How to Install and Use the Usability DataLogger (v5.0)

Todd Zazelenchuk, Ph.D.

ABOUT THE AUTHOR

Todd Zazelenchuk works in product design at Intuit, Inc. in Mountain View, CA where he plans and conducts research with Intuit's consumers in order to deliver a high quality user experience. Since 1996, Todd has contributed to the usable designs of commercial products and web applications for Whirlpool Corporation, the Centers for Disease Control, Palm Inc., and numerous universities in the Canada and the United States, including Indiana University where he earned his PhD in Instructional Design and led the user-centered design efforts at IU's University Information Technology Services from 1999-2003.

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The Usability DataLogger v5.0

ABOUT THE DATALOGGER

Usability DataLogger v5.0 is an Excel-based tool designed to help you record observations and measurements during a usability evaluation. The first section delineates what the tool does and does not offer. The sections that follow describe the basic architecture of the tool, and provide screen shots and general instructions for use.

What it Offers:

- A Microsoft Excel file (requiring Microsoft Excel in order to run)
- Donation-ware (download it at: http://www.userfocus.co.uk/resources/dalalogger.html)
- Cross-platform compatibility (PC or Macintosh)
- Ability to collect both quantitative and qualitative data
- Ability to support both formative and summative evaluations
- Customizable by you to meet your specific needs (moderate Excel skills required)
- Enter your initial test details:
    - Project title, researcher name, logger name, study date
    - Participant profile details (gender, age, role/occupation)
    - Scheduled dates and times for each session
    - Manage up to 20 participants and 50 tasks
    - Automatically generate linear or random task order
    - Choose from SUS or Perceived Ease of Use & Usefulness (TAM) satisfaction scales
- Print your test-related materials
    - Print a table of participant profile details (or insert table into test report)
    - Print a list of all tasks for use as a moderator's guide
    - Print a set of individual task cards with one task per card
    - Print a copy of your selected satisfaction questionnaire for participant use
    - Print your data summaries of task observations and questions for each participant
- Enter data during or after the study:
    - Take notes of qualitative observations for each task and enter directly during the study or from your paper notes after the study is over
    - Record participants' success ratings from a menu of your predefined effectiveness levels on each participant page
    - Record task performance time with a built-in timer on each participant page
    - Record participants' satisfaction scores from a menu of your pre-selected satisfaction questionnaire
    - Record participants' confidence rating scores on a scale of 1-7
- Organize your data for easy analysis following completion of a study
    - Review and print automatically compiled summaries of observations and questions
    - Review and print (or insert) Task Success charts showing regular task performances and adjusted task performances with confidence intervals (margin of error calculations)
    - Review and print (or insert) Efficiency charts showing mean time per task together with min and max times for all participants

What it Does NOT Offer:

- Video data marking or management
- Automatic report generation

USING THE DATALOGGER

Requirements

Operating System:	Macintosh, Windows
Microsoft Excel:	Office 2003 or higher
Resolution:	1024x768 or higher

The Worksheets

The Usability DataLogger is an organized collection of worksheets contained within a single Microsoft Excel file. Table 1 displays the complete set of worksheet tabs, each with a description of the information contained on that sheet.

Table 1. List of Worksheets and their Descriptions

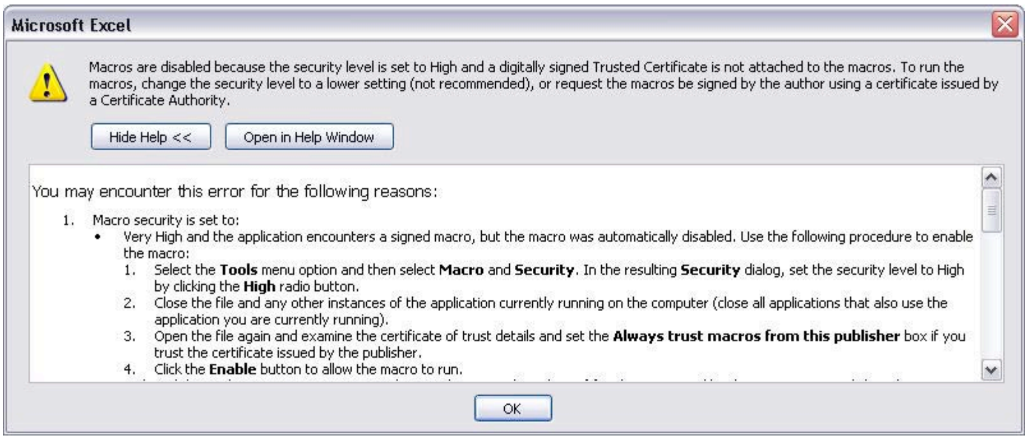
Worksheet name	Description
Admin	Test protocol data (participant details, task order, # of tasks...)
Tasks	Tasks for the study, settings for randomization, scoring, printing, etc.
Pilot1, Pilot2	Data collection for pilot tests (results not compiled in charts)
P1…20	Data collection for participants 1-20 (task completion, time per task…)
Data(Sum) *	Data compilation sheet for calculating all scores
Data(Charts) *	Data compilation worksheet for populating charts worksheet
Charts	Automatic chart generation of task success, efficiency and satisfaction
Observations	Summary of individual observations of tasks, organized by task, formatted to print
PrintForms	Includes Satisfaction Questionnaire, Task List, and Task Cards formatted for printing

* indicates a worksheet that can be shown or hidden from the Charts worksheet

Opening the File

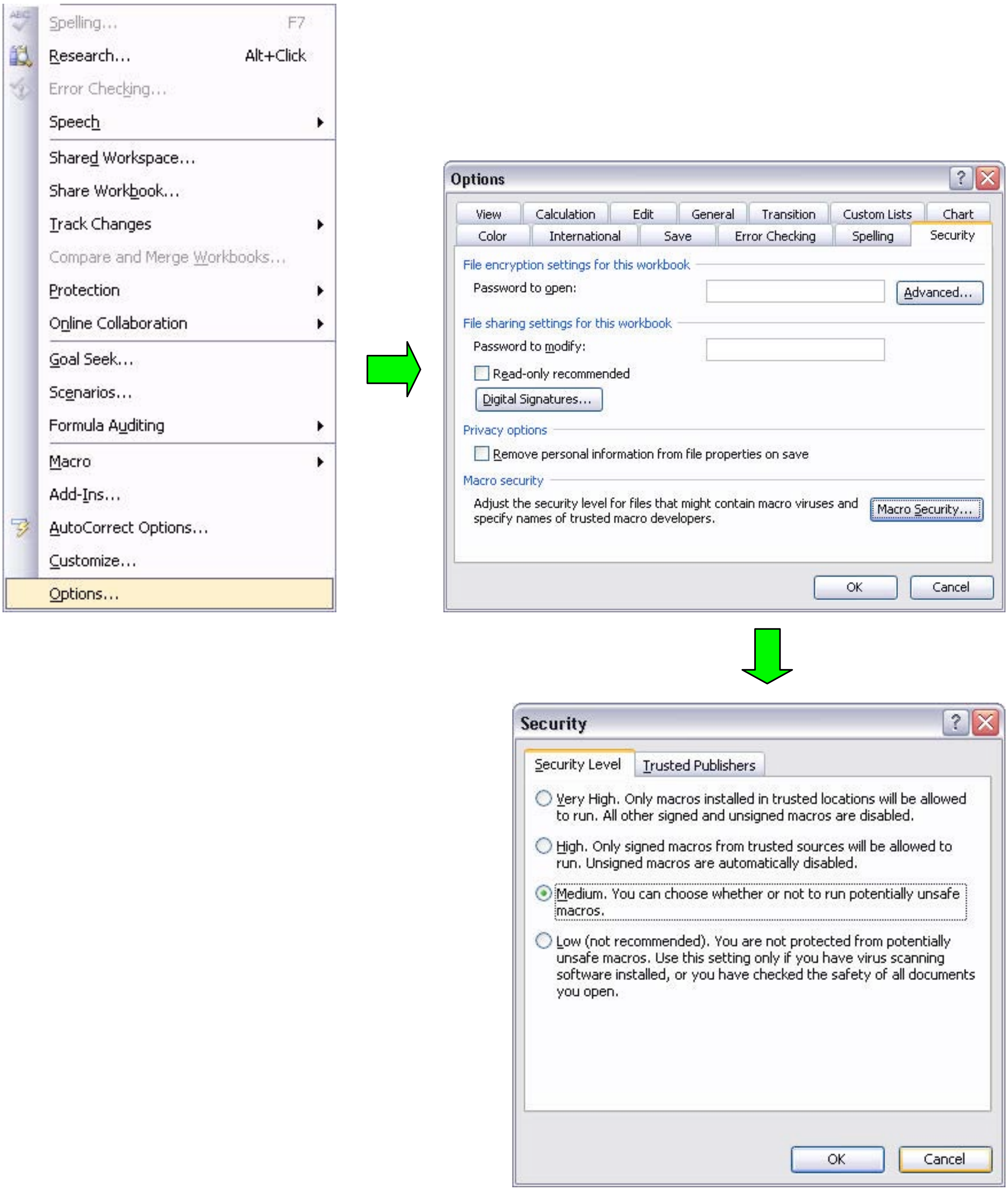
For PC users:
After double-clicking the DataLogger v5.0 file, you may receive a Macros Security message indicating that your system security will not permit you to run the Visual Basic macros embedded in the datalogger.

Figure 1: Macros Security Message



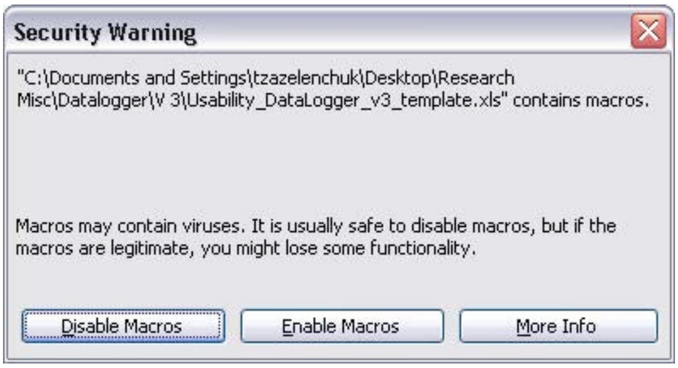
In this event, you may adjust the security settings inside your MS Windows settings to reduce the security level from High to Medium or Low. Select *Options* from the *Tools* menu in MS Excel. Select the *Security* tab and click *Macros Security*. Change the security level setting from *Very High* or *High* to *Medium*. Save your change and try reopening the Datalogger. From this point on, it should work the same for both PC and Macintosh systems.

