

**APPENDIX A**

**PRE-TEST SURVEY QUESTIONS**

## PRE-TEST HYPOTHESES SHEET

**H1: As scores within the HPWREN Relative Advantage Index increase, positive diffusion communication channels increase.**

HPWREN Relative Advantage Index	Question
Improves research efforts with access to real-time data	9
Improves teaching efforts with access to real-time data	10
Improves dissemination ability	11
Benefits outweigh costs	12
More advantage than disadvantages	13

**H2: As scores within the HPWREN Compatibility Index increase, positive diffusion communication channels increase.**

HPWREN Compatibility Index	Question
Compatible with current technology	14
Requires little specialized training	15
Meets several technological needs	16
Able to use without significant changes to data collection	17
Able to use without significant changes to course curricula	18

**H2: As scores within the HPWREN Complexity Index increase, positive diffusion communication channels decrease.**

HPWREN Complexity Index	Question
Have network, real-time collection, transmission questions	19
Perceive technology as difficult to use	20
Will need technical assistance	21
Prefers person-to-person technical assistance	22
Lacks technological savvy, uncomfortable about network	23

**<Diffusion communication channels are measured in the post-test of this study.>**

**TELEPHONE QUESTIONNAIRE SCRIPT**

<> indicates note to interviewer only - not to be read aloud to subject.

<1. Enter phone number as ID variable.>

<In the case of missing data, indicate 9 in the applicable edge coding section.>

Hi. I'm an SDSU grad student, Kim Bruch, and am following up on an email that I sent you a few days ago regarding an NSF-funded research project that is providing Santa Margarita Ecological Reserve and the Sky Oaks Field Station with high-speed network connectivity.

I'm calling to ask you a few questions about the impact of the network upon your research and your teaching, and which future networking schemes could best benefit your work.

Basically, the two Field Stations are currently being connected to a high-speed network called HPWREN, which is funded by the National Science Foundation. The speed of the network is around 45 Megabits per second and will allow researchers like you to transmit large amounts of real-time information from the field station to the campus database where it can be readily accessed by researchers and students through a website. An in-field station network of automated data acquisition towers are also being developed; these towers are intended to assist researchers like you with data collection methods.

As mentioned in my email, I'd like to ask you a few questions about the impact of this network connectivity upon your research.

2. What will you and your team need to utilize the network? (Answer yes to as many of these as applicable). Do you need...

- a. computer equipment
- b. specialized sensors
- c. technical assistance/support (e.g., technician)
- d. training
- e. other: \_\_\_\_\_

3. What are your sources of data for your field experiments? (Again, answer yes to as many of these as applicable). Do you use...

- a. soil samples from plots
- b. climate data from tower
- c. other: \_\_\_\_\_

4. What are your current datalogging methods? Do you...

- a. write in field book, data forms, or maps, and later type into computer  
(computer brand/model: \_\_\_\_\_)
- b. type directly into PDA from field  
(PDA brand/model: \_\_\_\_\_)
- c. laptop computer  
(laptop brand/model: \_\_\_\_\_)
- d. other: \_\_\_\_\_

(1) ID =

\_\_\_\_\_

(2) needs =

- \_\_\_\_\_ computer equipment
- \_\_\_\_\_ specialized sensors
- \_\_\_\_\_ technical assistance/support (e.g., technician)
- \_\_\_\_\_ training
- \_\_\_\_\_ other: \_\_\_\_\_

\_\_\_\_\_

(3) field data sources =

- \_\_\_\_\_ soil samples from plots
- \_\_\_\_\_ climate data from tower
- \_\_\_\_\_ other

\_\_\_\_\_

(4) field data logging =

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. Does your research...

- a. Always
- b. Sometimes
- c. Seldom or
- d. Never

...require continuous measurements (continuous = measurements that are taken more than once per day)?

6. What is your sample interval (how often)?

7. Do you...

- a. Always
- b. Sometimes
- c. Seldom or
- d. Never

...use specific sensors (e.g., cameras, meteorological data, soil probes, etc)?

