fits-all” solutions!

• Stakeholders need to determine the level of sophistication that is required for their specific DSS application

• Can’t just throw the system “over-the-fence” and expect success. Training is a must!
A smart taxpayer-funded Solution Seriously!!!!!

- Began after a study discovered a disconnect between road weather forecasts and the road maintenance community

- A system was developed that translates current and predicted road & weather information into recommended maintenance actions

- **Goal** - improve the productivity and cost efficiency of transportation agencies

- A prototype was built [Maintenance Decision Support System; MDSS] based on open system principles, which fostered an MDSS market by making that prototype freely available
• Prototype was built in 2001
• Six versions have now been released
• System has been deployed by the private sector in 27 (or so) states and several European countries
• System being modified for non-winter needs
• System is automated but will always require human interpretation of the forecast… It is far from perfect!
Interesting problems

- On the surface this is a simple weather forecasting problem ..?.. How much snow and what do I need to do to the road?

- Reality – Users need different information for the same problem (example – MDSS in Denver)

- Users gauge value differently (Denver v. DIA v. Spain v. others)
Social science questions

- What does the user need?
- How are they actually going to use the product?
- What is the best way to display the information?
- Weather forecasting is not perfect... how do we express this?
- How will the user gauge the value of the forecast?
- How will the developer measure the value and communicate that to the user?
Solutions?

• Include social scientists instead of screwing it up yourself

• Develop Testbeds which could be used to evaluate:
  • how to communicate uncertainty
  • new presentation options
  • how users interpret products
  • identify knowledge gaps in atmospheric science
  • societal aspects of new capabilities
  • useful evaluation metrics (consistency, value, etc.)

• More education?
  • The hard way – experience
  • The less hard way – practical applied research classes that include social sciences