Figure 2: Options & Security Settings



For Mac users:
After double-clicking the Datalogger v5.0 file, you will receive a Security Warning asking your permission to *Enable Macros*. Select *Enable Macros* in order for the various features of the DataLogger to work properly. Each time you use the logger, you will need to perform this step.

Figure 2: Security Warning



When the file opens, you will arrive at the *Admin* worksheet. On this sheet, you may check for the latest version on the Userfocus website.

***NOTE**: The design of the DataLogger includes both white and grey background sections. The white areas are intended for data entry, while the grey areas are background (read only) areas. In v5.0, worksheet protection is turned OFF due to the need for hiding, showing, and resizing worksheet rows on a regular basis.*

Preparing Your Test

The *Admin* worksheet shows the opening worksheet for the datalogger. Reminder steps are presented in the top red header region. A series of expand/collapse sections are included in the grey region, identified by checkboxes. The *Donate* section is expanded on default and all other sections are collapsed.

The *Admin* worksheet is used to enter the necessary test parameters and details prior to conducting a study. These details include: Project name, participant names, session dates and times.

Figure 3: Admin Sheet

In the *Project* section of the *Admin* sheet, you may enter your project name. This will be populated on all printable forms throughout the datalogger. You may also enter the names of the researcher and datalogger for your study as well as the dates of the study. This information is for reference purposes only and does not appear elsewhere in the datalogger.

Figure 4: Admin Sheet/Project

In the *Participants* section of the *Admin* sheet (see Fig 5), you may enter the date, session time, name (& last initial), role, gender, and age for each participant in your study. You may enter details for up to two pilot participants. You may also enter additional details in two *Custom* fields that can be specific to your study (e.g. info gathered during recruitment that is helpful to include in a participant summary sheet).

There are several new features in v5.0 that make the datalogger easier and more powerful than before. The first is the reduced display of participant worksheets according to the number of participants that are listed on the *Admin* sheet. In previous versions, all 20 participant worksheets were visible all the time. In v5.0, visible *Participant* worksheets are determined by the number of populated *Name* rows in the *Participant* section of the *Admin* worksheet. In Figure 5, you can see that 2 pilot and 10 participant worksheet tabs are visible at the bottom of the screen, one for each person listed in the *Name* column of the *Participants* section.

The v5.0 datalogger also offers the ability to indicate whether or not you wish to include each participant's data in the *Observations* and *Charts* worksheets for later analysis. You may select *Yes*/*No* for each participant in the study, including the pilots. By selecting Yes, that participant's data will be included in all charts and on the *Observations* worksheet for data analysis purposes. This feature is helpful if you wish to ignore data from pilot participants or from a participant that didn't complete the study, etc…

Figure 5: Admin Sheet/Participants

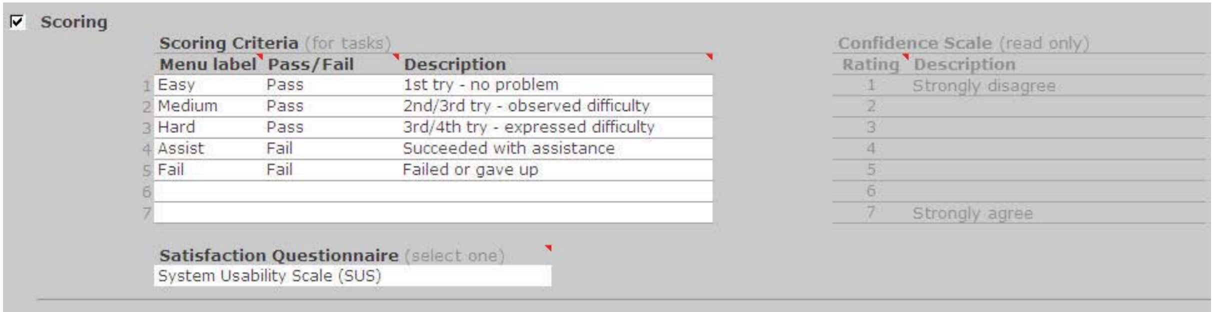
#	Date	Time	Name	Role	M/F	Age	Include	<Custom>
Pilot 1	02/29/08	9-10am	Amelia E	Admin Asst	F	30-35	No	
Pilot 2	02/29/08	1-2pm	Charles L	Plumber	M	40-45	No	
1	03/01/08	9-10am	Martin B	Business manager	M	50-55	Yes	
2	03/01/08	11-12pm	Joe F	Accountant	M	30-35	Yes	
3	03/01/08	1-2pm	Sara S	Lawyer	F	30-35	Yes	
4	03/01/08	3-4pm	Karen M	Finance consultant	F	35-40	Yes	
5	03/02/08	9-10am	Sandra P	Postal carrier	F	40-45	Yes	
6	03/02/08	11-12pm	Martha J	Retail clerk	F	30-35	Yes	
7	03/02/08	1-2pm	Jonathan B	Fitness instructor	M	35-40	Yes	
8	03/02/08	3-4pm	Wayne N	Teacher	M	50-55	Yes	
9	03/03/08	9-10am	Barry B	Professor	M	50-55	Yes	
10	03/03/08	11-12pm	Melissa S	Art instructor	F	45-50	Yes	
11							No	
12							No	
13							No	
14							No	
15							No	
16							No	
17							No	
18							No	
19							No	
20							No	
						N	10	

NOTE: for changes on the Admin worksheet to take effect (e.g. automatically displaying the appropriate Participant worksheets), you must click ***SAVE CHANGES*** *at the top of the Admin sheet.*

In the *Scoring* section of the *Admin* sheet (see Fig 6), you may create up to 7 scoring labels that will appear in the dropdown menu for each task on each *Participant* worksheet to allow you to score participants' performances on tasks. For each menu label, you are able to indicate whether the label represents a Pass/Fail result when presented in a chart. You may also provide a description for the rubric to help data loggers calibrate how to score performances.

NOTE: Depending on your needs, you may choose to define fewer than 7 scoring labels. If you choose to define fewer than 7 labels, you should leave any undefined cells EMPTY to avoid unnecessary elements populating the Participant and Charts worksheets.

Figure 6: Admin Sheet/Scoring



The Confidence Scale is a 7-point optional scale that appears on every *Participant* worksheet and allows you to collect participants' self-reported ratings of how confident they are that they were able to use the product being tested to complete the given task.

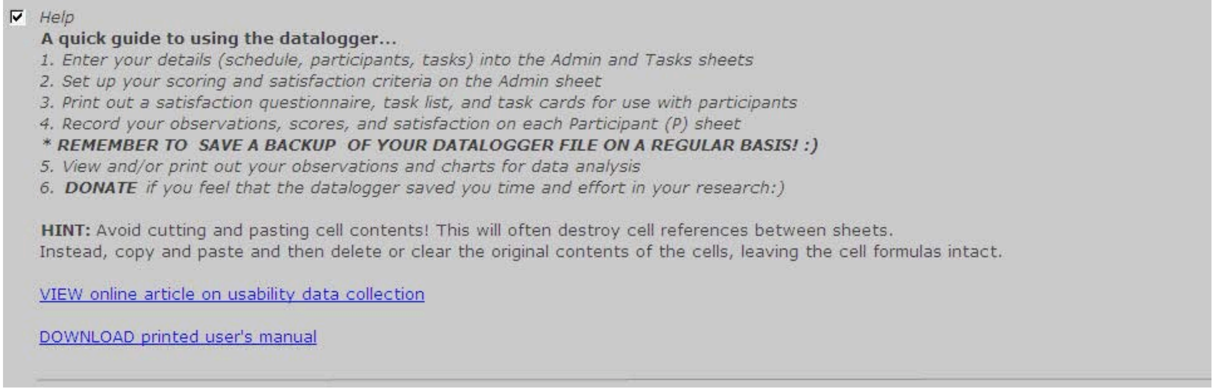
Finally, the Satisfaction Questionnaire drop-down menu allows you to select from one of two satisfaction questionnaires. The **System Usability Scale** (SUS) is a well-known 10-item satisfaction instrument developed by Digital Equipment Corporation. The **Perceived Ease of Use and Usefulness** questionnaire is a 12-item survey based on Fred Davis's Technology Acceptance Model (TAM). Once selected, the corresponding questions will appear on each participant worksheet. Results from the questionnaire are compiled and presented on the Charts worksheet. You may select NONE if you prefer not to have a satisfaction questionnaire displayed on each Participant worksheet.

In the *About* section of the *Admin* worksheet (see Fig 7), the background details for the Usability Datalogger are provided, including product name, version, last update, creator, and contributors. You may go online to check for the latest updates, or to email your feedback on the tool. In this section, you may also choose to edit the "Usability DataLogger v5.0" name in order to better fit your organization. Your new name will appear at the top of each sheet in the file following the edit.

Figure 7: Admin Sheet/About

In the *Help* section of the *Admin* sheet (see Fig 8), a brief outline of steps is provided to help users orient themselves to the tool. At the bottom of the section is a link to view an online article about usability data collection, and a link to the Userfocus site to be able to download this print manual.

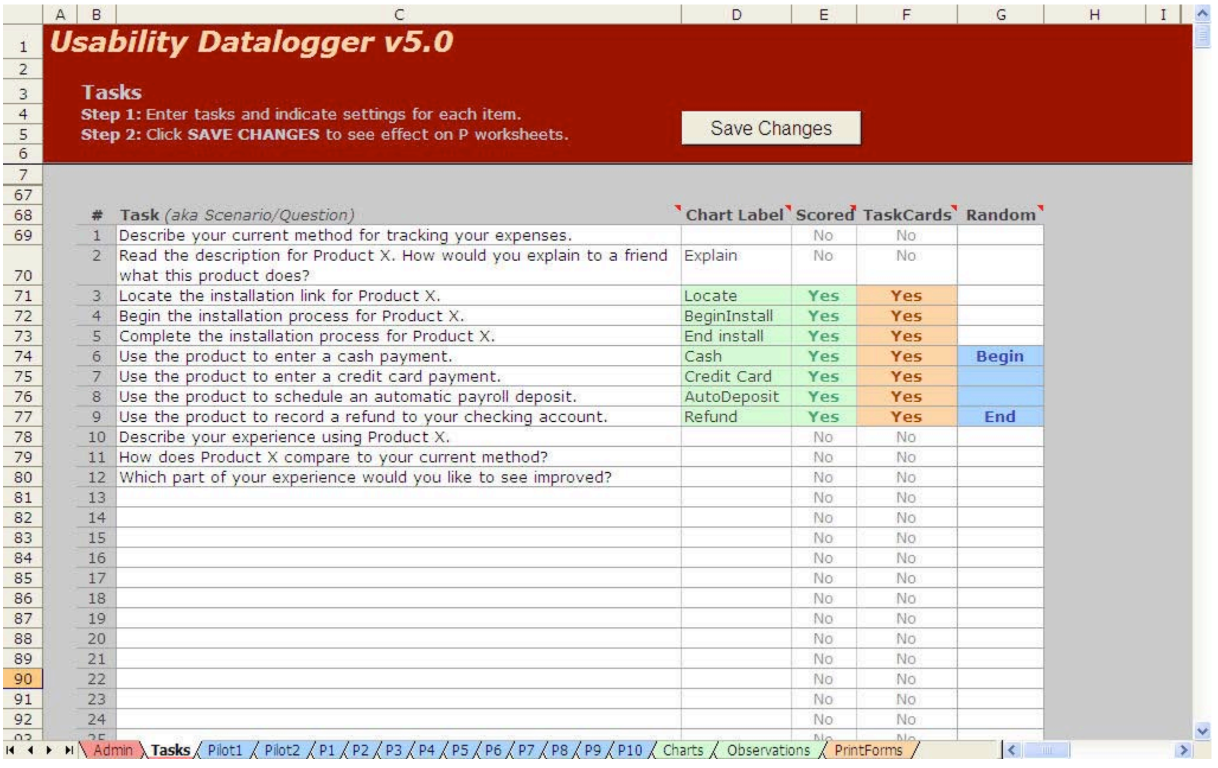
Figure 8: Admin Sheet/Help



On the *Task* sheet (see Fig 9), you may enter up to 50 tasks, questions, or scenarios for your research study.