8. Describe the sensors that you use: past, present, and hopefully future (i.e., what types of data could be useful for you in the future)?

Okay, that sounds really interesting. I'll make sure and relay that information to Sedra and Hans-Werner.

Now, I have a few more questions for you.

If I were putting words into your mouth about the following statements, would you strongly agree, agree, have no opinion, disagree, or strongly disagree....

9. HPWREN will help me improve my research endeavors by providing me with better access to real-time data than my current system. Do you...

- a. Strongly agree (5)
- b. Agree (4)
- c. Have no opinion (3)
- d. Disagree, or (2)
- e. Strongly disagree (1)

...with that statement?

10. HPWREN will help me improve my teaching efforts by providing me with improved access to real-time data in the classroom setting.

- a. Strongly agree (5)
- b. Agree (4)
- c. Have no opinion (3)
- d. Disagree, or (2)
- e. Strongly disagree (1)

11. HPWREN will allow me to disseminate research information to colleagues and applicable publics in a more efficient manner.

- a. Strongly agree (5)
- b. Agree (4)
- c. Have no opinion (3)
- d. Disagree, or (2)
- e. Strongly disagree (1)

(5) continuous measures =

\_\_\_\_\_

(6) sample interval =

\_\_\_\_\_

(7) user of specific sensors =

\_\_\_\_\_

(8) describe sensors =

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(9) RA1 = \_\_\_\_\_

(10) RA2 = \_\_\_\_\_

(11) RA3 = \_\_\_\_\_

12. All things considered, HPWREN benefits outweigh costs.
- Strongly agree (5)
  - Agree (4)
  - Have no opinion (3)
  - Disagree, or (2)
  - Strongly disagree (1)
- (12) RA4 = \_\_\_\_\_
13. Overall, HPWREN has more advantages than disadvantages.
- Strongly agree (5)
  - Agree (4)
  - Have no opinion (3)
  - Disagree, or (2)
  - Strongly disagree (1)
- (13) RA5 = \_\_\_\_\_
14. HPWREN would be very compatible with my current technology.
- Strongly agree (5)
  - Agree (4)
  - Have no opinion (3)
  - Disagree, or (2)
  - Strongly disagree (1)
- (14) C1 = \_\_\_\_\_
15. I will need little specialized training to use HPWREN technology.
- Strongly agree (5)
  - Agree (4)
  - Have no opinion (3)
  - Disagree, or (2)
  - Strongly disagree (1)
- (15) C2 = \_\_\_\_\_
16. HPWREN meets several technological needs of my research project.
- Strongly agree (5)
  - Agree (4)
  - Have no opinion (3)
  - Disagree, or (2)
  - Strongly disagree (1)
- (16) C3 = \_\_\_\_\_
17. I will be able to use HPWREN for research purposes, without changing the structure of my field data collection procedures.
- Strongly agree (5)
  - Agree (4)
  - Have no opinion (3)
  - Disagree, or (2)
  - Strongly disagree (1)
- (17) C4 = \_\_\_\_\_
18. I will be able to use HPWREN for teaching purposes, without significantly changing the structure of my course curricula.
- Strongly agree (5)
  - Agree (4)
  - Have no opinion (3)
  - Disagree, or (2)
  - Strongly disagree (1)
- (18) C5 = \_\_\_\_\_

19. I have questions about the basic concepts of HPWREN and how real-time field data collection and transmission works.

- a. Strongly agree (5)
- b. Agree (4)
- c. Have no opinion (3)
- d. Disagree, or (2)
- e. Strongly disagree (1)

(19) X1 = \_\_\_\_\_

20. HPWREN will be somewhat difficult for my staff and me to use for data collection and transmission.

- a. Strongly agree (5)
- b. Agree (4)
- c. Have no opinion (3)
- d. Disagree, or (2)
- e. Strongly disagree (1)

(20) X2 = \_\_\_\_\_

21. I will have to acquire the help of a technical person to help me with the use of HPWREN.

- a. Strongly agree (5)
- b. Agree (4)
- c. Have no opinion (3)
- d. Disagree, or (2)
- e. Strongly disagree (1)

