

**Connecting in Cyberspace: The Millennial Generation and Virtual Reference Service  
ASIST, Milwaukee, WI, October 18-25, 2007  
Marie L. Radford and Lynn Silipigni Connaway**

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**Contact Information for Authors:**

Marie L. Radford, Ph.D., Rutgers, the State University of NJ  
E-mail: [mradford@scils.rutgers.edu](mailto:mradford@scils.rutgers.edu)  
[www.scils.rutgers.edu/~mradford](http://www.scils.rutgers.edu/~mradford)

Lynn Silipigni Connaway, Ph.D., OCLC Online Computer Library Center, Inc.  
E-mail: [connawal@oclc.org](mailto:connawal@oclc.org)  
[www.oclc.org/research/staff/connaway.htm](http://www.oclc.org/research/staff/connaway.htm)

This paper highlights the results of virtual reference service (VRS) evaluation from the perspective of librarians, 12-18 year-old users, and other adult users of synchronous chat reference. Digital Natives (Premsky, 2001), the youngest members of the Millennial Generation (Sweeney, 2006), are comfortable in a virtual environment, use social software fluently and frequently, have adopted instant messaging and chat for socializing and engaging in collaborative homework projects, yet perceive VRS differently than these other virtual encounters. These teens have been referred to as “screenagers” (Rushkoff, 1996) because of their immersion in digital environment and technologies that require hardware with monitors. This international research project, funded by the Institute of Museum and Library Services, Rutgers University, and OCLC Online Computer Library Center, Inc., is one of the first large-scale VRS studies to include librarians, and users, with a specific focus on contrasting generational differences, including differences in the patterns of interaction between librarians and Digital Natives (see Radford & Connaway, 2007). This research innovatively addresses issues concerning the evaluation, sustainability, and relevance of VRS.

Analysis included detailed qualitative coding of the relational (interpersonal communication) dimensions from the 12-18 year-olds identified from a random sample of 850 live chat transcripts taken from a pool of over 500,000. In addition, the behaviors and attitudes of VRS librarians in interactions with screenagers were analyzed. Results indicate that these young Digital Natives exhibit different behaviors than librarians in the chat transcripts. When librarian behaviors with these screenagers were compared to interactions with other age groups of users, differences were also found in librarian behaviors. In reviewing the 850 transcripts, 146 users were identified as screenagers (either self-identified by the user, or inferred from textual cues by the researchers) and 226 were identified as “others” (college age, or adults). The age of the remaining VRS users could not be determined. Behaviors were coded using the Radford Chat Reference Category Scheme for Relational Dimensions (see below, and also see Radford, 2006a, 2006b). Analysis revealed that there were differences in the occurrence of both facilitators (positive behaviors that enhance communication in chat) and barriers (negative behaviors that impede communication in chat) for the screenagers when compared to the others (users of a different demographic).

The screenagers exhibited these facilitators more frequently than the others: using alphanumeric short-cuts, using an asterisk, doing repair and self-correction, and using alternate spelling of single words and slang expressions. With regard to barriers, the teens more frequently exhibited these behaviors than others: being impatient, rude, or insulting. Screenagers

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used inappropriate language and were goofing around with greater frequency as compared to others.

When the librarian behaviors with screenagers are compared to their behaviors with others, librarians more frequently exhibited these facilitators to the teens: seeking reassurance, use of alternate spelling of single words, demonstrating familiarity with the user, asking the other to be patient, using ellipsis (to indicate more...), and inviting them to return to the chat service if necessary. Librarians more frequently exhibited these facilitators toward others: encouraging remarks or praise, offering personal opinion or advice, explaining search strategy, explaining technical problems, suggesting strategy or explanation in a tentative way, offering to continue searching, making sure user has no more questions, and using closing rituals.

With regard to barriers, the librarians more frequently exhibited these behaviors towards screenagers: reprimanding, limiting time, failing or refusing to provide information when asked, ending abruptly, and sending them to Google. Towards others, the librarians more frequently exhibited these barrier behaviors: ignoring self-disclosure and being disconfirming.