- You may enter them in a linear sequence from start to finish, allowing certain introductory or background questionnaires to be included, followed by actual performance tasks, followed by summary questions. In v5.0, tasks can be short or long and will appear on each *Participant* worksheet regardless.
- In the Chart Label column, enter a 1-2 word short label to help identify the task on all data analysis charts on the *Charts* worksheet.

Figure 9: Tasks Sheet



#	Task (aka Scenario/Question)	Chart Label	Scored	TaskCards	Random
1	Describe your current method for tracking your expenses.		No	No	
2	Read the description for Product X. How would you explain to a friend what this product does?	Explain	No	No	
3	Locate the installation link for Product X.	Locate	Yes	Yes	
4	Begin the installation process for Product X.	BeginInstall	Yes	Yes	
5	Complete the installation process for Product X.	End install	Yes	Yes	
6	Use the product to enter a cash payment.	Cash	Yes	Yes	Begin
7	Use the product to enter a credit card payment.	Credit Card	Yes	Yes	
8	Use the product to schedule an automatic payroll deposit.	AutoDeposit	Yes	Yes	
9	Use the product to record a refund to your checking account.	Refund	Yes	Yes	End
10	Describe your experience using Product X.		No	No	
11	How does Product X compare to your current method?		No	No	
12	Which part of your experience would you like to see improved?		No	No	
13			No	No	
14			No	No	
15			No	No	
16			No	No	
17			No	No	
18			No	No	
19			No	No	
20			No	No	
21			No	No	
22			No	No	
23			No	No	
24			No	No	

- In the Scored column, select Yes/No to indicate whether you wish for the given task to be included in your data analysis charts on the *Charts* worksheet. Selecting Yes will also highlight that task on each Participant worksheet to remind you to enter a score for that task. In Figure 9, Task 1 is an introductory question that is not intended to be scored, so is therefore set to NO so as not to include it on the *Charts* worksheet. Tasks 2-9 are set to YES to indicate they will be included in scoring charts, while Tasks 10-12 will not. All tasks will be included in the *Observations* sheet to permit data analysis of the qualitative data collected.

- In the TaskCards column, select Yes/No to indicate whether you wish to include a given task in the Task Cards section of the *PrintForms* sheet. Task cards are intended to share with participants during the study and serve as handy reference cards if they need to refer back to a task or question during the activity.
- In the Random column, you may identify a Begin and End question to identify a series of questions to be randomized. First select the question where you would like to begin a random sequence in your study, then select the question that you would like to see end the random sequence. Click **SAVE CHANGES** to see the results on each Participant worksheet (NOTE: the order will not be randomized on the Tasks sheet itself, only highlighted in blue). In Figure 9, Tasks 6-9 have been identified for randomization. To remove the random order setting for your study, simply delete the Begin and End settings and click SAVE CHANGES again. (WARNING: if you already have data collected for tasks in your study, changing the order of your tasks in the logger may cause errors in your data).

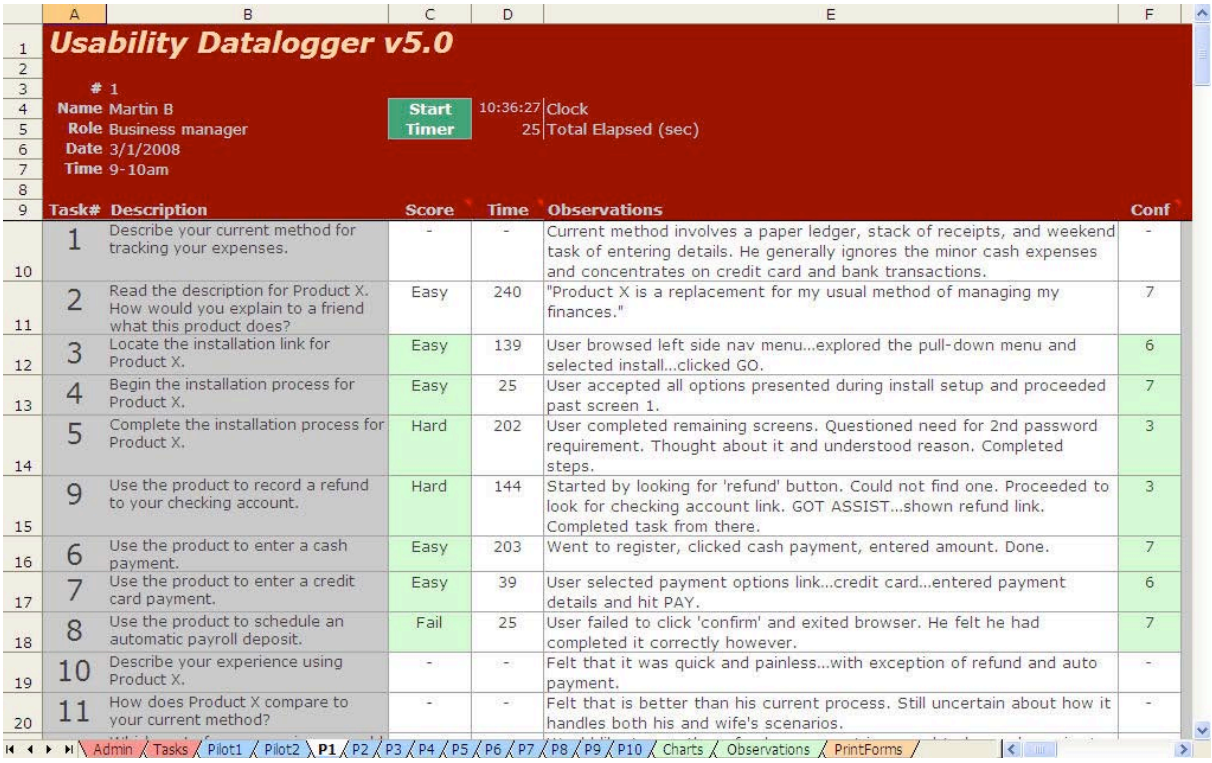
NOTE*: for changes on the Tasks worksheet to take effect (e.g. updating the task order settings on each Participant worksheet), you must click* ***SAVE CHANGES*** *at the top of the Tasks sheet.*

Recording an Individual's Performance

The *Participant* worksheet (see Fig 10) is used to record the data for each participant's session. On these worksheets, basic project and participant details, tasks, and task order are all pulled automatically from the *Admin* and *Tasks* worksheets. The researcher then records observations, time per task, scores and confidence for each task that the user performs. If a satisfaction questionnaire has been selected on the *Admin* sheet, satisfaction scores are also collected on each *Participant* sheet.

NOTE*: Datalogger users should not enter time per task data into cells when the user fails the task. This will avoid including time details for failed performances in the summary charts for efficiency.*

Figure 10: Participant Sheet



Usability Datalogger v5.0

#	1
Name	Martin B
Role	Business manager
Date	3/1/2008
Time	9-10am

Start Timer — 10:36:27 Clock; 25 Total Elapsed (sec)

Task#	Description	Score	Time	Observations	Conf
1	Describe your current method for tracking your expenses.	-	-	Current method involves a paper ledger, stack of receipts, and weekend task of entering details. He generally ignores the minor cash expenses and concentrates on credit card and bank transactions.	-
2	Read the description for Product X. How would you explain to a friend what this product does?	Easy	240	"Product X is a replacement for my usual method of managing my finances."	7
3	Locate the installation link for Product X.	Easy	139	User browsed left side nav menu...explored the pull-down menu and selected install...clicked GO.	6
4	Begin the installation process for Product X.	Easy	25	User accepted all options presented during install setup and proceeded past screen 1.	7
5	Complete the installation process for Product X.	Hard	202	User completed remaining screens. Questioned need for 2nd password requirement. Thought about it and understood reason. Completed steps.	3
9	Use the product to record a refund to your checking account.	Hard	144	Started by looking for 'refund' button. Could not find one. Proceeded to look for checking account link. GOT ASSIST...shown refund link. Completed task from there.	3
6	Use the product to enter a cash payment.	Easy	203	Went to register, clicked cash payment, entered amount. Done.	7
7	Use the product to enter a credit card payment.	Easy	39	User selected payment options link...credit card...entered payment details and hit PAY.	6
8	Use the product to schedule an automatic payroll deposit.	Fail	25	User failed to click 'confirm' and exited browser. He felt he had completed it correctly however.	7
10	Describe your experience using Product X.	-	-	Felt that it was quick and painless...with exception of refund and auto payment.	-
11	How does Product X compare to your current method?	-	-	Felt that is better than his current process. Still uncertain about how it handles both his and wife's scenarios.	-

Admin / Tasks / Pilot1 / Pilot2 / P1 / P2 / P3 / P4 / P5 / P6 / P7 / P8 / P9 / P10 / Charts / Observations / PrintForms

ANALYZING THE DATA

On the *Charts* worksheets, the researcher can view an automatically generated set of charts that display the overall effectiveness and efficiency measures for the tasks performed in the study, as well as users' satisfaction questionnaire results. These charts can be copied and pasted into final reports.