(21) X3 = \_\_\_\_\_

22. When I have a problem with a technological device, I prefer person-to-person technical assistance.

- a. Strongly agree (5)
- b. Agree (4)
- c. Have no opinion (3)
- d. Disagree, or (2)
- e. Strongly disagree (1)

(22) X4 = \_\_\_\_\_

23. I am not very knowledgeable about technology and do not currently feel comfortable using HPWREN.

- a. Strongly agree (5)
- b. Agree (4)
- c. Have no opinion (3)
- d. Disagree, or (2)
- e. Strongly disagree (1)

(23) X5 = \_\_\_\_\_

Okay, I just have one final question for you...

24. In the context of measuring the impact of broadband connectivity upon your field research, can you think of other things you would like to communicate that I should have asked you about? Or, do you have any comments that you would like to add for my study?

(24) additional comments =  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Once the network connectivity is in place, I will be contacting you for a post-test evaluation. I really appreciate your time. Thank you.

**APPENDIX B**

**POST-TEST SURVEY QUESTIONS**

## POST-TEST HYPOTHESES SHEET

**H4: As the breadth of positive diffusion communication channels increases, the degree of perceived complexity decreases.**

**H5: As the breadth of positive diffusion communication channels increases, the degree of perceived relative advantage increases.**

**H6: As the breadth of positive diffusion communication channels increases, the degree of perceived compatibility increases.**

HPWREN Diffusion Communication Index (O)	Question
Received information awareness packet	1
Information received from colleagues inside workplace has been favorable	17
Info received from acquaintances outside workplace has been favorable	18
Info received from print media has been favorable	19
Info received from broadcast media has been favorable	20
Info received from electronic media has been favorable	21

**H7: Subjects who score high within the HPWREN Relative Advantage Index are more likely to use the network connectivity than those who score low.**

HPWREN Relative Advantage Index (RA)	Question
Improves research efforts with access to real-time data	2
Improves teaching efforts with access to real-time data	3
Improves dissemination ability	4
Benefits outweigh costs	5
More advantage than disadvantages	6

**H8: Subjects who score high within the HPWREN Compatibility Index are more likely to use the network connectivity than those who score low.**

HPWREN Compatibility Index (C)	Question
Compatible with current technology	7
Requires little specialized training	8
Meets several technological needs	9
Able to use without significant changes to data collection	10
Able to use without significant changes to course curricula	11

**H9: Subjects who score high within the HPWREN Complexity Index are less likely to use the network connectivity than those who score low.**

HPWREN Complexity Index (X)	Question
Have network, real-time collection, and transmission questions	12
Perceive technology as difficult to use	13
Will need technical assistance	14
Prefers person-to-person technical assistance	15
Lacks technological savvy and uncomfortable about network	16

**Network connectivity use was measured with the following questions:**

Network Connectivity Use Index (U)	Question
Current use of HPWREN	22
Perceived use of HPWREN in future work	23
Perceived use of HPWREN for research endeavors within coming year	24
Perceived use of HPWREN for teaching purposes within coming year	25
Perceived use of HPWREN for overall purposes within coming year	26

**TELEPHONE QUESTIONNAIRE SCRIPT**

<> indicates note to interviewer only - not to be read aloud to subject.  
 <Enter phone number as ID variable.>  
 <In the case of missing data, indicate 9 in the applicable edge coding section.>

Hi. I'm an SDSU grad student, Kim Bruch, and am following up with the additional survey that I mentioned to you regarding an NSF-funded research project that is providing Santa Margarita Ecological Reserve and the Sky Oaks Field Station with high-speed network connectivity.

I'm calling to ask you a few more questions about the impact of the network upon your research and your teaching, and which future networking schemes could best benefit your work.

As you know, the Santa Margarita Ecological Reserve has been connected to a high-speed network called HPWREN, which is funded by the National Science Foundation. The speed of the network is around 45 Megabits per second and allows researchers like you to transmit large amounts of real-time information from the field station to the campus database where it can be readily accessed by researchers and students through a website. An in-field station network of automated data acquisition towers continue to be developed; these towers are intended to assist researchers like you with data collection methods.

