

## **Animated Agents Teaching Helping Skills in an Online Environment: A Pilot Study**

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### ***Abstract***

*Human service educators constantly struggle with how to best teach students the communication skills required of entry-level human service professionals. While teaching such skills is easier in a traditional face-to-face environment, teaching communication skills via distance learning presents its own challenges. Developing interactive web-based learning environments to teach helping skills may solve this dilemma. This article describes a pilot study of three web-based environments. The interactive environment assigns learners to serve as helpers while an animated agent portrays a client. A modeling environment has participants observing a client-helper interaction between two agents. The helper-client script environment presents a text-based script. Data collected to assess skill acquisition and usability indicate improvement in skills and positive user perceptions in all three environments.*

### **Introduction**

Human service professionals (HSPs) hold jobs in a variety of settings, including homeless and domestic violence shelters, community mental health, correctional facilities, and family violence, aging, alcoholism, and drug abuse programs. While HSP services vary depending upon the employment setting and the clients, HSPs share a primary purpose: to assist individuals and communities in functioning as effectively as possible (National Organization for Human Services (NOHS), 2007). To achieve this purpose, a primary goal in training HSPs is to give them effective helping skills necessary to work with a broad variety of clients on a daily basis. Communication skills are so important for the HSP that the Council for Standards in Human Service Education (CSHSE) identifies effective communication strategies and skills as one of the 12 skill sets that entry- and mid-level human services workers use daily in their jobs.

Human service educators, therefore, face constant challenges to provide learning experiences that help students develop their communication and helping skills for use with clients, co-workers, and supervisors. Human service programs offered through distance learning face even more difficulties as educators struggle with designing online and interactive video courses that provide opportunities for helping skills practice along with the evaluation of such skills. The more traditional instructional techniques of role-plays, group work, and even videotapes are often difficult to adapt for use in a distance learning setting. When the challenge of large class sizes, often found in distance learning, is added to this learning setting, teaching helping skills at a distance becomes even more overwhelming.

To remedy this issue, educators may want to explore other less traditional methods to provide opportunities for their distance-learning students to learn and practice helping skills appropriate for the field. This idea is not without precedent as systems to supplement similar skills such as crisis intervention are being developed and tested (Seabury, 2003). The goal of this research was to develop and pilot test a web-based learning environment designed to provide online training in

helping skills for human service students in distance learning settings. We briefly summarize the literature on empathy and helping skills, along with the literature on human services education at a distance and the use of animated agents in distance education. We then compare three web-based systems, two employing animated agents and one consisting of a script of a helper-client interaction. Findings from this pilot provided implications for human service educators and further research.

### *Background*

#### *The Need for Empathy and Helping Skills*

Entry-and mid-level human service workers use effective communication strategies and skills daily in their jobs (CSHSE). Empathy is considered a core condition for communicating effectively with clients (Chung & Bemak, 2002) and is used when the helper enters the client's world (Rogers, 1961), feeling *with* the client rather than *for* the client (Capuzzi & Gross, 1999). Empathy has been described as the foundation of all counseling (Feller & Cottone, 2003) as it requires that helpers be able to put themselves in the position of a client and to be able to feel, see, and think from the client's perspective, thereby understanding the client's world. Seeing the world from the client's perspective lets the effective helper sense the client's anger, frustration, or fear and avoid being drawn into the emotion, thus remaining objective. Helpers who interact with a client out of sympathy are often less able to maintain their objectivity, infusing their personal emotions with those of the client while allowing their own emotions to influence the responses they give the client. Effective helpers communicate their empathy in such a way that the client believes the helper has empathy for the client while the helper explores the client's cognitive and affective world view. The ability to communicate with empathy is essential for HSPs who are trying to help their clients achieve change.

Another consideration is the need for human services students to practice their skills, despite taking courses at a distance. While students need to practice their helping skills to become effective helpers, their need to practice must constantly be balanced with the need of agencies to provide high quality services for clients, keeping client welfare paramount at all times (ESHSP, 2000). Providing increased opportunities for skills practice that meet student and program needs while decreasing the risks for the clients (thus decreasing possible ethical violations) is vital to human service education. The importance of effective skills practice becomes even more critical as human service educators contemplate offering courses in a distance learning format.