Figure 11: Charts

On the *Charts* worksheet (see Fig 11), there are 8 different charts to select from:

- **Chart 1**: Task Performance (by Scored Criteria)
- **Chart 2**: Task Completion (Non-Adjusted)
- **Chart 3**: Task Completion (Adjusted for Small Sample Size)
- **Chart 4**: Task Completion & Confidence (Non-Adjusted)
- **Chart 5**: Task Completion & Confidence (Adjusted for Small Sample Size)
- **Chart 6**: Time Spent per Task
- **Chart 7**: Satisfaction (Satisfaction Usability Scale)
- **Chart 8**: Satisfaction (Perceived Ease of Use & Usefulness)

All charts are automatically generated to display those tasks flagged on the *Tasks* worksheet as *Scored* and to represent the cumulative data for those participants flagged in the *Include* column on the *Admin* worksheet. Charts 7 & 8 are active according to the satisfaction questionnaire selected on the *Admin* worksheet.

At the bottom of the Charts worksheet, you are able to Show/Hide the associated worksheets that contain all the calculation tables responsible for generating the various charts. The default selection is *Hide* in order to keep visible worksheets to a minimum.

***NOTE**: if your charts do not appear as you anticipated, be sure to return to both the Admin and Tasks worksheets to click **SAVE CHANGES** to make sure any edits have been implemented.*

Chart 1 displays the distribution of the different scoring criteria per task such that the criteria total 100% for each task. In Figure 12, we see that the tasks *Explain (the product)* and *Cash (payment)* were consistently performed with ease by all or most participants. Conversely, users frequently failed or found challenging the tasks of scheduling an *AutoDeposit* and performing a *Refund* with the product.

Figure 12: Chart 1 - Task Performance Rates (All Scoring Levels Combined = 100%)

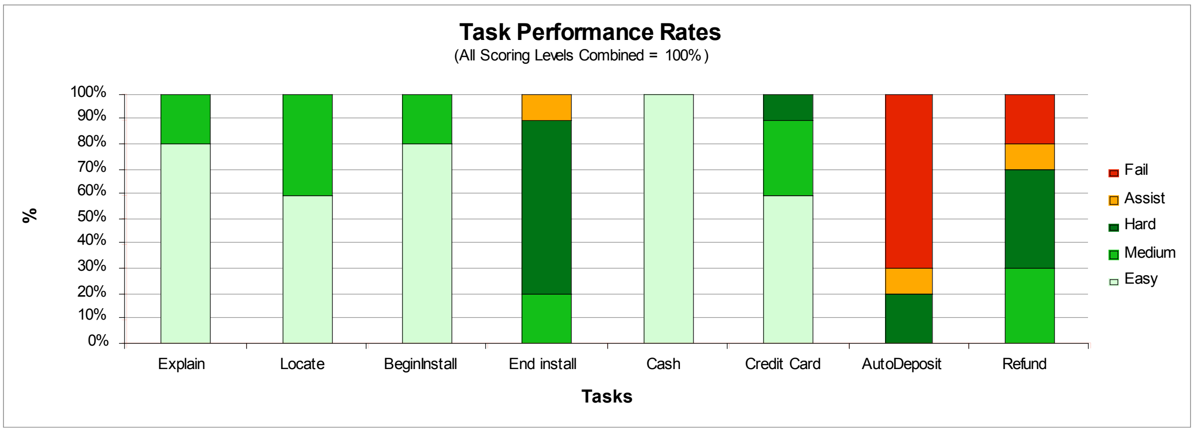


Chart 2 displays the standard proportion of Pass vs. Fail for each task. In Figure 13, we see that 5 of the 8 tasks identified on the Tasks worksheet to be included in data analysis were technically passed by 100% of the 10 participants in the study. Only 20% (or 2 of 10 participants) passed the *AutoDeposit* task and 70% (or 7 of 10 participants) passed the *Refund* task.

Figure 13: Chart 2 - Task Completion Rates (Non-Adjusted)

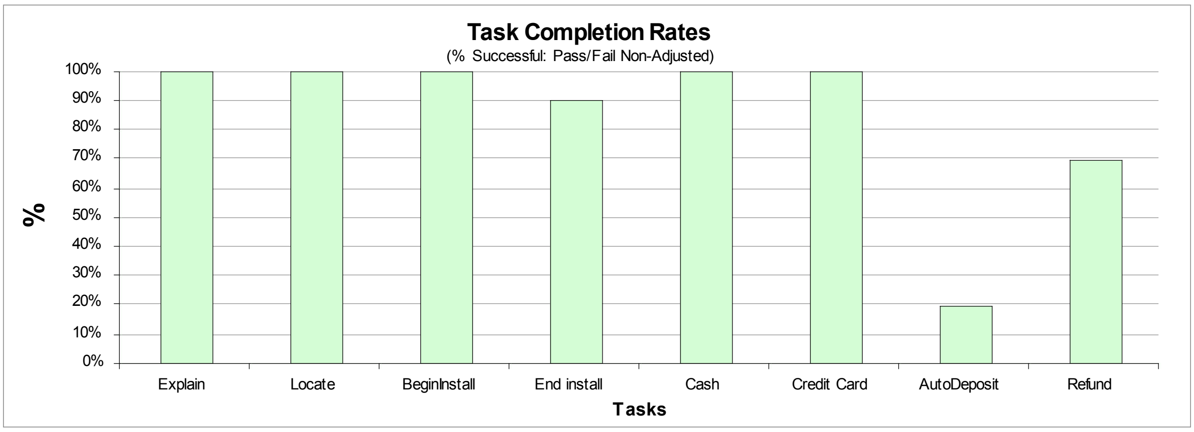


Chart 3 displays the proportion of Pass vs. Fail for each task adjusted for the fact that the study involves a small sample size. It also displays error bars for each task representing the confidence intervals (or margin of error) for each task based on the performances across all users in the study (provided they are flagged as *Include* on the *Admin* worksheet). In Figure 14, we see the same pattern as that in Figure 13, with the exception that all high scores are slightly lower and the low score (AutoDeposit) is slightly higher, revealing that the adjustment for small sample formula tends to move scores toward the mean.

Figure 14: Chart 3 - Task Completion Rates (Adjusted)

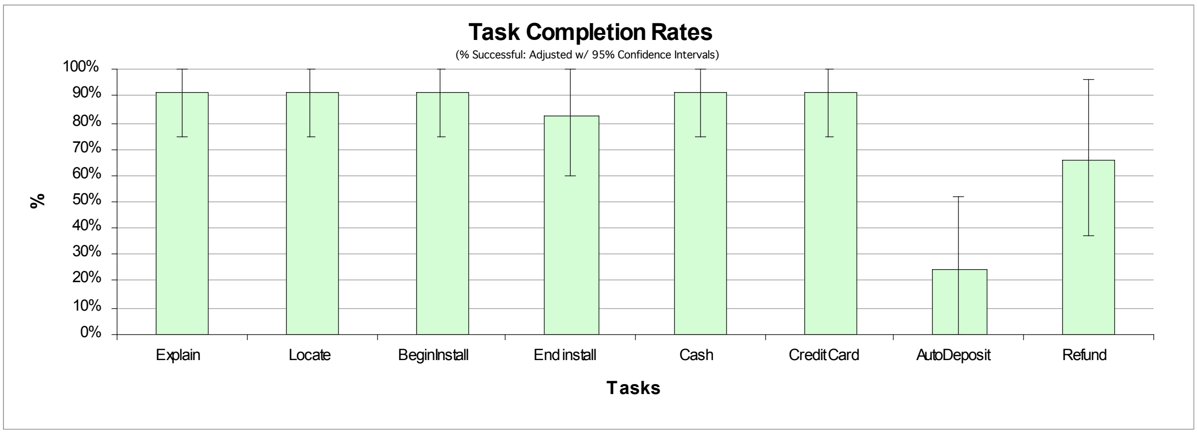


Chart 4 displays both the non-adjusted proportion of Pass vs. Fail and users' self-reported confidence rating for each task. In Figure 15, we see that although the *End Install* task was performed successfully by 90% (9 of 10) of participants in the study, participants were not very confident (40% on a 1-7 scale) that they had used the product correctly to complete the task. Conversely, even though only 2 of 10 participants (20%) successfully completed the *AutoDeposit* task, their average confidence rating was 95%, suggesting that they were not aware of their failure to use the product correctly to complete the task.

Figure 15: Chart 4 - Task Completion Rates (Non-Adjusted w/ Confidence Ratings)

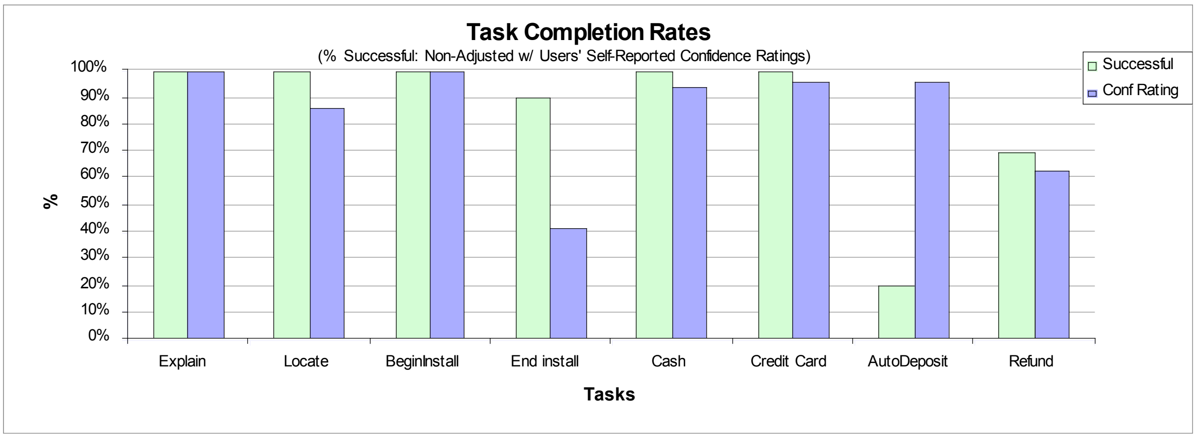


Chart 5 displays the proportion of Pass vs. Fail adjusted for small sample size and users' self-reported confidence ratings.

