If I build it, will they come? Program stakeholders use of dashboards for data outcomes and quality improvement

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American Evaluation Association Conference
Washington, DC October 2013

Dashboards in Program Evaluation

- Programs can generate lots of data
- Thankfully, much of it can be presented in Dashboards
  - The use of dashboards for evaluation monitoring is now part of the evaluation landscape (Mathison, 2011; Volkov & Baron, 2011)
  - We use dashboards as a way to systematize and simplify data to a few critical indicators, as well as to contrast program goals with actual performance in an effort to improve effectiveness (Nelson, 2010)

Dashboards at AEA

- In the last two years AEA hosted multiple presentations related to the creation of dashboards for data monitoring and quality improvement
- Multiple presentations and coffee break webinars related to improving the visualization of data

Previous presentations at AEA

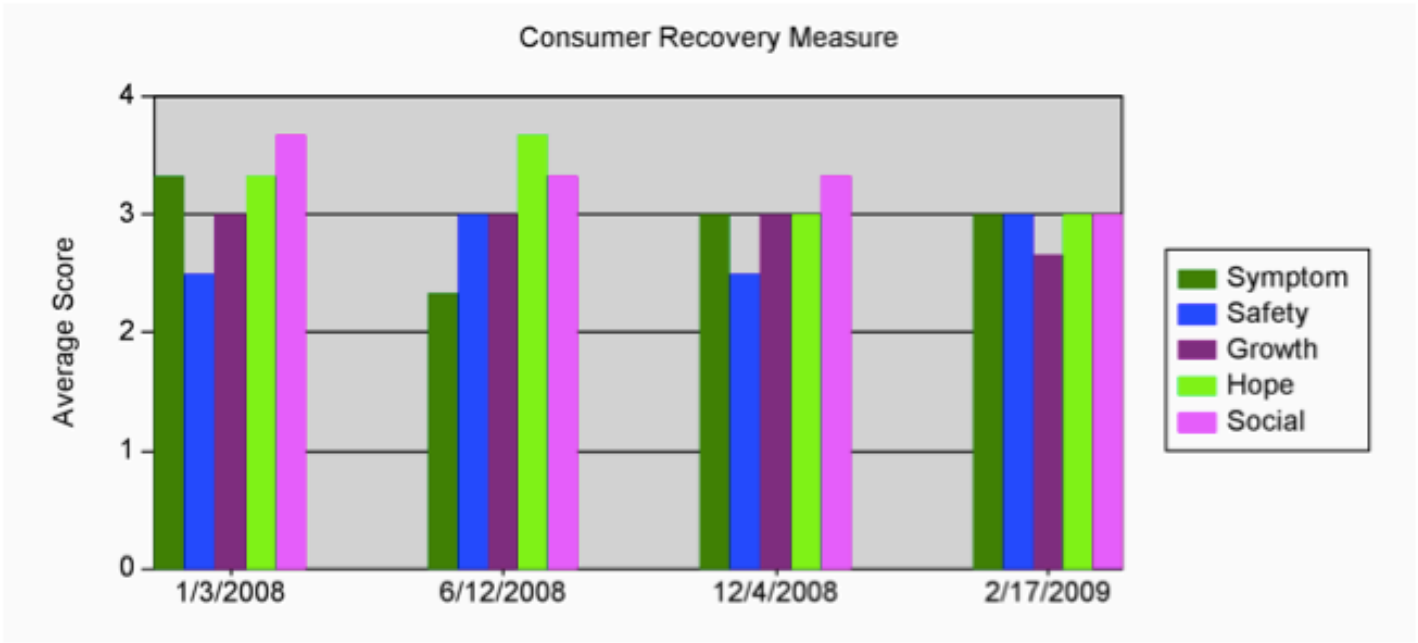
- Development of better dashboards
- How to build a dashboard using excel
- Tips for the development of better tables, charts that encourage interaction with the data, animate the results of queries, etc.
- Tools to assess the outcomes/outputs associated with the evaluation, and/or to address quality improvement as it relates to either the program or the data collection