#### *Human Services Education at a Distance*

Human services programs have been cautious in using distance learning as a standard mode of instruction, despite the advent of distance learning over a century ago (Matthews, 1999). While some research suggests that didactic and interactive classroom experience is necessary, perhaps even superior to distance education (Thyer, Pol, & Gaudin, 1997), other studies suggest that web-delivery can be an effective and quality pedagogical model for helping professionals (Doyle & Hogan, 2004). Newer research even provides a model for the development of online human services courses (Jensen, Heyl, & Haynes, 2004). Concerns about human services courses offered through distance learning, however, still focus on the question of the quality of the classroom experience, group process, and the relationship with the instructor as role model and mentor (Sandell & Hayes, 2002). A limited number of human service faculty are currently engaging in cutting edge initiatives using the full range of web-based tools available (Moore, 2005). Instead, most research on instructional interventions in human services coursework

focuses on web-enhanced or blended approaches that integrate e-mail, listservs, chatrooms, and internet searches (Frey, Yankelov, & Faul, 2003; Randolph & Krause, 2002). At the same time, human service educators are predicting that future academic challenges will include technology with the expectation that technology will have an even greater impact over the next decade (McClam, Woodside, & Cole-Zakrzewski, 2005). This pilot study was designed as an attempt to provide additional technological tools available for human service educators.

### *Agents in Distance Learning*

Animated agents are computerized, animated characters integrated into computer-based instructional environments. These characters allow designers to create environments where learners can interact with a conversational partner to obtain advice, feedback, or instruction. Consistent with early findings of human-computer interaction, agents allow for a realistic social interaction (Reeves & Nass, 1996). By using advanced technologies such as artificial intelligence, agents can be designed to support or facilitate learning by providing a teacher-student interaction with the learner (Shaw, Johnson, & Ganeshan, 1999; Slater, 2000). Animated agents have been used in many capacities and have been shown to be effective in teaching, largely due to their impression of a realistic social interaction (e.g., Atkinson, 2002; Lester et al., 1997; Moreno, Mayer, Spire, & Lester, 2001).

Some of the current uses of animated agents include their presence in multimedia instructional environments teaching middle school botany (Moreno, Mayer, & Lester, 2000); instructional planning (Baylor, 2002); computer literacy (Gilbert, Wilson, & Gupta, 2005; Graesser, Wiemer-Hastings, Wiemer-Hastings, Kreuz, & Tutoring Research Group, 1999); conceptual physics (Graesser, VanLehn, Rose, Jordan, & Harter, 2001); foreign language and culture for military personnel (Johnson, 2004); role playing (Prendinger & Ishizuka, 2001); and applications such as interviewing, negotiation, and patient assessment (Hubal & Guinn, 2001; Hubal, Frank, & Guinn, 2003). In all of these instances, evaluations have supported the use of agents as a viable replication of a human-human interaction and as an effective tool in online learning. It is conceivable to think that another possible application for pedagogical agent environments is in teaching communication skills through the simulated interviews or through the vicarious observation of an interview between helpers and their clients. It is also important to compare these agent-inhabited environments with the presentation of an effective scenario via hypertext to determine that resources necessary for animated agent development are well used.

Animated agents are primarily designed so that a single user engages in an interaction with a single agent. Current research primarily focuses on learning when users are exposed to two types of agent environments: interactive and vicarious. In the interactive environment the learner directly interacts with the agent (Baylor, 2002; Moreno et. al, 2001). The vicarious environment, also known as modeling, allows the learner to observe the specific behavior(s). There have also been comparisons of interactive versus vicarious environments where learners passively observe agent-agent interactions (Craig, Driscoll & Gholson, 2004). Findings from the aforementioned study indicated that learning gains were greater when learners interacted directly with the animated agent (attributed to the active learning occurring during the interactions), while observance of a collaborative tutoring session produced smaller but measurable learning gains. The results from this study merit further investigation in domains where learners may benefit by observing effective interactions as a model of appropriate behavior, such as in human services, consistent with findings in social learning theory (Bandura, 1977).