Figure 16: Chart 5 - Task Completion Rates (Adjusted w/ Confidence Ratings)

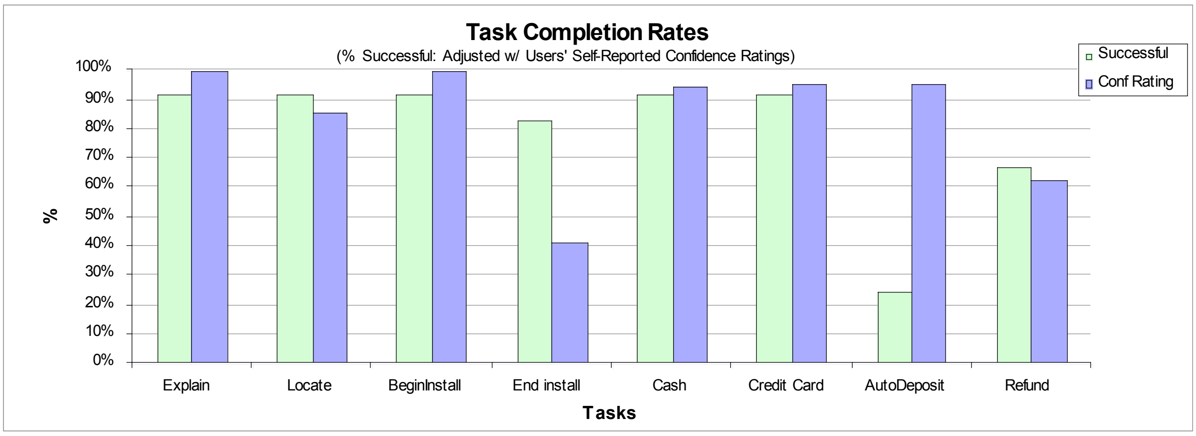


Chart 6 displays the mean Task Completion Time for each task selected on the *Tasks* worksheet, including the minimum and maximum times experienced by each participant. In Figure 17, we see that participants spent a mean time of approximately 20 seconds on this task with one participant spending a maximum of 50 seconds. In that same case, the 50 second participant was a bit of an outlier due to the mean and minimum time being almost identical. By contrast, the range of time that participants spent on the *Credit Card* task suggests a wide and even distribution of times spent by participants on that task.

Figure 17: Chart 6 - Task Completion Time (w/ Max & Min)

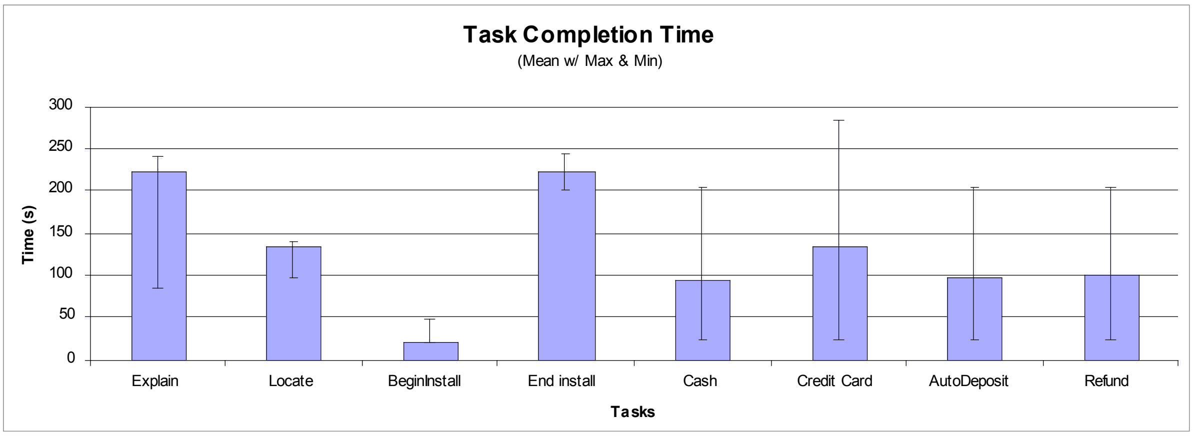


Chart 7 displays the single SUS score (%) and a histogram that reveals the distribution of participants' ratings on the 5 point scale. In Figure 18, we see that the overall SUS score is 81.9%. In the histogram, we see that many participants identified the 5th questionnaire item (integration of functions) as a problem area, while for the 3rd and 8th items, participants unanimously agreed that the product was easy to use.

Figure 18: Chart 7 - Satisfaction (SUS)

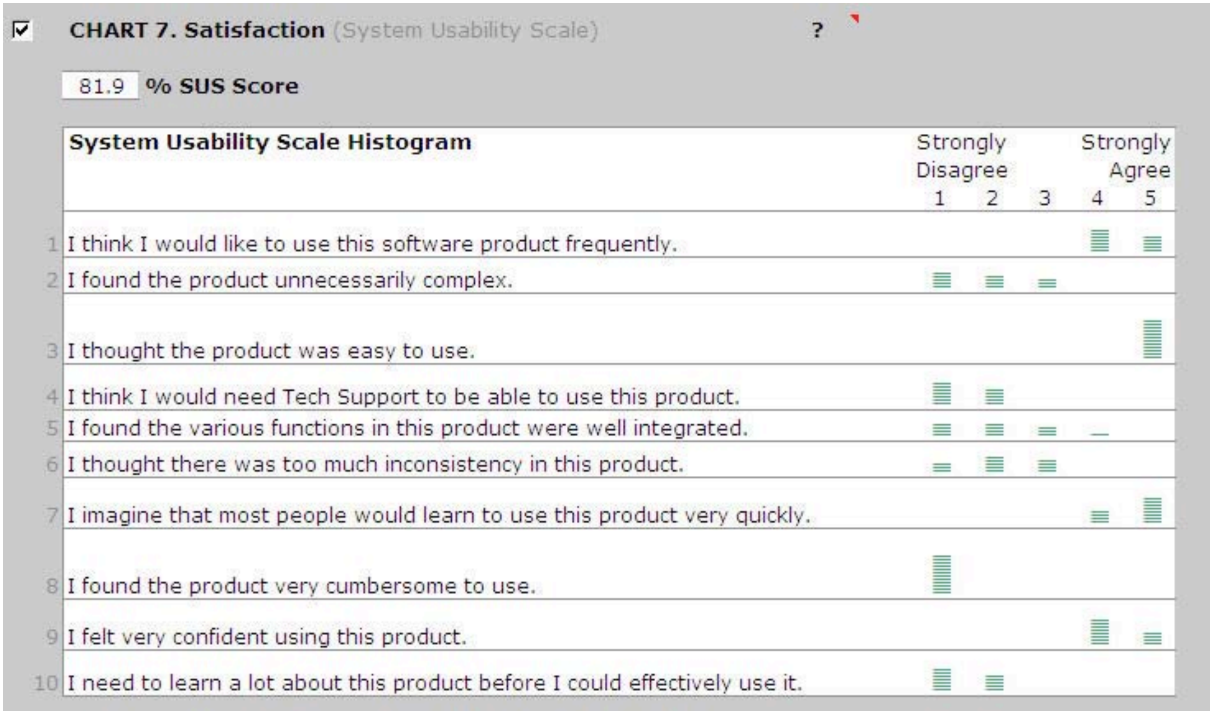


Chart 8 displays the mean scores (see Figure 19a) for *Ease of Use* and *Usefulness* from the Perceived Ease of Use & Usefulness satisfaction questionnaire, along with a histogram that reveals the distribution of participants' ratings (see Figure 19b).

Figure 19a: Chart 8 - Satisfaction (Perceived Ease of Use & Usefulness)

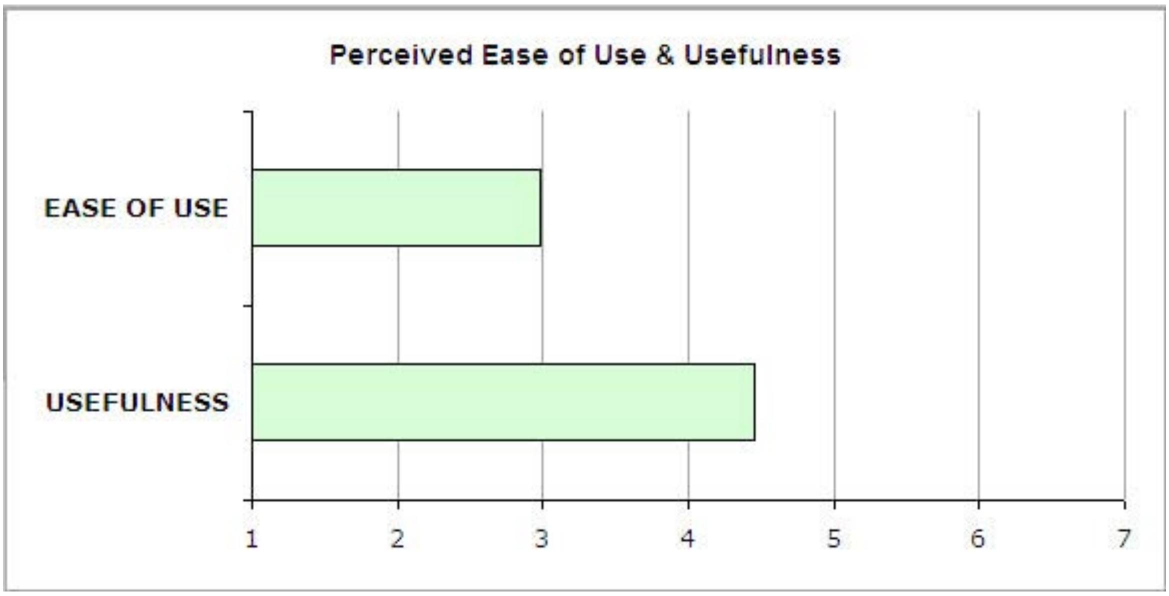
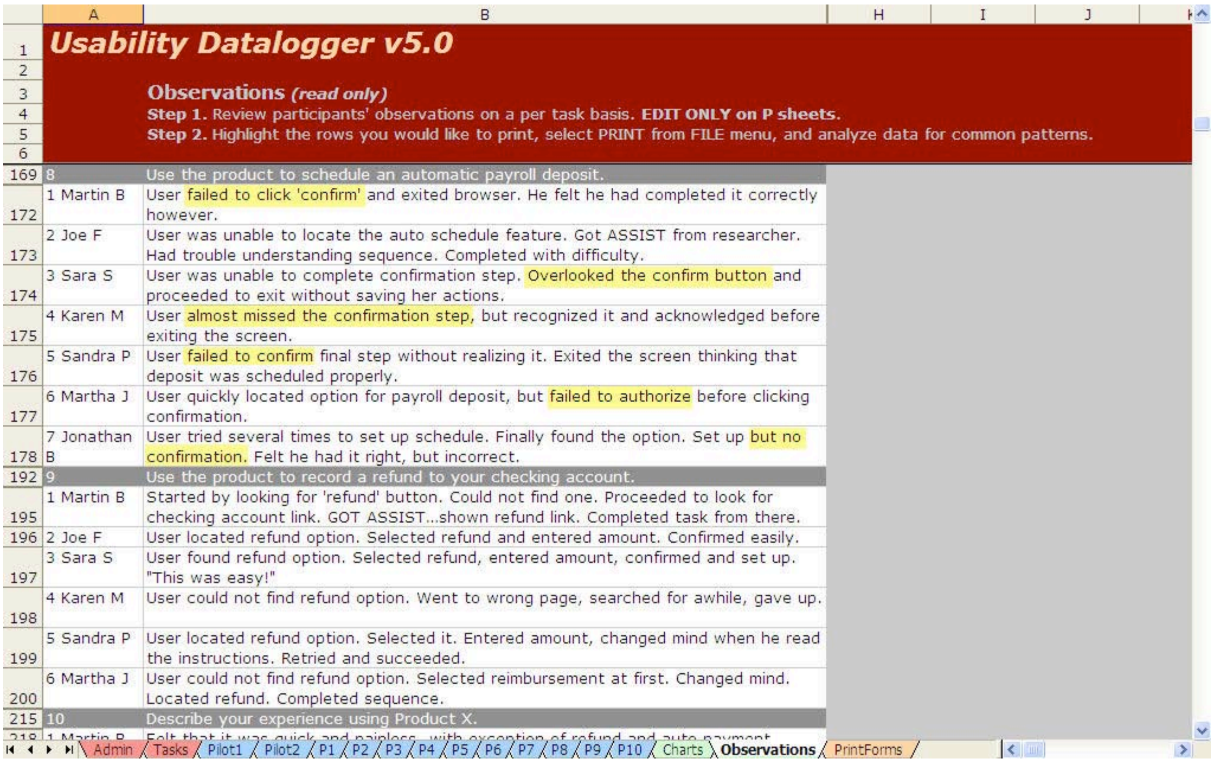