Our own experiences: Olmos-Gallo et. al, 2008

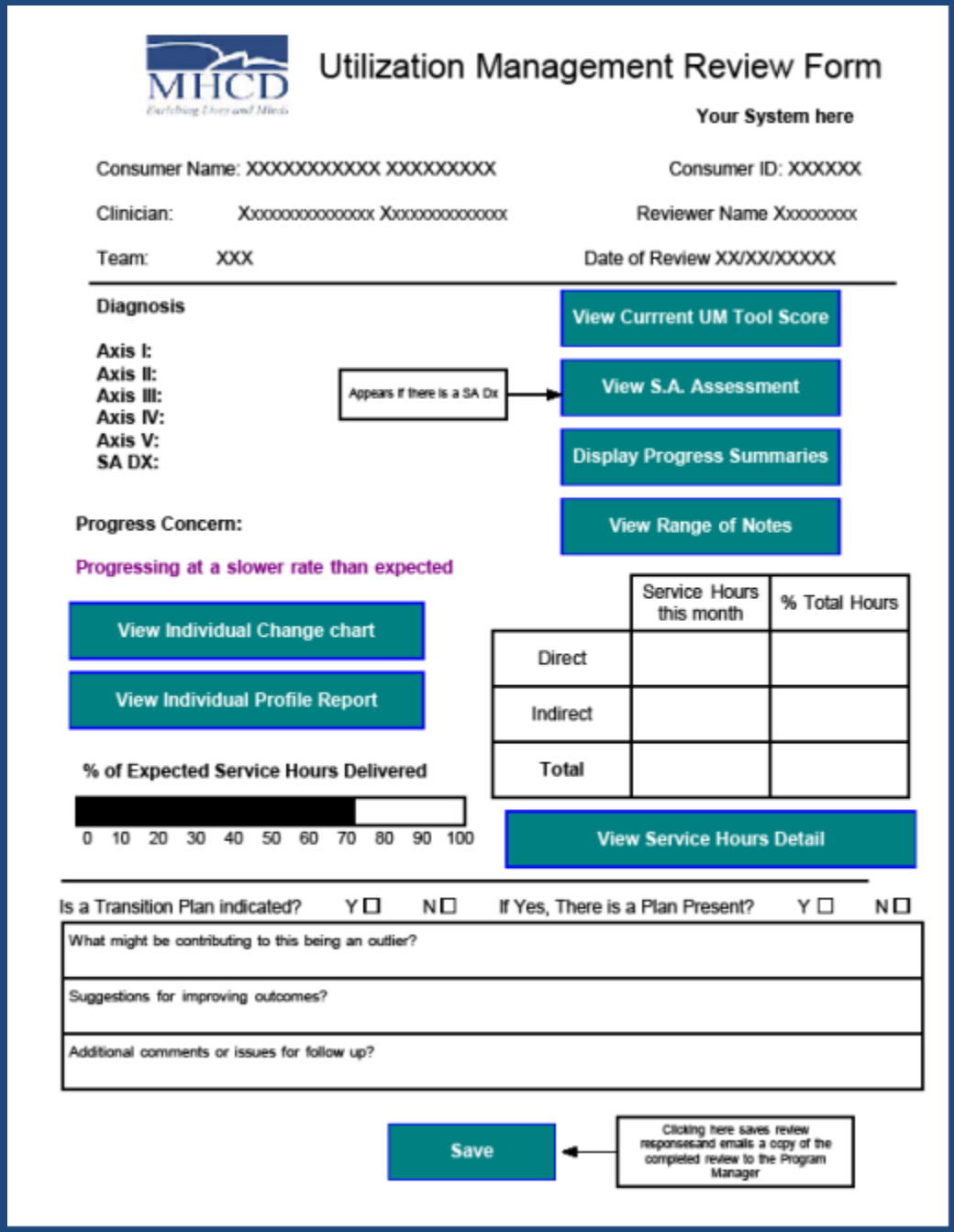
111111Consumer name

Team: number

Symptom Interference	Safety	Active Growth	Hope	Social Networks	Total Score	CRM date	Decline
3.33	2.50	3.00	3.33	3.67	7.96	1/3/2008	NO
2.33	3.00	3.00	3.67	3.33	6.89	6/12/2008	NO
3.00	2.50	3.00	3.00	3.33	6.43	12/4/2008	NO
3.00	3.00	2.67	3.00	3.00	5.81	2/17/2009	NO



McLean, Olmos-Gallo, & McKinney, 2010



McLean, Olmos-Gallo, & McKinney, 2010

MHCD
Mental Health Center of Denver
Enriching Lives and Minds

Individual Profile
Consumer Information

Name: XXXXXXXXXXXX
Team: XXX

Date of Birth: XX/XX/XXXX
Status: Active