These preliminary results suggest that much can be learned about these Digital Natives and librarian's behaviors toward them by close examination of their behavior in chat reference transcripts, building on previous research in this area (e.g., see Agosto & Hughes-Hassell, 2005, 2006; Lippincott, 2005; Walter & Mediavilla, 2005). These findings have numerous implications for practice, including development of best practice guidelines for chat reference and suggesting important areas for training of VRS librarians. Focus groups with VRS users, non-users, and librarians have been completed (see Connaway & Radford, 2007, Radford & Connaway, 2007). Online surveys and telephone interviews with these three groups are in progress and nearing completion and will provide additional insights into this rapidly evolving area of research.

**PowerPoint slides for this presentation are available at the Seeking Synchronicity web site:  
<http://www.oclc.org/research/projects/synchronicity/>**

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**Results Comparing Relational Facilitators and Barriers**  
**of Screnager VRS Users, College to Older Adult Users, and Librarians Employing the**  
***Radford Chat Reference Category Scheme for Relational Dimensions* ©2006**

	<b>Screenagers to Librarians N=146</b>	<b>Librarians to Screenagers N=146</b>	<b>Librarians to Others* N=226</b>	<b>Others to Librarians N=226</b>
<b>Facilitators</b>				
<b>Greeting Ritual</b>	33 (23%)**	76 (52%)	108 (48%)	68 (30%)
<b>Rapport Building</b>				
Seeking reassurance, confirmation, self-disclosure	57 (39%)	89 (61%)	115 (51%)	111 (49%)
Interjections	20 (14%)	11 (8%)	20 (9%)	38 (17%)
Offering confirmation	11 (8%)	7 (5%)	11 (5%)	18 (8%)
Inclusion	2 (1%)	48 (33%)	76 (34%)	6 (3%)
Approval	5 (3%)	3 (2%)	3 (1%)	14 (6%)
Empathy	4 (3%)	5 (3%)	5 (2%)	8 (4%)
Offering reassurance	16 (11%)	38 (26%)	56 (25%)	36 (16%)
Encouraging remarks praise	4 (3%)	18 (12%)	39 (17%)	13 (6%)
Enthusiastic remarks	2 (1%)	5 (3%)	4 (2%)	7 (3%)
Informal language	13 (9%)	8 (5%)	9 (4%)	21 (9%)
Alternate spelling abbreviated single words	41 (28%)	20 (14%)	28 (12%)	60 (27%)
Slang expressions	16 (11%)	2 (1%)	9 (4%)	21 (9%)
All lower case	43 (29%)	5 (3%)	16 (7%)	71 (31%)
Repair, self-correction	18 (12%)	5 (3%)	13 (6%)	25 (11%)
Humor	3 (2%)	0 (0%)	1 (0%)	6 (3%)
Self disclosure	61 (42%)	8 (5%)	17 (8%)	125 (55%)
Offering personal opinion, advice, value judgment	4 (3%)	43 (29%)	83 (37%)	10 (4%)
Admitting lack of knowledge or being at a loss as to where to search	13 (9%)	16 (11%)	31 (14%)	47 (21%)
Explaining search strategy	1 (1%)	9 (6%)	31 (14%)	6 (3%)
Explaining technical problems	5 (3%)	14 (10%)	26 (12%)	21 (9%)
Familiarity	1 (1%)	4 (3%)	2 (1%)	1 (0%)
Acknowledging humor	0 (0%)	1 (1%)	4 (2%)	0 (0%)
<b>Deference</b>				
Polite expressions	31 (21%)	83 (57%)	127 (56%)	61 (27%)
Thanks	75 (51%)	32 (22%)	51 (23%)	175 (77%)
Apology	10 (7%)	16 (11%)	28 (12%)	20 (9%)
Self-deprecating remarks	4 (3%)	2 (1%)	1 (0%)	10 (4%)
Asking for other to be patient	6 (4%)	57 (39%)	80 (35%)	9 (4%)
Agreement to try what is suggested or to wait	46 (32%)	2 (1%)	1 (0%)	116 (51%)
Suggesting strategy or explanation in tentative way	6 (4%)	12 (8%)	25 (11%)	8 (4%)
Praise, admiration	6 (4%)	0 (0%)	1 (0%)	13 (6%)
Expressions of enthusiasm	7 (5%)	4 (3%)	10 (4%)	16 (7%)