### *Purpose of this Study*

The purpose of this study was to investigate the use of animated agents to assist human services students at a distance in practicing helping skills. The rationale for this investigation is the increasing call to deliver human services instruction to a large number of students at a distance. By determining if animated agent learning environments are an effective delivery mode for practicing these types of skills, the researchers hope to add to the tools available for distance education in human services. In addition, this study will examine whether the type of instruction provided by the animated agent (interactive or modeling) is differentially effective. By determining which environment is most effective (if any), the researchers plan to continue development by improving or combining effective elements of the system for maximum effectiveness and ease of use.

This pilot study was conducted to answer the following specific research questions:

- Are web-based animated agent environments effective tools for the practice of communication skills for human services students in online settings?
- Are there differences in skill acquisition when human services students interact with an animated agent in a case study learning activity compared to reading a helper-client script?
- Are there differences in skill acquisition when human services students observe an interaction between two animated agents (modeling) compared to when they interact with the animated agent in a case study learning activity (interactive)?

## **Methodology**

### *Participants*

The participant pool for this pilot study included all students enrolled in human services courses during the last half of summer 2005. Three instructors offered extra credit to those students who participated in the pilot study. As an added incentive for participation, the researchers offered the chance to win a retail gift certificate when participants completed the experiment.

### *Instruments*

#### *Pre- and Posttest*

The researchers used pre- and posttests to determine knowledge levels of the participants. Both the pretest and the posttest were based on the Carkhuff Helping Skills Model (Carkhuff, 2000) and contained two components: a scenario followed by an open-ended measure of Helping Skills and a scenario followed by a Discriminating Measure of pre-written helper statements. In the Helping Skills component, participants were asked to imagine that they had been talking to the client for approximately 15 minutes then were asked to read the scenario that followed. They were next asked to write down the exact words they would use when speaking with the client. These open-ended responses were then rated to provide the Helping Skills score for each participant. The next component, the Discriminating Measure, asked participants to again imagine having been talking to the client for approximately 15 minutes and read the same scenario as before. This time the participants were given helping responses, one at a time, and asked to rate the effectiveness of each response on a scale of 1 (very ineffective) to 5 (very

effective). These responses were then scored to provide a Discriminating Measure for each participant. Appendix A shows a sample of the assessments used in both the pretest and posttests.

### *Helper-Client Script*

To simulate a traditional case study approach, the researchers created a typical scenario faced by entry-level human service professionals. This scenario was then expanded into a best practices script depicting a helping session between the client and the HSP, following the guidelines of a standard helping session. This script eventually became the basis for the three web-based environments. Appendix B contains an excerpt from the helper-client script.

### *Web-based Environments*

Three web-based instructional environments were created using Macromedia's *Authorware 7.1* (<http://www.macromedia.com/>). Two of the three environments included animated agents created using *Microsoft Agent Character Editor* (<http://www.microsoft.com/msagent/default.asp>). Characters were selected to best convey the role of the animated agents. Following are brief descriptions and screen shots of each environment used in the study.

*Helper-Client Script.* The helper-client script condition was web-based consisting of a helper-client script commonly found in human services instruction. Users read three dialog turns and advanced the screen by clicking a Continue button.

