Exploring the Impact of Computer Self-Efficacy on User Contributions and Learning within a Listserv Environment

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Exploring the Impact of Computer Self-Efficacy on User Contributions and Learning within a Listserv Environment

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ABSTRACT
This paper reports on the effects of computer self-efficacy and involvement on satisfaction with using a Listserv Web site, learning, and team-member tie strength. The customized Listserv allowed one hundred sixteen undergraduate students, enrolled in database and decision support courses, to exchange ideas and documents related to an Oracle class project. Questionnaires were administered before and after the class projects to study learning effects. The Listserv software collected data regarding logins, message and document postings, and lurkers (browsers). Findings indicate that the interaction of computer self-efficacy and involvement resulted in increased learning as well as tie-strength.

Keywords
Virtual Learning Environments, Web-based training, experimental research, basic skills training, information technology training, computer self-efficacy.

INTRODUCTION
Researchers have theorized and reported that computer self-efficacy (Bandura, 1997) affects computer usage (Compeau & Higgins, 1995; Compeau, Higgins, & Huff, 1999), satisfaction with technology (Staples, Hulland, & Higgins, 1999), and learning (Leidner & Jarvenpaa, 1995). More specifically, these studies show that individuals high in computer self-efficacy (CSE) will have increased computer use, learning, and satisfaction. Computer self-efficacy has also been shown to enhance the cultivation of online relationships when these relationships are established and sustained using computer mediated communications (CMC) technologies (Staples et al., 1999).

The use of CMC within an academic environment has resulted in increased learning and satisfaction (Alavi, Wheeler, & Valacich, 1995; Leidner & Jarvenpaa, 1995). Increased learning is due in part to the fact that CMC enhances collaboration throughout the learning process (Leidner & Jarvenpaa, 1995). Increased satisfaction is from greater interest and involvement in collaborative learning activities (Alavi et al., 1995). Researchers argue that CMC technologies (e.g. video conferencing) are almost as effective as face to face communication in terms of the richness of the messages exchanged during a learning session (Alavi et al., 1995).

Message richness and media choice are the essence of Media Richness Theory (MRT). MRT assesses the richness of the media along four dimensions: the amount of feedback, cues, language variety, and personal focus that a media allows (Daft, Lengel, & Trevino, 1987). MRT proposes that richer forms of communication such as face to face are better at communicating equivocal information than lean forms of communication such as text based email (Daft & Lengel, 1986; Daft et al., 1987). However, MRT does not consider the complexity of how relationships between individuals evolve over time. To develop a rich dialog over time, a deeper understanding of how to use lean media, particularly text, is required (Lee, 1994).

One technology that is frequently used to support CMC is a Listserv. A Listserv is an Internet-based software package that supports controlled access to a message distribution and discussion facility. Registered or authorized users exchange information by sending email messages to the Listserv host. Since a Listserv uses text as its primary message medium, a Listserv represents a lean channel of communication on the MRT continuum.

Researchers have studied the factors that motivate participants to use and contribute to Listservs. They have shown that individuals that have never met share useful information (Sproul & Kiesler, 1986) and that individuals share information for
mostly intrinsic reasons (Wasko & Faraj, 2000). Also, researchers have found that the amount of information exchanged contributes to the overall perceived success of the Listserv (DeSanctis, 2001).

This paper focuses on the individual factors that contribute to the success of Listservs, where success will be measured as the amount of information learned, satisfaction with use, and the strength of online relationships. The motivation for this study is that Listservs are a relatively inexpensive and potentially effective means to promote learning. Additionally, research on Listservs is very limited, especially research on how the use of Listservs enhances learning. The primary antecedent of the success factors will be computer self-efficacy (Compeau & Higgins, 1995; Compeau et al., 1999). Thus, the following general research question seeks to guide this research: How does an individual’s computer self-efficacy contribute to the individual’s learning, satisfaction, and strength of online relationships when using a Listserv to support learning-based tasks?