Figure 19b: Chart 8 - Histogram for Perceived Ease of Use & Usefulness

	Perceived Usefulness & Ease of Use	M	Strongly disagree 1	2	3	4	Strongly agree 5	6	7
1	Using this product enables me to accomplish tasks more quickly.	4.9							
2	Using this product improves my current performance.	4.2							
3	Using this product increases my productivity.	5.0							
4	Using this product makes me more effective.	4.2							
5	Using this product makes it easier to do my work.	4.3							
6	I find this product useful.	4.2							
7	Learning to operate this product was easy for me.	3.5							
8	I found it easy to get this product to do what I want it to do.	2.5							
9	My interaction with this product was clear and understandable.	3.3							
10	I found this product to be flexible to interact with.	2.7							
11	It was easy for me to become skillful at using the system.	3.0							
12	I found the system easy to use.	3.0							
	USEFULNESS	4.5							
	EASE OF USE	3.0							

On the *Observations* worksheets (see Fig 20), the researcher is able to view a summary of qualitative data across all participants organized by task. The sheet is formatted for easy printing and facilitates pattern recognition by grouping all related observations and responses together. In Figure 20, we see the observations recorded for 7 participants who completed Task 8. The yellow highlighter effect illustrates how the researcher might manually identify patterns on a subsequent printout of the *Observations* worksheet.

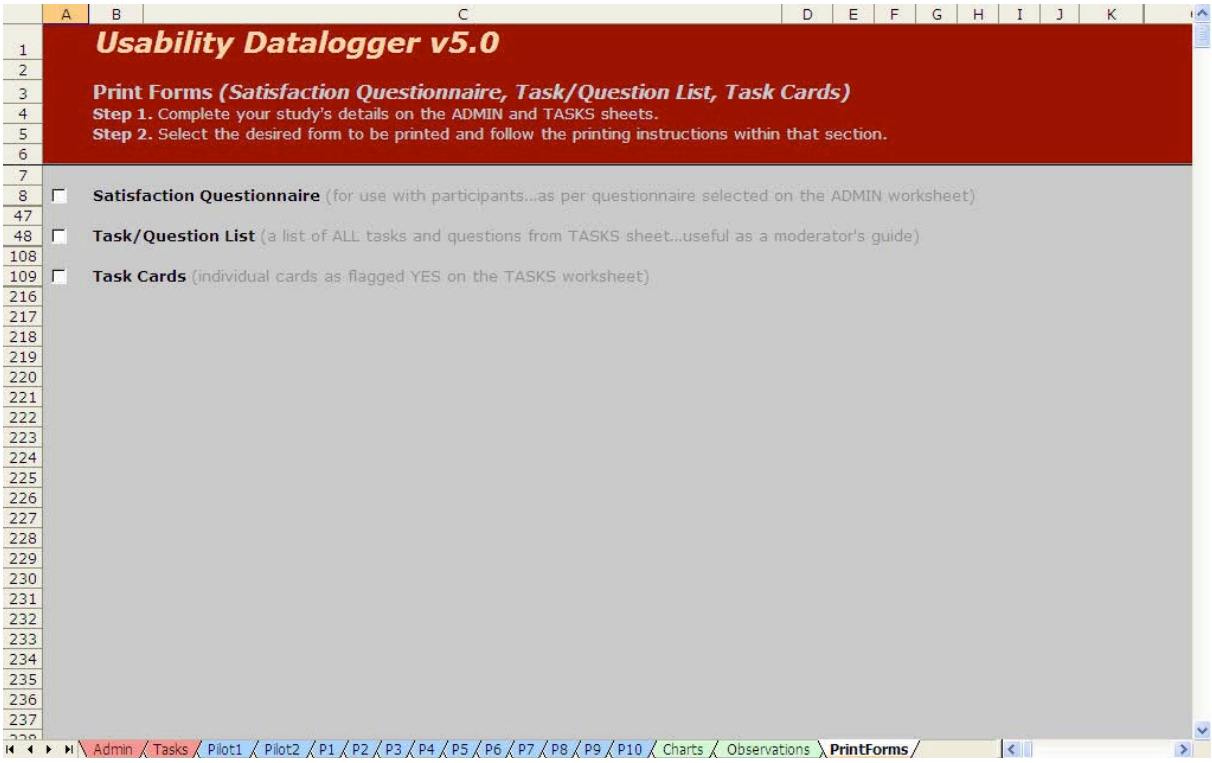
Figure 20: Observations Worksheet



PRINTING YOUR MATERIALS

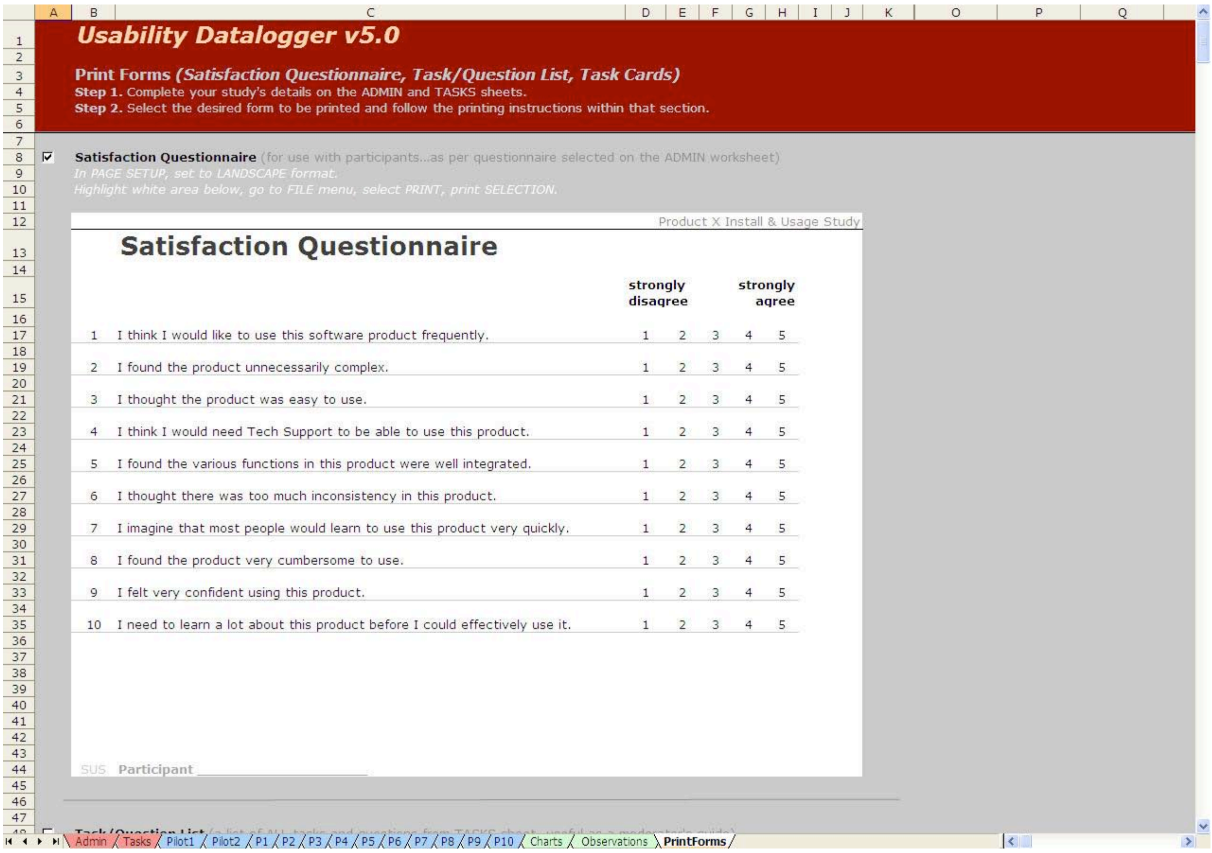
The *Print Forms* worksheet (see Fig 21) allows you to print out various physical artifacts for your usability study, including a satisfaction questionnaire for participants to complete, a task list of all items from the *Tasks* worksheet, and a set of Task Cards as flagged on the *Tasks* worksheet.

Figure 21: PrintForms Sheet



The *Satisfaction Questionnaire* (see Fig 21) displays either the 10 items from the SUS questionnaire or the 12 items from the Perceived Ease of Use and Usefulness questionnaire, depending on which questionnaire is selected on the *Admin* worksheet. This form may be printed out by following the on-screen instructions in white text.