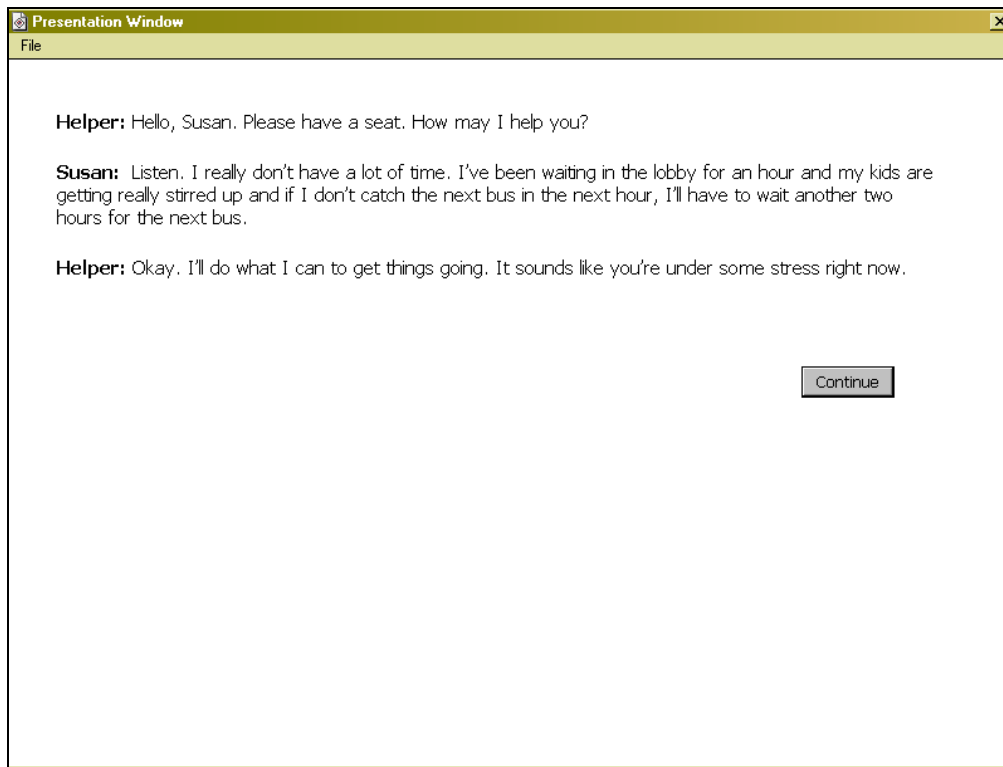


Figure 1. Screen from the helper-client script environment

*Modeling.* In the modeling agent environment, two animated agents interacted in a simulated case study environment using the same helper-client script as used in the helper-client

script condition. Users observed two computerized agents (a Helping Professional and her client) as they portrayed the script. Users heard two dialog turns and advanced the program by clicking a Continue button.

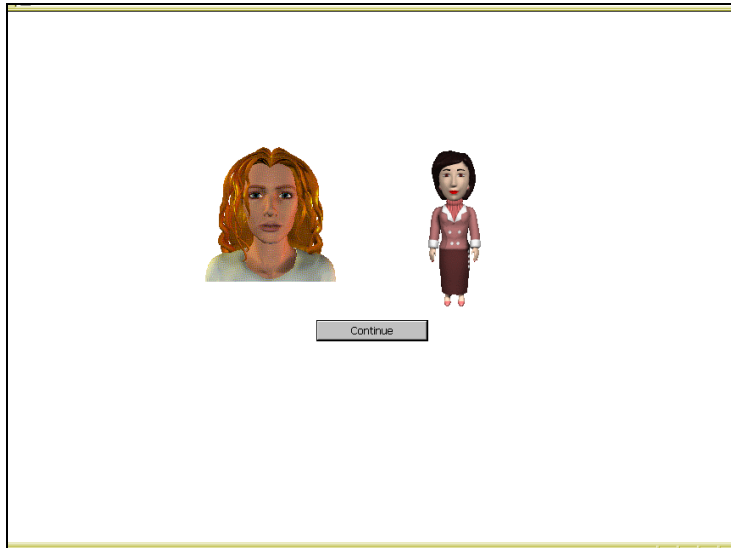


Figure 2. Screen from the modeling environment

*Interactive.* In the interactive environment, the agent portrayed a client and users played the role of Helper. Users listened to the agent speak a prescribed script. Users then chose from a list of responses (each at a different level of helping), which then determined the next response from the agent.



Figure 3. Screen from the interactive environment

### *Attitude Measure*

Five Likert-type questions were used to determine the users' perception of the instructional environments. Items were selected from an existing scale used to measure perceptions of animated agent environments and modified to fit the constraints of each

environment (Adcock & Van Eck, 2005). Items assessed the user's perceptions of the learning environments, including interest level and believability of the material using a rating scale ranging from 1 (strongly agree) to 6 (strongly disagree). Items are listed in Appendix C.

### *Procedure*

Participants were either contacted directly by their instructors or by the researchers via email. For the larger classes, instructors were asked to create three groups of students and randomly assign each group to one condition. For the smaller classes, the researchers simply assigned one of the three conditions to the entire class. Students received emails containing a brief overview of the study, instructions, and a link to their condition. When participants accessed the link, they viewed the informed consent form and were instructed to read over and click "Next" to indicate they understood the terms of the experiment. They were then directed to a page listing system requirements and links to necessary plug-ins tailored to each condition. After downloads were completed, the participants clicked "Next" and were taken to the pretest. Once they completed the two-part pretest, participants started their assigned instructional unit. After the instructional unit, they completed the posttest, the attitude measures, and were asked to contribute any comments to improve the instructional unit. Data were collected and stored in a database for analysis.