Facilitators, Continued

Notes: \*Others include College Age or Adults; \*\*Columns include numbers and percentages of the chat transcripts that included these relational dimensions.

[www.oclc.org/research/projects/synchronicity/resources/asist07-handout.pdf](http://www.oclc.org/research/projects/synchronicity/resources/asist07-handout.pdf)

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<b>Rerepresentation of Nonverbal Cues</b>				
Ellipsis	24 (16%)	43 (29%)	59 (26%)	48 (21%)
Punctuation or repeated punctuation for emphasis	30 (21%)	22 (15%)	38 (17%)	53 (23%)
Phrase abbreviations	6 (4%)	0 (0%)	3 (1%)	8 (4%)
Emoticons	7 (5%)	5 (3%)	8 (4%)	13 (6%)
Spells out nonverbal behaviors	3 (2%)	1 (1%)	1 (0%)	4 (2%)
All CAPS	13 (9%)	4 (3%)	11 (5%)	18 (8%)
Alpha-numeric shortcuts	5 (3%)	0 (0%)	2 (1%)	5 (2%)
Asterisk, other symbol for emphasis	7 (5%)	1 (1%)	4 (2%)	8 (4%)
<b>Closing Ritual</b>	<b>47 (32%)</b>	<b>31 (21%)</b>	<b>62 (27%)</b>	<b>111 (49%)</b>
Invites to return if necessary	1 (1%)	21 (14%)	25 (11%)	1 (0%)
Makes sure user has no more questions	0 (0%)	27 (18%)	45 (20%)	1 (0%)
Offers to continue searching & e-mail answer	0 (0%)	7 (5%)	24 (11%)	0 (0%)
Explanation of signing off abruptly	8 (5%)	8 (5%)	2 (1%)	12 (5%)
<b>Barriers</b>				
<b>Relational Disconnect, Failure to Build Rapport</b>				
Robotic answer	0 (0%)	0 (0%)	3 (1%)	0 (0%)
Reprimanding	2 (1%)	6 (4%)	1 (0%)	3 (1%)
Limits time	0 (0%)	9 (6%)	4 (2%)	0 (0%)
Lack of attention, ignoring question	0 (0%)	3 (2%)	2 (1%)	0 (0%)
Condescending	3 (2%)	3 (2%)	1 (0%)	4 (2%)
Ignoring self-disclosure	0 (0%)	2 (1%)	7 (3%)	0 (0%)
Misunderstands question	0 (0%)	1 (1%)	1 (0%)	0 (0%)
Inappropriate script or inappropriate response	2 (1%)	4 (3%)	6 (3%)	2 (1%)
Failing to offer reassurance	2 (1%)	7 (5%)	13 (6%)	3 (1%)
Mirrors rude behavior	1 (1%)	0 (0%)	0 (0%)	1 (0%)
Disconfirming	18 (12%)	3 (2%)	12 (5%)	26 (12%)
Ignoring humor	0 (0%)	0 (0%)	1 (0%)	0 (0%)
Impatience	12 (8%)	2 (1%)	0 (0%)	13 (6%)
Rude or insulting	9 (6%)	0 (0%)	0 (0%)	9 (4%)
Inappropriate language	6 (4%)	0 (0%)	0 (0%)	6 (3%)
Failure or refusal to provide information when asked	1 (1%)	7 (5%)	5 (2%)	3 (1%)
Derisive spelling out nonverbal behaviors	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Mistakes	1 (1%)	0 (0%)	0 (0%)	1 (0%)
Goofing around	4 (3%)	0 (0%)	1 (0%)	4 (2%)
Uses jargon no explanation	1 (1%)	1 (1%)	5 (2%)	5 (2%)
<b>Negative Closure</b>				
Abrupt ending	63 (43%)	23 (16%)	20 (9%)	109 (48%)
Disclaimer	0 (0%)	6 (4%)	11 (5%)	0 (0%)
Premature or attempted closing	0 (0%)	5 (3%)	9 (4%)	2 (1%)
Ignoring cues that user wants more help	0 (0%)	6 (4%)	7 (3%)	0 (0%)
Premature referral	0 (0%)	4 (3%)	8 (4%)	0 (0%)
Sends to Google	0 (0%)	8 (5%)	0 (0%)	0 (0%)
Failure to refer	0 (0%)	2 (1%)	5 (2%)	0 (0%)