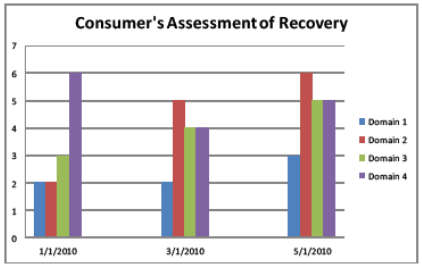
Age: XX
GAF: XX

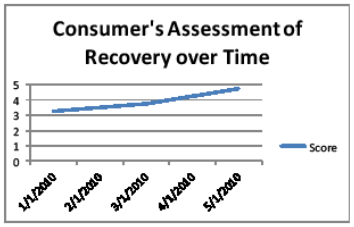
Primary Diagnosis: XXX.xx Primary Diagnosis
Secondary Diagnosis: XXX.xx Secondary Diagnosis
Substance Abuse Diagnosis: XXX.xx Substance Diagnosis

Primary Clinician Name: XXXXXXXXXXXXXX
Psychiatrist Name: XXXXXXXXXXXXXX

Consumer's Assessment of Recovery Scores

Domain 1	Domain 2	Domain 3	Domain 4	Date	Score
xxx	xxx	xxx	xxx	xx/xx/xxxx	xx.xx
xxx	xxx	xxx	xxx	xx/xx/xxxx	xx.xx
xxx	xxx	xxx	xxx	xx/xx/xxxx	xx.xx



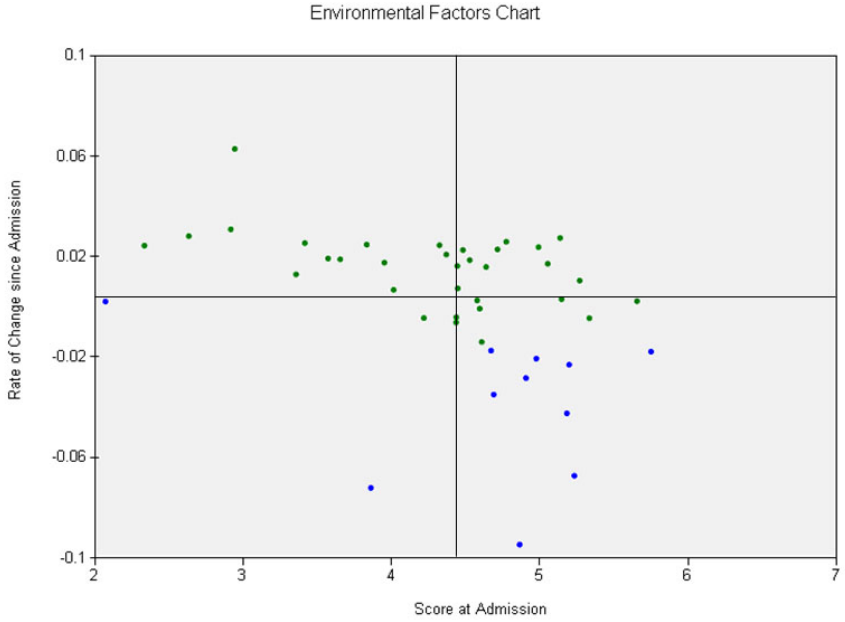


MHCD
Enriching Lives and Minds

Environmental Factors Change Chart

Clinician's Assessment

Your Team



Where are the users?