### **Data Analysis**

#### *Pre- and Posttest*

The open-ended measure of Helping Skills was scored by two raters based on the Carkhuff Helping Skills Model (Carkhuff, 2000). Both raters completed approximately 4 hours of training until they had attained inter-rater agreement of 94% on the Carkhuff scale. Reliability was computed based on inter-rater agreement on 76% of the observations used for the pilot study. Participant responses on both the pre- and posttest received a Helping Skills Score between 1 and 5. An Analysis of Covariance (ANCOVA) using the pretest score as a covariate was used to determine if there were significant differences in Helping Skills Scores between conditions.

The Discriminating Measure of pre-written helping statements was scored using the Discriminating Response Score Sheet (see below). The expert's rating of each response was subtracted from the student's rating for the response, with the differences added together, then divided by 5 to compute the final Discriminating Measure Score. An ANCOVA (using the pretest score as a covariate) was used to determine if there were significant differences in Discriminating Measure Scores between conditions.

Response	Student Rating		Expert Rating		Difference
A	_____	-	<u>3</u>	=	_____
B	_____	-	<u>1</u>	=	_____
C	_____	-	<u>5</u>	=	_____
D	_____	-	<u>2</u>	=	_____
E	_____	-	<u>4</u>	=	_____
			TOTAL	=	_____
Student Discrimination Score (TOTAL divided by 5)				=	_____

*Figure 4.* Discriminating response score sheet

.5 is the desired Discrimination Score (Carkhuff, 2000).

### *Attitudinal Measure*

Items from the attitude measure were combined to create a single attitude measure. Cronbach's alpha for this scale was calculated at .899, so it was determined that this was a reliable scale. An Analysis of Variance (ANOVA) was used to determine if there were significant differences in user perceptions of the environment between conditions.

## **Results**

### *Demographics*

A total of 46 participants completed the study in one of three conditions (interactive, helper-client script or modeling). One hundred percent of the participants were female. The majority of participants (70%) were completing their courses via distance learning, with the remaining 30% taking their courses on the main campus. Eighty three percent of the participants indicated their major was human services, and the majority were at the end of their studies (13%) completing all of their required courses by the end of the summer term.

### *Learning Outcomes*

Programming issues resulted in a loss of some data from the pre and posttests. The decision was made to drop the participants with missing data. Therefore, in the analyses described below, data from only 24 participants are included. Before the Analyses of Covariance was run on both Helping Skills and Discriminating Measure, the researchers conducted an examination of the means to look for indications of differences in skill level. Findings indicated that the Helping Skills Scores showed improvement from pretest to posttest for the interactive condition ( $MD = .21$ ) and for the helper-client script condition ( $MD = .17$ ), but not for the modeling condition ( $MD = .03$ ). Because of the method of scoring, improvement in the Discriminating Measure Score is evidenced in a decreased score. Although all three conditions showed learning gains in the Discriminating Measure from pretest to posttest (interactive  $MD = .18$ ; script  $MD = .33$ ; modeling  $MD = .24$ ), the improvement was not statistically significant. Table 1 shows these means for each condition separated by skill.

**Table 1: Mean Comparisons of Pre- and Posttests by Condition**

Condition	<u>Communication Skills</u>		<u>Discriminating Measure</u>	
	Pre	Post	Pre	Post
Interactive	2.23 (.68)	2.44 (.68)	1.07 (.24)	.89 (.32)
Helper-Client Script	2.23 (.77)	2.40 (.81)	1.13 (.35)	.80 (.34)
Modeling	2.43 (1.17)	2.40 (.65)	1.12 (.31)	.88 (.35)

( ) = standard deviation



Two ANCOVA were used to determine if there were significant differences in the posttests across conditions. To control for prior knowledge, pretest scores were used as a covariate in both analyses. In the Helping Skills assessment, no significant differences were found ( $F(2, 24) = .005$ ,  $p = .995$ ;  $MS = .002$ ), but the means indicate a slightly better performance in the interactive condition. Significant differences were also not evident in the Discriminating Measure posttest ( $F(2, 24) = .170$ ;  $p = .844$ ;  $MS = .023$ ). The largest difference between the means (indicating better performance) was with the helper-client script condition.