THEORETICAL MODEL

Social Cognitive Theory (SCT) is a widely accepted theory used to explain and understand human behavior (1997). The basic precept is that individuals form a triadic relationship with their environment, behavior, and personal factors. This three-way relationship is described as reciprocal determination. In other words, what a person thinks, believes, and feels determines how the person behaves (Bandura, 1997). Because of the triadic relationship, individuals tend to participate in activities according to their personal preferences and competencies. Through their actions, people create as well as select environments. Environmental influences, in turn, partly determine which forms of behavior are developed and activated. According to SCT, environmental influences and personal characteristics affect behavior. Bandura’s triadic relationship is represented in Figure 1.

![Figure 1: The Triadic Reciprocity or Reciprocal Determinism](image)

Bandura (1997) emphasizes that an individual’s behavior will ultimately determine their performance. This research extends Bandura’s model by hypothesizing that individual factors will moderate the relationship between behavior and performance. Consistent with SCT, we consider Computer Self-Efficacy (CSE) an individual factor. We measure performance as the individual’s learning, satisfaction, and tie-strength. Behavior is measured as the level of involvement in Listserv activities. Using these measures, we posit that CSE will have a moderating effect on the relationship between involvement and the dependent variables learning, satisfaction, and tie-strength. Our theoretical model is shown in Figure 2.
One behavior particularly important in high academic performance is involvement in course activities (Alavi et al., 1995; Leidner & Jarvenpaa, 1993; Webster & Hackley, 1997). These researchers found that involvement for distant learning students lead to increased learning (Webster & Hackley, 1997), and was a critical factor in learning through the use of CMC technologies (Alavi et al., 1995).

\[ H_1: \text{Increased involvement in the Listserv will result in increased learning.} \]

Involvement has been shown to influence the individual’s satisfaction with CMC (Hiltz & Johnson, 1990). Hiltz and Johnson (1990), using a modified version of the Bailey and Pearson (1983) instrument, found that prior and current involvement with the technology increased the degree of satisfaction with CMC technologies.

\[ H_2: \text{Increased involvement in the Listserv will result in increased satisfaction in the Listserv.} \]

Tie-strength is measured as a combination of four dimensions: quantity, emotional intensity, intimacy, and reciprocity of communications (Granovetter, 1982; Marsden & Campbell, 1984). Additionally, some of these dimensions are correlated (Granovetter, 1982; Marsden & Campbell, 1984). For example, individuals that incur more frequent communications over longer periods will increase the emotional intensity and intimacy of their exchanges as they get to know each other (Granovetter, 1982). Consequently, individuals that exchange more messages will have stronger ties (Granovetter, 1982). Tie-strength is important to the success of Listservs because it measures the degree that the individuals trust and depend on one other.

\[ H_3: \text{Increased involvement in the Listserv will result in increased tie-strength.} \]

Perceived self-efficacy refers to beliefs in one’s capabilities to perform actions in attaining concomitant outcomes (Bandura, 1997). Researchers have tied self-efficacy directly with performance in explaining why particular individuals learn new skills quickly and with less effort (Karl, O'Leary-Kelly, & Martocchio, 1993). However, when researchers manipulate environmental variables, they find that self-efficacy moderates rather than mediates relationships between the environmental variable and performance (Saks, 1994).

Computer self-efficacy (CSE) is a specific type of self-efficacy (Bandura, 1997) and relates to an individual’s perceived judgment of their capability to use a computer (Compeau & Higgins, 1995; Compeau et al., 1999; Hill, Smith, & Mann, 1987). Individuals use self-efficacy to exercise control over their environment. Their perceptions of their ability increase or decrease their motivation and affect, and ultimately determine their actions and behaviors.
Because students choose to participate in Listserv activities, it is proposed that involvement in the Listserv is an environmental variable. Thus, we expect to find that CSE will moderate the relationship between the independent variable involvement and the dependent variable learning.

\textit{H4a: When using a Listserv, CSE will moderate the relationship between involvement and learning such that increased CSE will result in increased learning.}

CSE has been shown to predict use of a technology and satisfaction with usage (Compeau & Higgins, 1995; Compeau et al., 1999). Researchers have found that individuals with high CSE experience higher IT usage and are more satisfied with the use of technology (Compeau & Higgins, 1995; Compeau et al., 1999).