- Despite constant communication with users and administration, we could not get any traction
  - We will see increase in activity after training, or pep talks but it dwindle in a matter of days
  - We modified the dashboards in multiple ways
    - Even silly changes like the color of the dots because “red means danger”
- To this day, the use is minimal

What this presentation is about

- Dashboards are a waste of time, if program stakeholders do not use them to improve quality, or for outcome monitoring
- Few AEA presentations have explored the issue of adoption that is, understanding what motivates end users to use dashboards on a regular basis
  - Without this connection, dashboards are only a pretty piece of software sitting on a desktop

If we build it…

- Assumption: if we build a better/flashier/user-friendly dashboards, the user will come and use it
- Fact: user-friendliness/visual appeal may have no impact if we cannot convince the end-user to use it
- Hypothesis: in order to use the dashboard, users need to see a value added to what they're doing
  - Favorable attitude toward the application
  - Affected by the perceived social environment within the organization
  - Feeling of control over the factors that may facilitate or constrain his/her use of the dashboard (Ajzen, 1991)

The approach

- Explore the effect of attitudes, subjective norms, and perceived behavioral control over the adoption of new technology
  - Use of a mobile app for health information
    - Protocol analysis of a few users
    - User's survey
    - Analysis of usability data

THE STUDY

Protocol analysis of a few users

User's survey

Analysis of usability data

Protocol Analysis

- Technique used to explore problem solving (Ericsson & Simon, 1999)
- Asks the subject to solve a problem, while verbalizing what (s)he is doing
  - Individuals try to navigate the app while verbalizing what they're doing
  - Analysis based on content of transcripts and observation notes to determine what strategies are in use/issues that may arise from the user's navigation
- Analysis based on 4 new app users

Example Protocol

- … Selected "Conditions" from the left, I'll look for XXXXX … selected letter "X", wow! Tons of stuff! Makes me feel that it'll take a long time to get through it.
- … Found XXXXX. I tried to enlarge the font and can't
- … Find the description, symptoms… This info does not match with what I know about that condition.
- I selected a video, watched it, but now I don't know how to go back to the previous page… frustration. Pressed the iPad button, sends me back to my "desktop",
- … pressed the APP icon and sends me back to where I was, good! I didn't feel like starting again from the beginning.
- Selected another video, I want to see if there is any way to just go back one page. Press "L – History" and it only shows me the link to the two videos I watched. I'll press the iPad button again.
- … I want to go back to the list of diseases but I don't know how. I try to slide the screen to the right and now I can see the list
- … How do I get out of here???? I want to go back to the list of diseases but I don't know how.

Selected sections only

Key elements extracted from P.A.

- Amount of information overwhelms
  - *Makes me feel that it'll take a long time to get through it*
- Lack of match with known information leads to distrust
  - *This info does not match with what I know about that condition*
- Transfer of skills to new environment
  - Pinch of the screen to enlarge font… did not work
  - Swipe of screen to the right … did work
- Uncertainty about how the app works leads to awkward navigation
  - *Pressed the iPad button, sends me back to my "desktop"*
  - *I'll press the iPad button again*
- And to frustration
  - *now I don't know how to go back to the previous page… frustration*