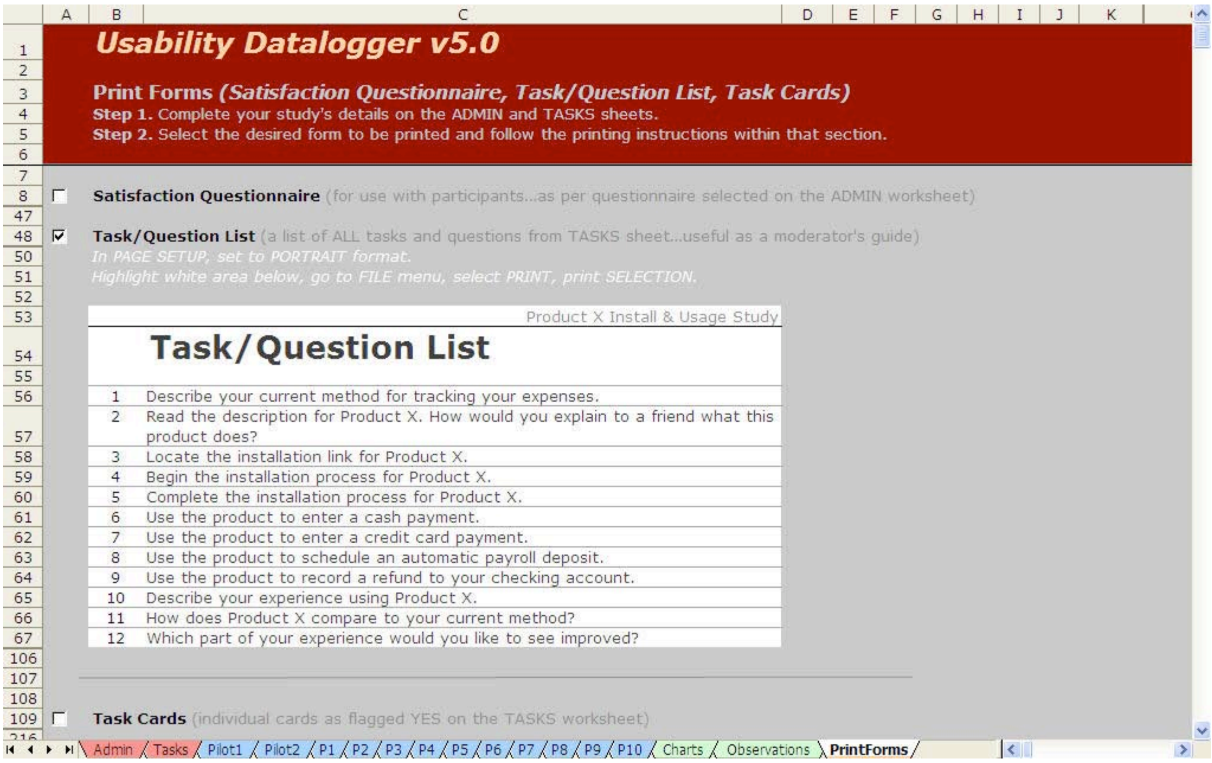
Figure 21: PrintForms (Satisfaction Questionnaire)



The *Task List* worksheet (see Fig 22) displays all tasks/questions entered on the *Tasks* worksheet. This list may be used as a moderator's guide for your study.

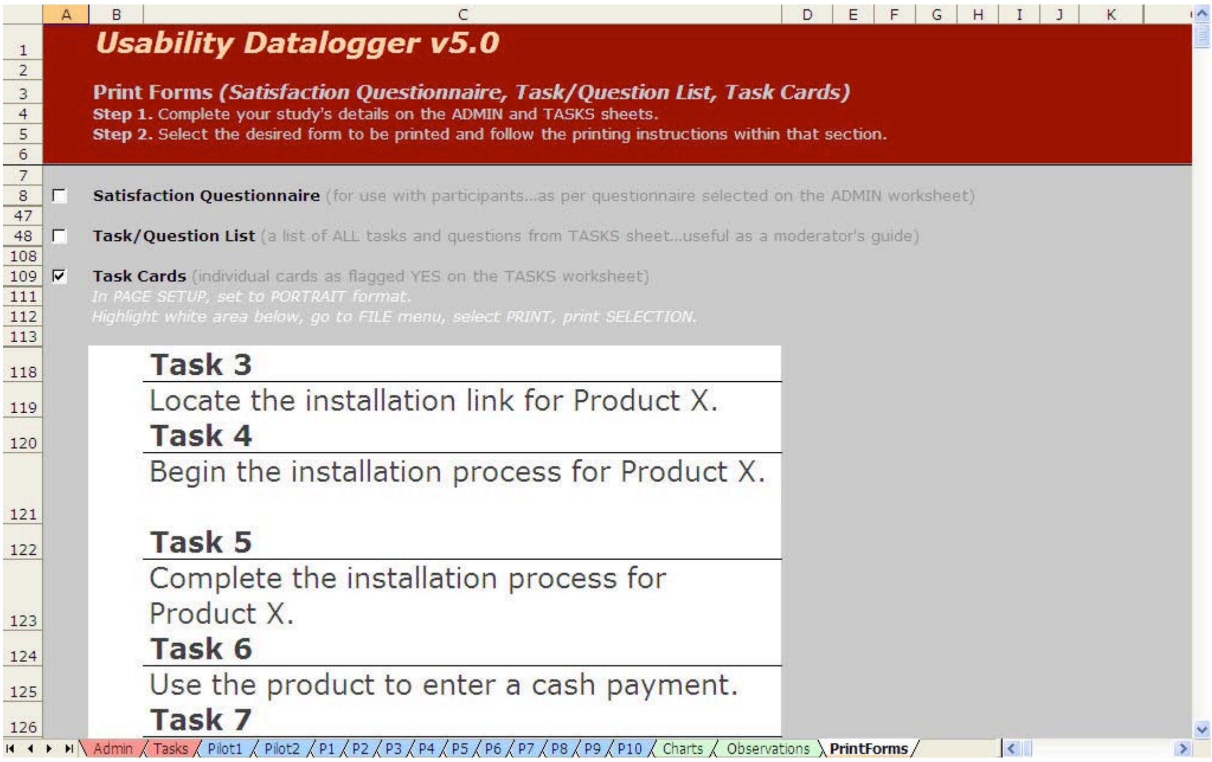
NOTE: *To edit a task, return to the Tasks worksheet and make your modifications to the task wording there. Making edits on the PrintForms worksheet will interfere with cell formulas.*

Figure 22: PrintForms (Task/Question List)



The *Task Cards worksheet* displays those tasks/questions flagged in the *TaskCards* column of the *Tasks* worksheet. Each card is formatted to print on an individual page.

Figure 23: PrintForms (Task Cards)

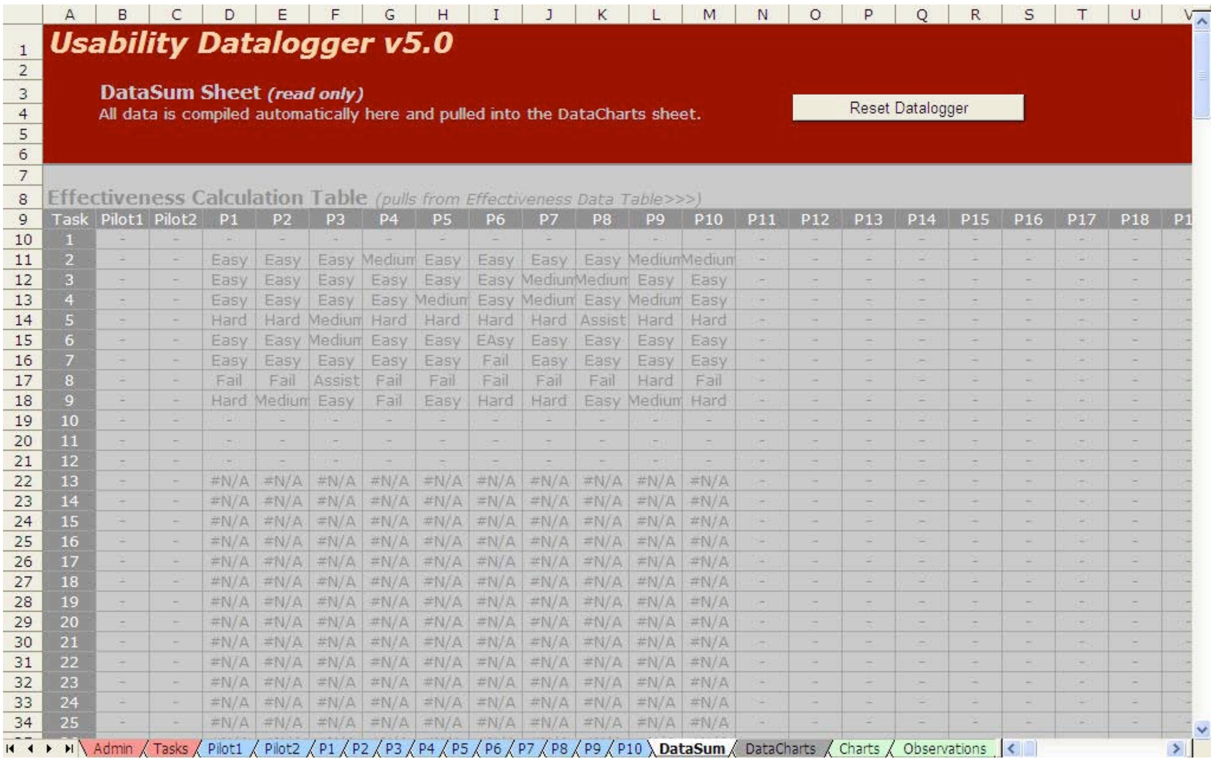


SUMMING UP YOUR DATA

The *DataSum* and *DataCharts* worksheets are where all your quantitative data gets compiled and calculated for entry into the Charts worksheet. You may Show/Hide these worksheets using the radio buttons at the bottom of the *Charts* worksheet.

The *DataSum* worksheet (see Fig 24) is intended to be a read-only worksheet and should be used for reference purposes only, unless you desire to make changes to the way the datalogger works, or if you wish to customize its feature set further.

Figure 24: DataSum Sheet



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DataSum Sheet *(read only)*
All data is compiled automatically here and pulled into the DataCharts sheet.