\textit{H4b: When using a Listserv, CSE will moderate the relationship between involvement and satisfaction such that increased CSE will result in increased satisfaction in the Listserv.}

Individuals with high CSE will have increased CMC usage (Compeau & Higgins, 1995; Compeau et al., 1999). More frequent use of CMC will increase the quantity of messages and subsequently strengthen the ties among individuals using the technology (Marsden & Campbell, 1984).

\textit{H4c: When using a Listserv, CSE will moderate the relationship between involvement and tie-strength such that increased CSE will result in increased tie strength.}

\textbf{RESEARCH DESIGN}

\textbf{Overview}

The research setting involved 115 subjects working in self-organized groups of 2 or 3 to complete a set of course-required tasks in Oracle Forms Developer and PL/SQL. All subjects had Internet access to a Listserv on which they received uniform training. Subjects participating in the study were volunteers. No extra credit or incentives were provided for participation. Additionally, one graduate student, serving as an Oracle help desk coordinator, contributed and used the Listserv. In fact, this person was the primary contributor of postings. This person posted a new message when she determined that a general problem or misunderstanding existed and a posting would be helpful to all classes.

\textbf{The Subjects}

The 115 subjects were junior and senior undergraduate majors in Management Information Systems (MIS) at a large public university in the Southeast United States. All subjects were enrolled in one of six sections of a database class in the same semester. The average age of the students was 22.9 years (SD=2). 28% of the students were female. Seventy-eight out of 115 subjects (67.8%) reported prior experience with a Listserv.

\textbf{Procedure}

To address the issue of common method variance (Cook & Campbell, 1979) data was collected at multiple points throughout the study period. A pretest was administered during class time early in the semester. The pretest collected demographic information, computer self-efficacy, and Oracle knowledge. After all pretest data was collected, subjects were informed or reminded of their Listserv login id and password through an email message. The email also included reminders on how to access and use the Listserv.

The Listserv was moderated for offensive content. When a student emailed a posting to the Listserv, the message was reviewed for appropriateness and then either accepted or rejected. If accepted, the message was posted to the Listserv, which also resulted in the message being sent to all participants. None of the emails sent to the Listserv were deemed inappropriate.

During the last week of the semester, the posttest was administered during class time. The posttest measured the student’s Oracle knowledge, satisfaction with using the Listserv, and tie-strength of their online relationships. After administering the posttest, subjects were debriefed.

\textbf{MEASURES}

\textbf{Computer self-efficacy}

The computer self-efficacy measure was adapted, with minor wording changes as related to the Oracle task, from Lee and Bobko (1994). The scale consisted of ten items, each measured with a yes/no response along with the percentage confidence level using anchors of 1 (not at all) to 100 (to a great extent). A sample item is “I could complete my Oracle project using
the Oracle Listserv if there was no one around to tell me what to do as I go.” Computer self-efficacy strength was measured by asking subjects about the degree of confidence in their ability to complete the class project using the Listserv. The raw scores of computer self-efficacy strength were summed across the self-efficacy levels that had been answered “yes” (Lee & Bobko, 1994). One item, “I could complete my oracle project using the Oracle Listserv if there was no one around to tell me what to do as I go”, was omitted because its loading did not load as high as other items in the scale. The reliability for this measure was 0.84.

Involvement
The involvement measure was derived from Wasko and Faraj (2000). This measure was calculated based on the number (frequency) of postings. From this measure, subjects were categorized into two groups: active and non-active. Lurkers (Pickering & King, 1995) were categorized as non-active. Additionally, an overall involvement measure was defined. This measure was a summation of frequency data consisting of the number of logins, number of pages accessed, and number of postings.

Tie-strength
Tie-strength measured the strength of the relationships among team members participating in the Listserv. The instrument used to measure tie-strength was taken from Wasko and Faraj (2000). The measure is a fourteen item, five-point Likert scale with anchors of 1 (not at all) to 5 (to a great extent). One item, “I know that other members will help me, so it’s only fair to help other members”, had a loading of 0.28. This item was omitted in the analysis. The reliability for this scale was 0.86.