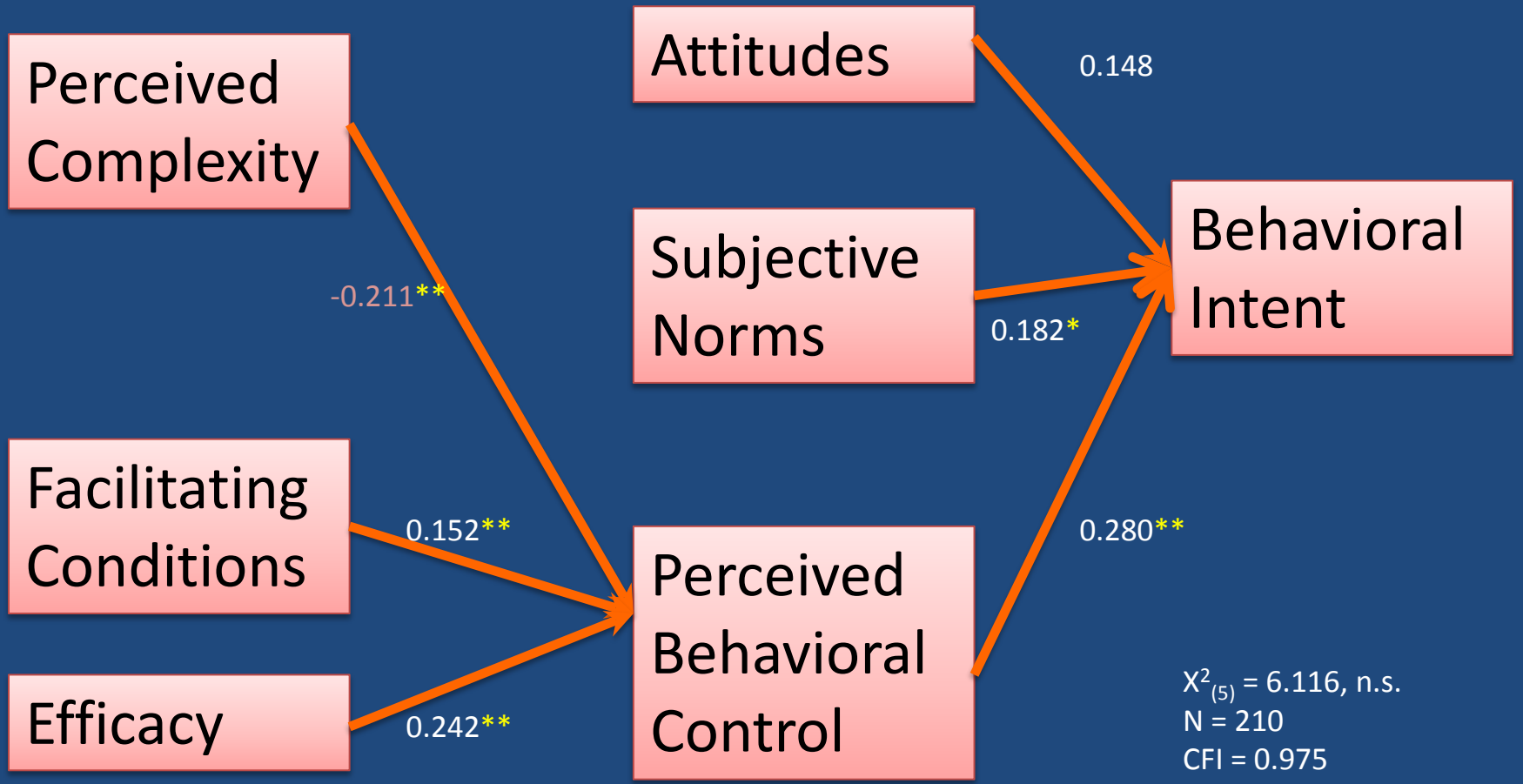
Survey data

- Survey to app users
  - 389 users
  - 21 items grouped into 7 domains
- Items adapted from Taylor, & Todd (1995)
  - Items explore the effects of attitudes, subjective norms, and perceived behavioral control over adoption of VHS+