Just like the last time we talked, I have a few questions about the impact of this network connectivity upon your research.

1. First of all, did you receive the packet of information that I sent you via the mail last week?

- a. Yes (2)
- b. No (1)

Okay, now, here are a few more questions that I have for you. They will seem familiar, because I asked you most of these questions just a couple of months ago. If I were putting words into your mouth about the following statements, would you strongly agree, agree, have no opinion, disagree, or strongly disagree....

2. HPWREN will help me improve my research endeavors by providing me with better access to real-time data than my current system. Do you...

- a. Strongly agree (5)
- b. Agree (4)
- c. Have no opinion (3)
- d. Disagree, or (2)
- e. Strongly disagree (1)

...with that statement?

3. HPWREN will help me improve my teaching efforts by providing me with improved access to real-time data in the classroom setting.

- a. Strongly agree (5)
- b. Agree (4)
- c. Have no opinion (3)
- d. Disagree, or (2)
- e. Strongly disagree (1)

ID =

---

(1) O1 =

---

(2) RA1 = \_\_\_\_\_

(3) RA2 = \_\_\_\_\_

- |                                                                                                                                                                                                                                                                       |                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| <p>4. HPWREN will allow me to disseminate research information to colleagues and applicable publics in a more efficient manner.</p> <p>a. Strongly agree (5)<br/> b. Agree (4)<br/> c. Have no opinion (3)<br/> d. Disagree, or (2)<br/> e. Strongly disagree (1)</p> | <p>(4) RA3 = _____</p> |
| <p>5. All things considered, HPWREN benefits outweigh the costs.</p> <p>a. Strongly agree (5)<br/> b. Agree (4)<br/> c. Have no opinion (3)<br/> d. Disagree, or (2)<br/> e. Strongly disagree (1)</p>                                                                | <p>(5) RA4 = _____</p> |
| <p>6. Overall, HPWREN has more advantages than disadvantages.</p> <p>a. Strongly agree (5)<br/> b. Agree (4)<br/> c. Have no opinion (3)<br/> d. Disagree, or (2)<br/> e. Strongly disagree (1)</p>                                                                   | <p>(6) RA5 = _____</p> |
| <p>7. HPWREN would be very compatible with my current technology.</p> <p>a. Strongly agree (5)<br/> b. Agree (4)<br/> c. Have no opinion (3)<br/> d. Disagree, or (2)<br/> e. Strongly disagree (1)</p>                                                               | <p>(7) C1 = _____</p>  |
| <p>8. I will need little specialized training to use HPWREN technology.</p> <p>a. Strongly agree (5)<br/> b. Agree (4)<br/> c. Have no opinion (3)<br/> d. Disagree, or (2)<br/> e. Strongly disagree (1)</p>                                                         | <p>(8) C2 = _____</p>  |
| <p>9. HPWREN meets several technological needs of my research project.</p> <p>a. Strongly agree (5)<br/> b. Agree (4)<br/> c. Have no opinion (3)<br/> d. Disagree, or (2)<br/> e. Strongly disagree (1)</p>                                                          | <p>(9) C3 = _____</p>  |
| <p>10. I will be able to use HPWREN for research purposes, without changing the structure of my field data collection procedures.</p> <p>a. Strongly agree (5)    b. Agree (4)<br/> c. Have no opinion (3)<br/> d. Disagree, or (2)    e. Strongly disagree (1)</p>   | <p>(10) C4 = _____</p> |
| <p>11. I will be able to use HPWREN for teaching purposes, without significantly changing the structure of my course curricula.</p> <p>a. Strongly agree (5)    b. Agree (4)<br/> c. Have no opinion (3)<br/> d. Disagree, or (2)    e. Strongly disagree (1)</p>     | <p>(11) C5 = _____</p> |

12. I have questions about the basic concepts of HPWREN and how real-time field data collection and transmission works.

- a. Strongly agree (5)
- b. Agree (4)
- c. Have no opinion (3)
- d. Disagree, or (2)
- e. Strongly disagree (1)