SATISFACTION
Bailey and Pearson (1983) developed a 39-item, 5-point Likert scale, with anchors of 1 (strongly disagree) to 5 (strongly agree), instrument for measuring satisfaction with technology. Ives et al. (1983) revised the instrument, eliminating items that were psychometrically unsound. The revised instrument was used to measure satisfaction. The reliability for this measure was 0.95.

Learning
Piccoli, Ahmad & Ives (2001) used an examination to measure the student’s knowledge. Following this method, an examination was developed to measure the student’s knowledge of Oracle Forms Developer and PL/SQL. The instrument consisted of 10 questions. The same questions were given in the pre and posttest. It was intended that learning would be measured as the difference between the pre and posttest. However, 29 students’ (25%) posttest scores were lower than their pretest scores. Cook and Campbell (1979) indicate that a pre and posttest comparison is sometimes difficult because of maturation and timing issues. Therefore, only the posttest scores were used in accessing that amount of learning that occurred as a result of participating in the Listserv.

Data Analysis
Contingency theory has been used to study relationships among variables within organizational contexts (McKeen, Guimaraes, & Wetherbe, 1994). The model proposed in this study suggests that the relationship between involvement and the dependent variables satisfaction, tie-strength, and learning is positive and that the strength of these relationships is moderated by computer self-efficacy.

Linear regression was used to test the relationships between involvement and the dependent variables learning, satisfaction, and tie strength. To test the hypotheses that self-efficacy moderates the relationships between involvement and the dependent variables, Moderated Regression Analysis (MRA) was performed as recommended by Sharma, Durand and Gur-Arie (1981).

In applying MRA for a single predictor variable (i.e. involvement (I)), four regression equations are examined. The criterion variables satisfaction, learning, and tie strength are all represented as D. The moderator variable is always computer self-efficacy (CSE). The descriptive covariates are gender (G) and age (A). The equations are:

1. \[ D = A + G \]
2. \[ D = A + G + a_1 I \]
3. \[ D = A + G + a_1 I + b_2 CSE \]
4. \[ D = A + G + a_1 I + b_2 CSE + b_3 I * CSE \]
According to the MRA technique, if equations 3 and 4 are not significantly different (i.e. \( b_3 = 0, b_2 \neq 0 \)), then computer self-efficacy is not a moderating variable, but rather an independent (predictor) variable. For computer self-efficacy to be a moderating variable, equations 2 and 3 must be similar yet significantly different from equation 4 (i.e. \( b_2 \neq 0, b_1 \neq 0 \)). Conversely, if equations 2, 3, and 4 are significantly different from each other, then computer self-efficacy is both a moderating and independent predictor variable (i.e. \( b_2 \neq b_3 \neq 0 \)).

**Results**

Means, standard deviations, and intercorrelations among the variables in the study are presented in Table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>S.D.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Involvement (Inv)</td>
<td>1.99</td>
<td>5.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Learning</td>
<td>3.87</td>
<td>1.47</td>
<td>0.20*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Computer Self-Efficacy (CSE)</td>
<td>0</td>
<td>1.72</td>
<td>-0.18*</td>
<td>0.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Satisfaction</td>
<td>2.88</td>
<td>0.71</td>
<td>-0.12</td>
<td>-0.11</td>
<td>0.11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Tie-strength</td>
<td>2.75</td>
<td>0.72</td>
<td>-0.04</td>
<td>-0.08</td>
<td>0.11*</td>
<td>0.68**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Gender (G)</td>
<td>72 %</td>
<td>male</td>
<td>-0.03</td>
<td>-0.41</td>
<td>-0.20</td>
<td>-0.02</td>
<td>-0.10</td>
<td></td>
</tr>
<tr>
<td>7. Age (A)</td>
<td>22.9</td>
<td>3.67</td>
<td>0.05</td>
<td>0.00</td>
<td>0.00</td>
<td>-0.22*</td>
<td>-0.19*</td>
<td>-0.03</td>
</tr>
</tbody>
</table>