Survey Questions

question	domain
I have access to a smart phone whenever I want	ATTITUDE
I have time to use apps that I've downloaded to my smartphone	ATTITUDE
Having apps that work with my existing smartphone is important to me	ATTITUDE
I will probably download new apps in the next three months	BEH-INT
I use XXXXXXX to look up healthcare information for me and those close to me	BEH-INT
I use XXXXXXX for my online healthcare needs	BEH-INT
An app that is difficult to operate is good	COMPLEXITY
Trying to use XXXXXXX sometimes can be frustrating	COMPLEXITY
The XXXXXXX app is difficult to learn	COMPLEXITY
Apps are easy for me to operate	EFFICACY
It is important to me to be able to operate an app without getting help	EFFICACY
Knowing how to operate an app that is new to me is important	EFFICACY
I have the resources, knowledge and ability to operate a mobile app	PRC-BEH-C
I am very savvy when using mobile apps	PRC-BEH-C
I have the resources, knowledge and ability to download apps I want	PRC-BEH-C
Being able to research health conditions using an app is good	REL-ADV
XXXXXXX enables me to better manage my health	REL-ADV
XXXXXXX works well for me based on how I prefer to manage my healthcare	REL-ADV
Generally speaking I want to do what my friends and my family think I should be doing	SUBJECT-NORM
My family thinks it makes sense that I use XXXXXXX to manage my healthcare	SUBJECT-NORM
People who are important to me use apps to manage their healthcare	SUBJECT-NORM

Results



*p < 0.05 ** p < 0.01

$X^2_{(5)}$ = 6.116, n.s.
N = 210
CFI = 0.975
TLI = 0.945
Rmsea = 0.041 (0, 0.11)
Srmr = 0.033

Results Survey

- Path model demonstrates that users are more likely to show behavioral intent, based upon:
  - Attitude toward apps
    - but not too much
  - Normative belief (what others think about the user's use of apps)
  - Perceived behavioral control, dependent upon
    - The perceived complexity of the app (negative relationship)
    - Their perceived efficacy
    - Perceived facilitating conditions

Usability data

- Sample of users, June 2013
- Total records: 340, 164
- Pattern identification emerging from the data using data mining (JMP, SPSS, R)
- Breakdown of number of steps to disease based on demographics, Hierarchical Cluster analysis, cross-validation of samples

Usability exploratory analysis

- Hierarchical clusters (Ward method) using:
  - Number of actions, Gender, Access
- 6 clusters (30% of the variation in users' responses. Significant prediction of the number of times a user will view a disease)

Usability exploratory analysis

- *Confirmatory highly directed searchers*: Men, access through symptoms, M=4.8 actions, specify gender and age, NO secondary symptoms = low number of disease views (M=2.3)
- *Exploratory highly directed searchers:* Men, access through symptoms, M=20 actions, specify gender but not age and not secondary symptoms (until much later) = higher number of disease views (M=7). LOST
- *Confirmatory searchers with low a priori search strategies:* Women, access through avatar, M=10 actions, specify gender but not age and not secondary symptoms (until much later) = low number of disease views (M=3.3).
- *Exploratory searchers with low a priori search strategies:* Women, access through avatar, M=16.7 actions, specify gender but not age and not secondary symptoms (until much later) = moderate number of disease views (M=4.6). LOST
- *Confirmatory searchers with high a priori search strategies:* Women, access through symptoms, M=15.5 actions, specify gender and secondary symptoms but not age (until much later) = moderate number of disease views (M=4.4).
- *System as Game:* Men and women, no preference on access, M=49.9 actions, specify their but not secondary symptoms not age (until much later) = high number of disease views (M=14.5). LOST

Usability data findings

- For the app, intended use is a very important indicator of use
- But we can also see some potential issues associated with the Theory of Perceived Behavior
  - We are wondering whether some of these patterns are more the result of being lost in the app
    - Related to the large number of steps in some cases

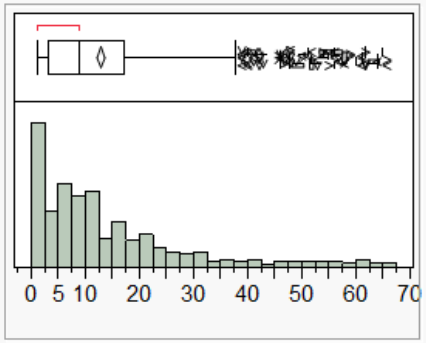
What does this all mean?