The lack of significant findings is probably due in large part to the small sample size used in this pilot study. However, plans are already underway for a second round of implementation, this time with a greater number of students from various educational backgrounds. We do feel that these findings are important as they serve as a proof of concept and a good means of formative evaluation.

#### *User Perceptions*

A One-Way ANOVA was used to determine if there were any significant differences in participant attitudes across the different conditions. No significant differences were found ( $F(2, 21) = .507$ ;  $p = .609$ ). However, it should be noted that the means from all conditions indicate a positive perception of the environments in terms of interest, motivation, helpfulness and believability. Table 2 shows the mean responses per item for each condition.

Table 2: Mean Responses to Attitude Scale Per Item by Condition

	My interactions encouraged the development of my knowledge in this area	My interactions increased my interest in the subject	My interactions were motivating	My interactions were helpful in learning about Human Services	I believed what the program had to say
Interactive ( $n = 9$ )	2.44 (1.01 )	2.00 (1.22 )	2.22 (1.09 )	2.44 (1.42)	2.22 (1.39)
Helper-client Script ( $n = 10$ )	2.10 (0.99)	1.90 (0.88)	2.00 (1.33)	1.80 (0.79)	2.10 (0.88)
Modeling ( $n = 5$ )	2.20 (1.10)	2.80 (1.30)	2.60 (1.14)	2.60 (1.52)	2.40 (1.34)

( ) = standard deviation

1=strongly agree; 2=somewhat agree; 3=agree; 4=disagree; 5=somewhat disagree; 6=strongly disagree

#### **Implications**

Information collected from the assessments and user perceptions, combined with the open-ended comments, were encouraging in terms of providing effective supplemental instruction in helping skills. As this was a pilot study, this information is also useful for assisting developers in planning for the next stage of implementation after a period of revision. Recommendations for change to the project are as follows:

1. Combining the useful elements from all three environments into one web-based learning environment may improve student learning while increasing the ease by which students can navigate the environment.

2. Converting the module to a more flexible platform will allow for improvements in the animated character including a better voice and the ability to gesture, adding to the authenticity of the session.
3. Several adjustments to the assessments would provide a clearer picture of the effectiveness of the environment. First, instead of only one scenario as offered in the pilot, we want to offer five scenarios, providing a better measure of both the communication skills and the discrimination abilities of the research participants.
4. An increased sample size of evaluation participations would allow us to make more general conclusions about the effectiveness of the environments.
5. A comparison of performance scores and attitudes between those students taking the course through distance learning and those in the face-to-face environment would also be useful.

The data collected during this pilot study is informative to both human services and educational technology researchers by adding to existing literature on the implementation of animated agent environments in various learning situations. Findings support the idea that elements from all three environments are effective tools for practicing essential helping skills. Additionally, the practical significance of this study is the creation of an effective learning environment that can be implemented efficiently with a large number of students.

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## Appendix A

### Sample Assessment

#### Part I.

Before you begin this program, we would like to explore your current knowledge of helping skills.

Imagine that you have been talking to the following client for about 15 minutes. The client is a 25-year old woman who is having problems at work. She says:

“I am so tired of being treated this way! The boss keeps one eye on me constantly. Every time I make a decision, he tells me I’m wrong. If I don’t make a decision and go to him for help, he tells me I should be making my own decisions. He says that’s what he pays me for. It seems no matter what I do, I just can’t win. I am so tired of this. I can’t wait ’til I find another job, but he’s not gonna give me a good reference.”

Now type what you would say to this client – the exact words you would use if you were actually speaking to this woman:

#### Part II.

The human service field requires professionals to be able to discriminate between possible helping responses to determine the effectiveness of a helping response. This next section will give us an idea of your current skill level at judging the effectiveness of a response.