**Cross-Product Term**

<table>
<thead>
<tr>
<th>M</th>
<th>S.D.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. Inv * CSE</td>
<td>0.94**</td>
<td>0.23**</td>
<td>-0.05</td>
<td>-0.14</td>
<td>-0.29</td>
<td>-0.03</td>
<td>0.06</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Means, standard deviations, and intercorrelations of study variables

\( N = 115 \)

* \( p < .05 \)

** \( p < .01 \)

The control variables (i.e. age and gender) were entered into the regression equation first. Age was found to relate to only two of the six study variables, satisfaction and tie strength (\( p < 0.05 \)). Gender did not relate with any of the study variables (\( p > 0.8 \)).

The results of the moderated regression analysis are shown in Table 2. The independent variable, involvement, and moderating variable, computer self-efficacy were centered. As hypothesized (H1), individuals demonstrating more
involvement in Listserv activities had increased learning. The relationship between involvement and learning was significant, therefore, hypothesis 1 was accepted. Hypothesis 2 proposed that individuals demonstrating more involvement in Listserv activities would report greater satisfaction with the Listserv technology than individuals with lower involvement. The relationship between involvement and satisfaction was significant. However, the relationship was in the opposite direction as hypothesized. Therefore, hypothesis 2 is rejected. Hypothesis 3 proposed that individuals with higher levels of involvement in Listserv activities would report greater tie-strength with their communication partners than individuals with lower levels of involvement. The relationship between involvement and tie strength was significant, however, the relationship was in the opposite direction as hypothesized. Therefore, hypothesis 3 is rejected.

### Table 2: Moderated Regression Analyses (MRA) Results

Hypotheses 4a, 4b and 4c proposed that a moderating effect of computer self-efficacy would be significant for learning, satisfaction, and tie-strength. Computer self-efficacy was found to be a predictor for learning and tie-strength, but not satisfaction. Computer self-efficacy did not moderate either learning (4a) or satisfaction (4b). Therefore, 4a and 4b are rejected. Computer self-efficacy was found to moderate the involvement to tie-strength relationship. However, since the relationship between involvement and tie strength is negative, hypothesis 4c is also rejected.
Discussion
This research hypothesized that involvement in Listserv activities increases learning, satisfaction, and the strength of online relationships. This study also contends that a contingency factor, computer self-efficacy, significantly affects the relationships between involvement and the dependent variables learning, satisfaction, and the strength of online relationships.

The independent variable, involvement, did affect as hypothesized, the dependent variable, learning. However, for the dependent variables, tie strength and satisfaction, increased involvement in Listserv activities led to a decrease in tie strength and satisfaction. This negative relationship between satisfaction and involvement may stem from the fact that students prefer a richer environment in accessing Oracle information.

A qualitative session with students was held to determine why participation was low within the Listserv. Students indicated that the Listserv did not provide them with enough information to complete their Oracle projects. Students further indicated that they preferred to ask questions to an expert in person. We contend that since Oracle questions typically have more than one solution, and to reduce equivocality in communicating Oracle knowledge, students may require richer formats such as face-to-face communications.

Computer self-efficacy was hypothesized to moderate the relationships between involvement and learning, satisfaction, and strength of online relationships. The results indicate that computer self-efficacy moderates the relationship between involvement and tie strength, and the moderating effect is positive. However, the relationship between involvement and tie strength was negative. These confounding relationships indicate that individuals with high computer self-efficacy can maintain lower involvement in Listserv activities and still strengthen their online relationships.

Limitations
One of the main limitations of this study was that the number of subjects in the nonparticipation group was significantly greater than the number of subjects in the participating group. Listservs typically take years for participation to reach a sustainable community (Wasko & Faraj, 2000). Because the Listserv in this experiment had only been in operation for one semester, participation was low.

Another limitation of the study is that students interacted with each other outside the Listserv environment during the course of the experiment. Learning may have been influenced by these interactions. In addition, the study use only students currently enrolled in the MIS program. Notably, MIS majors, will have a higher CSE than students in currently enrolled in other majors. However, it is important to note that very few (less than 2 percent) of the subjects indicated previous experience with Listservs. Additionally, students’ experiences with Listservs did not have an affect on any of the study’s variables.