Notes: \*Others include College Age or Adults; \*\*Columns include numbers and percentages of the chat transcripts that included these relational dimensions.

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**Example of Positive Face-Work, “The size of an Atom.” (QP 275)**

1	U	hi i have a science question im not quite sure about. which are bigger (from say smallest to largest): and atom, chromosome, molecule, cell, and substance/chemical formula of a substance?
2	L	Patron's screen name: [Patron Name]
3	L	Hi [Patron Name], i'm reading your question now.
4	L	[Patron Name], can you explain "substance/chemical formula of a substance"? is that the size of a substance?
5	U	well, really just a chemical formula. like, is a chemical formula inside a cell, or is it made up of cells,? i wasn't sure about that one.
6	L	When you are talking about size do you mean measurement or weight?
7	U	measurement
8	L	Okay, I'm going to send a description about a size. I can help you with descriptions of each item, and from there you can determine which is smallest to largest...okay?
9	L	<a href="http://www.triumf.ca/EHS/rpt/rpt_1/node7.html">http://www.triumf.ca/EHS/rpt/rpt_1/node7.html</a>
10	U	ok
11	L	I just sent a description about an atom, did you receive it?
12	U	yes
13	L	Was the ifnformation helpful?
14	U	yes
15	L	Are you ready for another description? When we end this chat, you can add your email, and the links will be sent to you. They will also appear at the end of our chat.
16	L	Also, to make sure I find the appropriate information, what grade level is this information for?
17	U	7th grade, yep im ready
18	L	<a href="http://www.ornl.gov/sci/techresources/Human_Genome/posters/chromosome/faqs.shtml">http://www.ornl.gov/sci/techresources/Human_Genome/posters/chromosome/faqs.shtml</a>
19	L	I just information about the chromosome. Please let me know when you receive it and if it is helpful, or too technical. :) thanks.
20	U	ok, i understand. a cell is bigger than an atom and a chromosome is smaller than a cell, but is it smaller than an atom?
21	L	hmmm...that is a very good question, let me see what i can find...
22	U	ok. thankyou
23	U	actually, i think i get it now. thank you for helping me!
24	L	Okay, would you still like descriptions of the rest?
25	U	maybe just whether an atom is bigger than a chromosme

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*Example of Positive Face-Work, continued*