Reset Datalogger

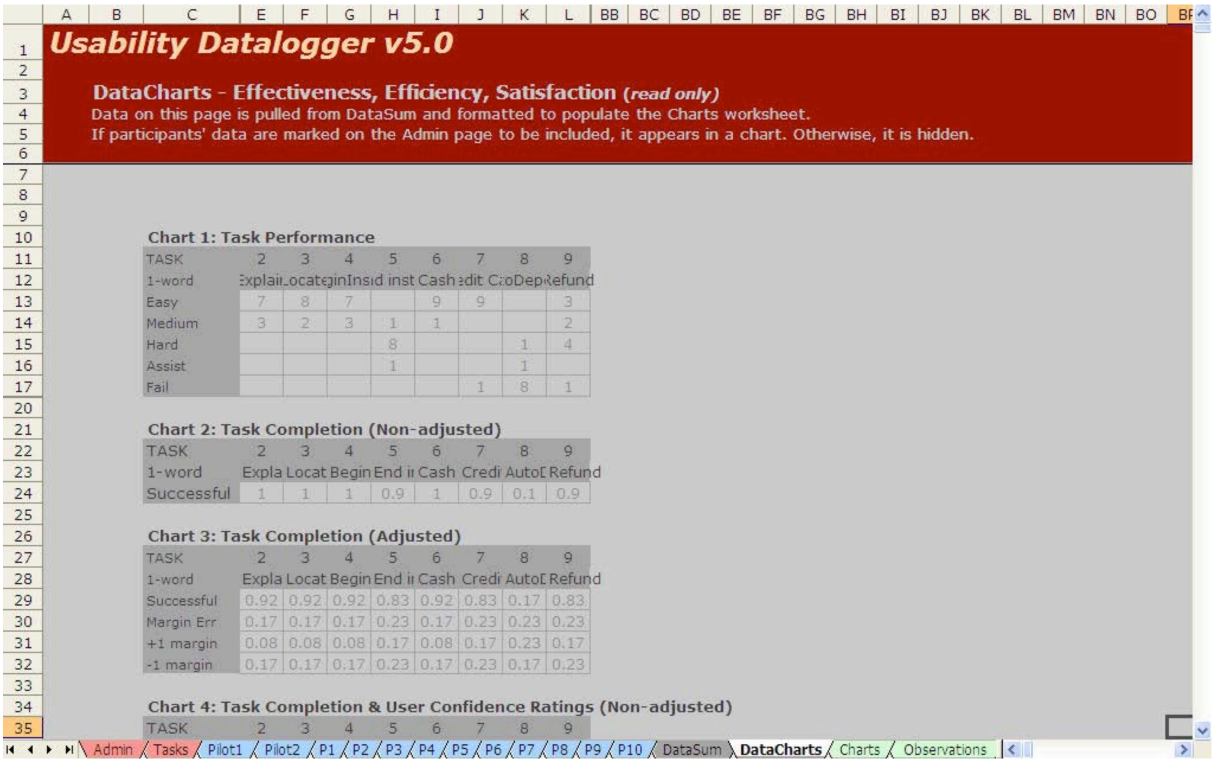
Effectiveness Calculation Table *(pulls from Effectiveness Data Table>>>)*

Task	Pilot1	Pilot2	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	Easy	Easy	Easy	Medium	Easy	Easy	Easy	Easy	Medium	Medium	-	-	-	-	-	-	-	-
3	-	-	Easy	Easy	Easy	Easy	Easy	Easy	Medium	Medium	Easy	Easy	-	-	-	-	-	-	-	-
4	-	-	Easy	Easy	Easy	Easy	Medium	Easy	Medium	Easy	Medium	Easy	-	-	-	-	-	-	-	-
5	-	-	Hard	Hard	Medium	Hard	Hard	Hard	Hard	Assist	Hard	Hard	-	-	-	-	-	-	-	-
6	-	-	Easy	Easy	Medium	Easy	Easy	EAsy	Easy	Easy	Easy	Easy	-	-	-	-	-	-	-	-
7	-	-	Easy	Easy	Easy	Easy	Easy	Fail	Easy	Easy	Easy	Easy	-	-	-	-	-	-	-	-
8	-	-	Fail	Fail	Assist	Fail	Fail	Fail	Fail	Fail	Hard	Fail	-	-	-	-	-	-	-	-
9	-	-	Hard	Medium	Easy	Fail	Easy	Hard	Hard	Easy	Medium	Hard	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	-	-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	-	-	-	-	-	-	-	-
14	-	-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	-	-	-	-	-	-	-	-
15	-	-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	-	-	-	-	-	-	-	-
16	-	-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	-	-	-	-	-	-	-	-
17	-	-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	-	-	-	-	-	-	-	-
18	-	-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	-	-	-	-	-	-	-	-
19	-	-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	-	-	-	-	-	-	-	-
20	-	-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	-	-	-	-	-	-	-	-
21	-	-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	-	-	-	-	-	-	-	-
22	-	-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	-	-	-	-	-	-	-	-
23	-	-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	-	-	-	-	-	-	-	-
24	-	-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	-	-	-	-	-	-	-	-
25	-	-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	-	-	-	-	-	-	-	-

Admin / Tasks / Pilot1 / Pilot2 / P1 / P2 / P3 / P4 / P5 / P6 / P7 / P8 / P9 / P10 / DataSum / DataCharts / Charts / Observations

The *DataCharts* worksheet (see Fig 25) is also intended to be a read-only worksheet and should be used for reference purposes only. Data on this sheet is pulled from the *DataSum* worksheet and ‘reduced’ to show only data for those tasks and participants that the researcher has identified for inclusion in data analysis. Data on this sheet is then pulled into the *Charts* worksheet for display.

Figure 25: DataCharts Sheet



RESETTING YOUR WORKSHEET

In the red header section of the *DataSum* worksheet is the *Reset Datalogger* button (see Fig 24). This button lets you clear all test details and participants' performance data from the logging tool for easy re-use in a new study.

INSIDE THE DATALOGGER'S VISUAL BASIC MACROS

Entire books have been written on using Visual Basic (VB) and various scripts to achieve specific goals. The purpose of this section is only to help get you started locating and understanding the DataLogger's existing scripts. Additional VB learning may be necessary for you to extend the capabilities of the Usability DataLogger to meet your needs.

As with any scripting language, Visual Basic allows you to make use of a predefined vocabulary and syntax to construct your code. A script that you write for a given file is called a *macro* and allows you to automate or extend the standard features of a given application. In the Usability DataLogger, Visual Basic macros are used for the following activities:
- display, start, stop, and reset the stopwatch timer
- show/hide content sections within a given worksheet
- show/hide worksheets depending on # of participants entered

You can locate the macros in the Usability Datalogger by selecting the *Tools* menu and choosing *Macros* (see Fig 26). Once selected, the *Macros* option (see Fig 27) presents you with a dialog box displaying the current list of macros and allows you to select and edit a desired macro.

Figure 26: Accessing Visual Basic Macros

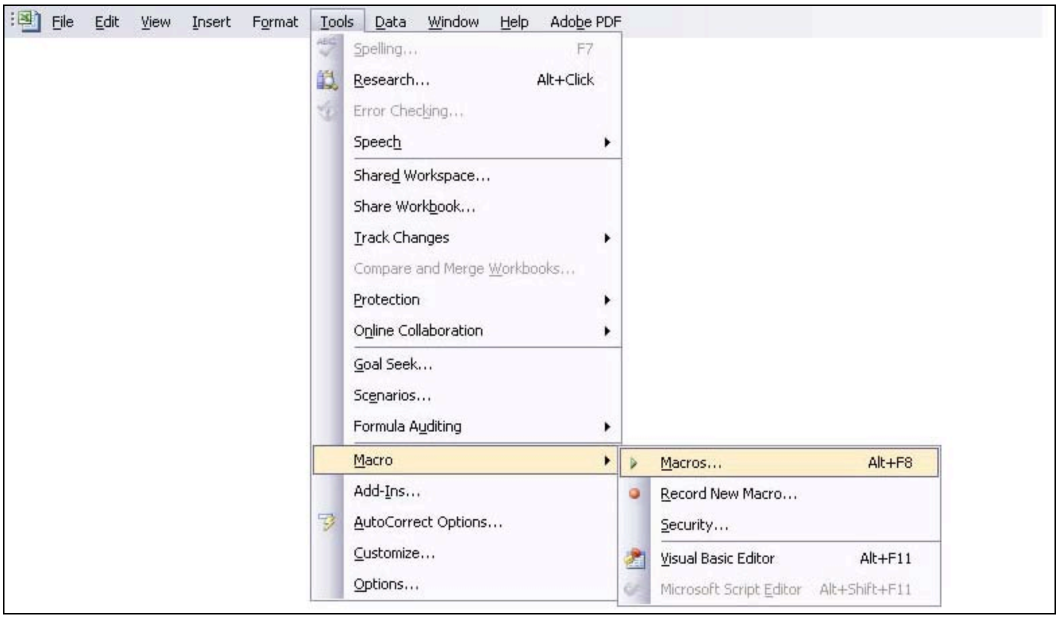
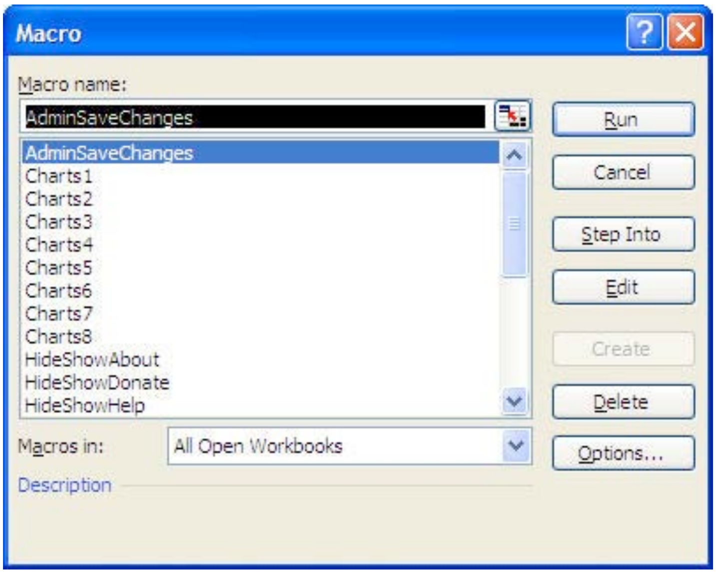


Figure 27: List of Visual Basic Macros



Conclusion

Any usability study is only as good as the data that are collected and the method by which they are analyzed and interpreted. Several excellent commercial software applications have been developed over recent years to help support these activities. Microsoft Excel offers yet one more possibility for usability researchers to consider when it comes to collecting and organizing data for analysis. The Usability DataLogger represents one such Microsoft Excel-based tool that provides usability researchers with an inexpensive, customizable solution for collecting usability data.

References

Dayton, D. (2004). Best Practices for Utest Logging. (http://www.usabilityprofessionals.org/usability_resources/conference/2004/im_dayton.html)

ISO (1998). ISO 9241-11: Ergonomic requirements for office work with visual display terminals (VDTs); Part 11 - Guidance on usability, International Standards Organization.

Nielsen, J. (1993). *Usability engineering*. Cambridge, MA, Academic Press.

Lewis, J.R. and Sauro, J. (2006). When 100% Really Isn't 100%: Improving the Accuracy of Small-Sample Estimates of Completion Rates. Journal of Usability Studies, 3(1), p.136-150.

Sauro, J. (2005). Restoring Confidence in Usability Results. (http://www.measuringusability.com/conf_intervals.htm)

Shneiderman, B. (1998). *Designing the user interface: Strategies for effective human-computer interaction*. Reading, MA, Addison-Wesley Longman.

van Welie, M., G. C. van der Veer, et al. (1999). *Breaking down usability*. INTERACT '99, Edinburgh, Scotland.

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