The use of student subjects is a potential risk to the external validity of the study and represents a limitation of the study (Benbasat, 1989). In this study, the use of student subjects does not create a significant risk to the external validity. Primary, this is because the focus of the Listserv (e.g. Learning Oracle) is one of the main objectives of the database class. Subjects were interested in the content of the Listserv because it directly related to the objectives of the database class.

CONCLUSION
The statement drawn most from this research is that involvement in outside resources, specifically a Listserv, improves learning. However, the degree to which learning is improved is a result of how well the resources meet the informational and media needs of the student. Consistent with prior research (Alavi et al., 1995; Leidner & Elam, 1995) and SCT, we found that greater involvement in classroom activities led to increased learning. Consistent with MRT, the lack of richness in the media reduced user satisfaction and subsequently led to decrease involvement (Daft et al., 1987). Self-efficacy did not improve learning or satisfaction. Bandura (1997) did concede that some individuals with higher self-efficacy require less involvement in classroom activities to achieve high performance. Hence, people that indicated that they could easily learn Oracle using a Listserv may also be able to learn Oracle on their own and subsequently not used the Listserv.

References


APPENDIX A

Item loadings

<table>
<thead>
<tr>
<th>Item</th>
<th>Completely Standardized Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self-efficacy</td>
</tr>
<tr>
<td>Self-efficacy: These questions concern your level of self-efficacy. Please choose the response (a number from 1 to 100) that best reflects your level of agreement with the following statements.</td>
<td></td>
</tr>
<tr>
<td>I could complete my oracle project using the oracle listserv</td>
<td></td>
</tr>
<tr>
<td>If there was no one around to tell me what to do as I go.</td>
<td>Yes ___ No ___ Percent confident ___%</td>
</tr>
<tr>
<td>if I had never used a Listserv before</td>
<td>Yes ___ No ___ Percent confident ___%</td>
</tr>
<tr>
<td>if I only had a manual on the Listserv for reference</td>
<td>Yes ___ No ___ Percent confident ___%</td>
</tr>
<tr>
<td>if I had seen someone else use the Listserv before trying it out myself</td>
<td>Yes ___ No ___ Percent confident ___%</td>
</tr>
<tr>
<td>If I could call someone for help if I got stuck</td>
<td>Yes ___ No ___ Percent confident ___%</td>
</tr>
<tr>
<td>if someone else had helped me get started</td>
<td>Yes ___ No ___ Percent confident ___%</td>
</tr>
<tr>
<td>if I had a lot of time to complete the oracle project for which the Listserv was provided</td>
<td>Yes ___ No ___ Percent confident ___%</td>
</tr>
<tr>
<td>if I had just the built-in help facility for assistance</td>
<td>Yes ___ No ___ Percent confident ___%</td>
</tr>
<tr>
<td>if someone showed me how to do it first</td>
<td>Yes ___ No ___ Percent confident ___%</td>
</tr>
<tr>
<td>If there was no one around to tell me what to do as I go.</td>
<td>Yes ___ No ___ Percent confident ___%</td>
</tr>
</tbody>
</table>
Satisfaction: *These questions concern your level of satisfaction. Please choose the response (a number from 1 to 5) that best reflects your level of agreement with the following statements*

<table>
<thead>
<tr>
<th>Item</th>
<th>Self-efficacy</th>
<th>Satisfaction</th>
<th>Tie-Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>The information from the Listserv is presented in a useful format</td>
<td>0.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am satisfied with the accuracy of the Listserv</td>
<td>0.83</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The information clear</td>
<td>0.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Listserv accurate</td>
<td>0.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The system provides sufficient</td>
<td>0.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The system provides up-to-date information</td>
<td>0.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I get the information I need from the Listserv in time</td>
<td>0.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Listserv easy to use</td>
<td>0.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The system user friendly</td>
<td>0.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Listserv provides the precise information I need</td>
<td>0.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The information content of the Listserv meets my needs</td>
<td>0.77</td>
<td></td>
<td></td>
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</tbody>
</table>