26	L	<a href="http://antoine.frostburg.edu/cgi-bin/senese/searchglossary.cgi?query=molecule&amp;shtml=%2Fchem%2Fsenese%2F101%2Fglossary.shtml">http://antoine.frostburg.edu/cgi-bin/senese/searchglossary.cgi?query=molecule&amp;shtml=%2Fchem%2Fsenese%2F101%2Fglossary.shtml</a>
27	L	I just sent a description of a molecule. I'm going to look to see about atoms and chromosomes.
28	L	still searching...
29	L	i'm finding information about each, but not in relation to each other....i'm still searching...
30	U	ok
31	L	[Patron Name], I'm at a loss. I haven't found anything to answer your question. I could mark your question for follow-up and someone would get back to you within the next several days. When do you need your answer?
32	U	By tomorrow but i don't think it's vitally important. Thank you for trying
33	U	Patron ended chat session.
34	L	Your Welcome [Patron Name]. Good luck with your project, and I hope you find the answer.
35	L	<a href="http://www.google.com/search?hl=en&amp;lr=&amp;rls=RNWE,RNWE:2004-49,RNWE:en&amp;defl=en&amp;q=define:Chromosome&amp;sa=X&amp;oi=glossary_definition&amp;ct=title">http://www.google.com/search?hl=en&amp;lr=&amp;rls=RNWE,RNWE:2004-49,RNWE:en&amp;defl=en&amp;q=define:Chromosome&amp;sa=X&amp;oi=glossary_definition&amp;ct=title</a>
36	L	Set Resolution: Answered
37	L	Set Description: Homework

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**Example of Negative Face-Work, “Mesopotamian Government.” (QP 44)**

1	U	Can you find me information on Mesopotamian government?
2	L	[Please hold for the next available librarian. If you would like a transcript of this session emailed to you, please type your full email address now.]
3	L	[[Librarian Name]-MillVPL - A librarian has joined the session]
4	L	[Hello [Patron Name]...I'm looking at your question...]
5	L	it looks like your pc is not compatible with mine--we are unable to cobrowse, so I'll go to google to search. Have you looked for infomation there?
6	U	yes
7	L	well I found an excellent link on the google page...you can put into google's search bar : Mesopotamia +government and look at the links they provide...
8	U	can you send them to me
9	L	if we could cobrowse we could look at the links together...but you can do the search yourself, yes?
10	L	Mesopotamia +government
11	L	buhler.usd313.k12.ks.us/prosperity/meso3.html
12	L	www.kidsnewsroom.org/elmer/infoCentral/ frameset/civilizations/meso/gov/
13	L	oi.uchicago.edu/OI/MUS/ED/TRC/MESO/law.html - 14k -
14	U	I have already searched there and that really doesn't help me
15	L	It would be much easier for you to do the google search I showed you so you could click on the links and read the conten as you go along...
16	L	why not?
17	L	Can you describe your needs a little for me?
18	L	[Patron Name]...are you there?
19	U	Well I want to know how the government ran and just a little information on Hammurabi
20	L	okay...let me look at one of the links I sent you...
21	L	The Laws of Hammurabi are the longest and best organized of the law collections that survive from ancient Mesopotamia. King Hammurabi, who ruled from ... oi.uchicago.edu/OI/MUS/ED/TRC/MESO/law.html - 14k
22	L	this link answers your questions--you need to look at this site--can you do that?
23	U	no
24	L	do you know how to use google?
25	U	yes
26	L	www.google.com

*Example of Negative Face-Work, continued*



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27	L	so what happens when you type in the search bar: Mesopotamis +government?
28	L	Mesopotamia
29	U	can you connect me with [Librarian2 Name]
30	L	hold on...
31	L	I don't see anyone with that name--just different libraries. You could log out and come back in again if you like?
32	U	Can you contact me with anyone from the Porter Ranch Library
33	L	I'm going to go on to another person if you don't want to continue--I need to have a little input from you...
34	L	I'm sorry, where is that library--in the LA area?
35	U	yes
36	L	I see Thousand Oaks...but not Porter Ranch...
37	L	you can log out and come back in again...if you like
38	U	can you try the west valley regional
39	L	I'm going to log out now--you can request that when you come back in--I only saw Thousand )aks...
40	L	oaks
41	U	what
42	L	Try the links I sent you...you can get the information you need---goodbye and come again!
43	U	what
44	L	Note to staff: COMP [[Librarian Name]-MillVPL - user has closed this session]
45	L	Chat Session Ended.