- Converging evidence from protocol analysis and survey
  - App use may depend on 1) attitude toward the use of Apps, 2) what others in your social group think, 3) perceived control
- Usability data suggests that intended use may be important too
  - Exploratory users/Game: exploring/playing, or LOST?
    - Currently exploring. May be link of some of the patterns to attitudes, social norms and perceived control

Patterns dependent on Attitude, Social Norms, Perceived control

Distributions Access through Avatar?=No

ACTIONS

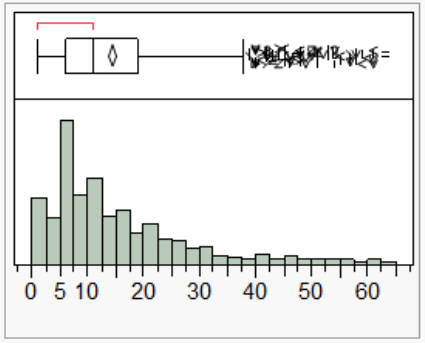


Quantiles		
100.0%	maximum	66
99.5%		62.935
97.5%		54
90.0%		29
75.0%	quartile	17
50.0%	median	9
25.0%	quartile	3
10.0%		1
2.5%		1
0.5%		1
0.0%	minimum	1

Summary Statistics	
Mean	12.799628
Std Dev	13.045741
Std Err Mean	0.3249273
Upper 95% Mean	13.436952
Lower 95% Mean	12.162303
N	1612

Distributions Access through Avatar?=Yes

ACTIONS



Quantiles		
100.0%	maximum	63
99.5%		61
97.5%		49.275
90.0%		31
75.0%	quartile	19
50.0%	median	11
25.0%	quartile	6
10.0%		3
2.5%		1
0.5%		1
0.0%	minimum	1

Summary Statistics	
Mean	14.45317
Std Dev	12.16819
Std Err Mean	0.3266113
Upper 95% Mean	15.093876
Lower 95% Mean	13.812464
N	1388

Difference in number of actions, dependent on point of access. People who access through the avatar take more steps to reach disease than people who access through symptom list.

Maybe people who access through avatar are less certain about what they are looking for

Exploring whether they got lost

What does this mean for my dashboard?

- It seems clear that use may depend on Attitude, Social Norms, Perceived control, complexity
  - What is the attitude toward the dashboard?
    - Address any issues that may reduce credibility in the data (e.g., accuracy, especially perceived accuracy)
    - Follow up on any concerns/questions so users understand that dashboard use is a worthwhile behavior
    - During training/refreshing address issues of attitudes through importance, job expectations

What does this mean for my dashboard? (cont)

- Increase the Subjective Norms of supervisors/coworkers regarding the dashboard
  - User's behavior will always follow suit to the social environment (i.e., in favor or against dashboard use)
  - Find champions in every department; Individuals people look up to, who will champion the use of the dashboard
  - Supervisors are expert users of the dashboard, and praise subordinates who use the dashboard on a regular basis
  - Supervisors/champions show examples of how much more efficient work has become since the use of the dashboard started

What does this mean for my dashboard? (cont)

- Increase sense of control over the use
  - Make the look more similar to other programs people in the organization may be familiar with
  - Create “gurus” within the departments who can troubleshoot
  - Observe how people use the dashboard, and share shortcuts or other efficient ways to accomplish work
  - Users who are not adequately trained, or whose working conditions place the decision to use the dashboard out of their control will have low perceived behavioral control

Thanks

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