(12) X1 = \_\_\_\_\_

13. HPWREN will be somewhat difficult for my staff and me to use for data collection and transmission.

- a. Strongly agree (5)
- b. Agree (4)
- c. Have no opinion (3)
- d. Disagree, or (2)
- e. Strongly disagree (1)

(13) X2 = \_\_\_\_\_

14. I will have to acquire the help of a technical person to help me with the use of HPWREN.

- a. Strongly agree (5)
- b. Agree (4)
- c. Have no opinion (3)
- d. Disagree, or (2)
- e. Strongly disagree (1)

(14) X3 = \_\_\_\_\_

15. When I have a problem with a technological device, I prefer person-to-person technical assistance.

- a. Strongly agree (5)
- b. Agree (4)
- c. Have no opinion (3)
- d. Disagree, or (2)
- e. Strongly disagree (1)

(15) X4 = \_\_\_\_\_

16. I am not very knowledgeable about technology and do not currently feel comfortable using HPWREN.

- a. Strongly agree (5)
- b. Agree (4)
- c. Have no opinion (3)
- d. Disagree, or (2)
- e. Strongly disagree (1)

(16) X5 = \_\_\_\_\_

17. The information that I have received and heard about HPWREN from colleagues within my workplace has been favorable.

- a. Strongly agree (5)
- b. Agree (4)
- c. Have no opinion (3)
- d. Disagree, or (2)
- e. Strongly disagree (1)

(17) O2 = \_\_\_\_\_

18. The information that I have received about HPWREN from acquaintances outside of my workplace has been favorable.

- a. Strongly agree (5)
- b. Agree (4)
- c. Have no opinion (3)
- d. Disagree, or (2)
- e. Strongly disagree (1)

(18) O3 = \_\_\_\_\_

19. The information that I have received and heard about HPWREN from print media (e.g., newspapers, magazines) has been favorable.

- a. Strongly agree (5)    b. Agree (4)  
 c. Have no opinion (3)  
 d. Disagree, or (2)    e. Strongly disagree (1)

20. The information that I have received and heard about HPWREN from broadcast media (e.g., television, radio) has been favorable.

- a. Strongly agree (5)    b. Agree (4)  
 c. Have no opinion (3)  
 d. Disagree, or (2)    e. Strongly disagree (1)

21. The information that I have received and heard about HPWREN from electronic media (e.g., websites, electronic newsletters) has been favorable.

- a. Strongly agree (5)    b. Agree (4)  
 c. Have no opinion (3)  
 d. Disagree, or (2)    e. Strongly disagree (1)

22. Are you currently using HPWREN?

- a. Yes (2)    b. No (1)

23. Will you use HPWREN in your future work?

- a. Yes - Definitely (5)    b. Yes - Probably - (4)  
 c. Unsure (3)    d. No - Probably (2)  
 e. No - Definitely (1)

24. I am likely to use HPWREN in my research in the coming year.

- a. Strongly agree (5)    b. Agree (4)  
 c. Have no opinion (3)    d. Disagree (2)  
 e. Strongly disagree (1)

25. I am likely to use HPWREN in my teaching in the coming year.

- a. Strongly agree (5)    b. Agree (4)  
 c. Have no opinion (3)    d. Disagree (2)  
 e. Strongly disagree (1)

26. I am likely to use HPWREN in some way in my work in the coming year.

- a. Strongly agree (5)    b. Agree (4)  
 c. Have no opinion (3)    d. Disagree (2)  
 e. Strongly disagree (1)

Okay, I just have one final question for you...

27. In the context of measuring the impact of broadband connectivity upon your field research, can you think of other things you would like to communicate that I should have asked you about? Or, do you have any comments that you would like to add for my study?

(19) O4 = \_\_\_\_\_

(20) O5 = \_\_\_\_\_

(21) O6 = \_\_\_\_\_

(22) U1 = \_\_\_\_\_

(23) U2 = \_\_\_\_\_

(24) U3 = \_\_\_\_\_

(25) U4 = \_\_\_\_\_

(26) U5 = \_\_\_\_\_

(27) comments =

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_