Imagine that you have been talking to the following client for about 15 minutes. The client is a 25-year old woman who is having problems at work. She says:

“I am so tired of being treated this way! The boss keeps one eye on me constantly. Every time I make a decision, he tells me I’m wrong. If I don’t make a decision and go to him for help, he tells me I should be making my own decisions. He says that’s what he pays me for. It seems no matter what I do, I just can’t win. I am so tired of this. I can’t wait ’til I find another job, but he’s not gonna give me a good reference.”

Listed below are several alternative responses that might have been made by someone trying to help this client. Next to each response, type in a number to indicate your rating of the effectiveness of the response. Use the following scale:

- |     |   |                     |
|-----|---|---------------------|
| 1.0 | = | Very ineffective    |
| 2.0 | = | Ineffective         |
| 3.0 | = | Minimally effective |
| 4.0 | = | Very effective      |
| 5.0 | = | Extremely effective |

- \_\_\_\_\_ a. “You feel angry because your boss won’t let you make decisions on your own and take responsibility for them.”
- \_\_\_\_\_ b. “It *is* a pretty tough work world out there, you know.”
- \_\_\_\_\_ c. “You feel discouraged because you can’t demonstrate that you’re able and willing to make decisions and take responsibility for them and you want to prove yourself. A first step might be to list all the things you could do to prove you are capable of making good decisions. Then, choose one to start with that your boss could accept.”
- \_\_\_\_\_ d. “In other words, your boss seems to be unwilling to let you make decisions on your own, too afraid that you’ll make bad ones...maybe not trusting you to choose well.”
- \_\_\_\_\_ e. “You’re frustrated because you can’t communicate to your boss that you are capable of making good decisions, and you want to show him that you can.”

## Appendix B

### Helper-Client Script Excerpt

HSP: Hello, Susan. Please have a seat. How may I help you?

Susan: (**anxious, fidgety, in a hurry**) Listen. I really don't have a lot of time. I've been waiting in the lobby for an hour and my kids are getting really stirred-up and if I don't catch the next bus in the next hour, I'll have to wait another 2 hours for the next bus.

HSP: Okay. I'll do what I can to get things going. It sounds like you're under some stress right now.

Susan: Well I am glad you can tell. (**sarcasm**) It's just been one thing after another for the past 2-3 months and I'm about to throw in the towel.

HSP: Tell me what you mean by that.

Susan: (**tearful**) I don't have a job. I can't work because I can't pay anyone to watch my kids because I have no money. Their damn father up and left me and this time he moved somewhere and didn't tell me where he's going, except for he left me to marry someone. He took the only car I can use and now my I can't stay at my place because it's been condemned by the city. The police came by the place I rent today and said I had to get out. These slumlords take your money and then get the place condemned when they want you out. No one cares about this shit going on because they're not the ones out on the street with two kids. (**becoming angry**)

HSP: You have a lot going and feel overwhelmed by all that's happening right now.

Susan: Yeah. I'm scared about what's gonna happen next....what to do....how to keep my kids safe. I have nowhere to go. (**more tears**) And that no-good man - it's all his fault! (**increasing anger, voice rises at end**)

HSP: You're angry because now you have all of the responsibility for the kids .

Susan: (**more tears**) It's not like this is the first time....but I really need some help! (**more tears**)

HSP: You're afraid because you cannot support yourself and your kids and you want to be able to.

Susan: (**starts smiling**) Yeah. I gotta be able to take of 'em myself.

HSP: You want to take care of your kids all on your own, to support them and keep a roof over their heads without any help. You've got a lot going on right now, so let's break this down so we can manage each of your concerns in pieces. Does that sound okay to you?

Susan: (**smiles**) Yeah, but I just need for you to hurry before my kids tear this place up.

HSP: Let's see what we need to do. First, we need to take care of you and kids for now. What are you doing for money and food?

Susan: I ain't got no money and I have the food in my purse to get us through maybe 2 more days. No milk or nothing. I can't keep that stuff cold.

HSP: Okay.....What about work? Have you had a chance to start looking for work? ....

## Appendix C

### Items Assessing User Perceptions

- My interactions encouraged the development of my knowledge in this area
- My interactions increased my interest in the subject
- My interactions were motivating
- My interactions were helpful in learning about Human Services
- I believed what the program had to say