

Trustworthy in the Eye of the Beholder? - A Cognitive Perspective on Personal Profile Information in Virtual Project Teams

Ellen Rusman, Jan van Bruggen, Peter Sloep, Rob Koper, Centre for Learning Sciences and Technology (CELSTEC), Open University of the Netherlands, Valkenburgerweg 177, 6419 AT Heerlen,

Email: ellen.rusman@ou.nl, jan.vanbruggen@ou.nl, peter.sloep@ou.nl, rob.koper@ou.nl

Martin Valcke, Department of Educational Studies, Ghent University, Henri Dunantlaan 2, B9000 Ghent, Belgium, Martin.Valcke@UGent.be

Abstract: Collaboration in virtual project teams heavily relies on interpersonal trust, for which perceived trustworthiness is an important determinant. This study provides insight in the foundation of trustors' information preferences to assess a trustee's professional trustworthiness in the initial phase of a virtual project team. We hypothesize that trustors in virtual teams prefer particular information elements since they provide them with relevant cues for trust warranting properties of a trustee. Starting from a list of commonly preferred information elements to inform trustworthiness assessments (n=226), we analyze explanations for these preferences with the help of a theory-grounded coding scheme. Results show that indeed respondents prefer information elements as they provide them with multiple cues to assess the trustworthiness of a trustee. Information elements providing unique cues could not be identified. Results of this study can inform the design of artifacts to get acquainted in the initial phase of a virtual project team.

Introduction

A positive level of interpersonal trust improves collaboration and communication (Corbitt, Gardiner & Wright, 2004; Gambetta, 1988; Jarvenpaa, Knoll, & Leidner, 1998; Jarvenpaa & Leidner, 1998). In contrast, when there is a lack of trust, team members spend considerable time monitoring each other, backing-up or duplicating work, and documenting problems (Wilson, Straus, & McEvily, 2006). Interpersonal trust is a positive psychological state (cognitive and emotional) of a trustor (person who can trust/distrust) towards a trustee (person who can be trusted/distrusted). It comprises trustor's positive expectations of the intentions and future behaviour of the trustee, leading to a trustors' willingness to display trusting behaviour in a specific context (Castelfranchi & Falcone, 2010; Chopra & Wallace, 2002; Hung, Dennis & Robert, 2004; Mayer, Davis & Schoorman, 1995; Riegelsberger, Sasse & McCarthy, 2004; Rousseau, Sitkin, Burt, & Camerer, 1998; Ulivieri, 2005). Although interpersonal trust is both an important pre-condition of, as well as a result of collaboration, still little is known about how we can foster its formation.

One promising approach is to facilitate trustworthiness assessments. The perceived trustworthiness is an important factor influencing overall interpersonal trust of a trustor in a trustee, in combination with a trustors' trust propensity, situational characteristics (e.g. perceived risk, task complexity, social control mechanisms) and trustors' mood at the time of trust formation (Castelfranchi & Falcone, 2010; Riegelsberger, 2005; Rousseau et al., 1998). The extent to which the trustor trusts the trustee to perform adequately is the trustee's perceived trustworthiness (Hardin, 2002). A trustor, when not knowing a trustee, continuously tries to gauge the trustworthiness of a trustee based on available signs and signals revealing the properties of a trustee. Once these signals are used to reveal a certain perceived property of another, they become cues for that property (Donath, 2007). Signs and signals can be related to trustees characteristics, such as their facial expression or education, as well as to behavior, such as providing help or being open about task problems (Six, Nooteboom & Hoogendoorn, 2010). In mediated environments, these signs and signals are different or hampered.

The availability of signs and signals can be stimulated by providing communication support through pre-structured templates (Aranda et al., 2010; Remidez, Stam & Laffey, 2007; Ten Kate, 2009). These templates should then be designed to contain that personal information that is useful to assess the trustworthiness of a trustee, through the display of particular information elements. Information elements are small containers for data about a person. Examples are 'name', 'photo', 'hobbies', 'job title' and so on.

If one knows what type of information trustors prefer to inform their trustworthiness assessments and why they have this particular preferences, one could provide a pre-structured template to facilitate the availability of this information (Rusman, van Bruggen, Cörvers, Sloep & Koper, 2009). However, until today it remains unclear what specific personal information most trustors prefer and why. We do know that personal information can facilitate the growth of interpersonal trust (Zolin, Fruchter & Hinds, 2003; Feng, Lazar & Preece, 2004), but we do not know what specific information supports trustworthiness assessments.

We hypothesize that trustors seek specific information that matches with their cognitive schema of trustworthiness while they try to instantiate this schema to assess the trustworthiness of a specific trustee. This schema guides their search for information that can function as cues for trust-warranting properties of a trustee.

We test whether trustors prefer information elements that provide these cues to determine whether someone is trustworthy. We try to answer the following question:

Do trustors prefer those information elements that provide them with (relevant/multiple/unique) cues for specific trust-warranting properties?

The answer to this question provides insight in the foundation of information preferences, which can guide the design of communicative templates as well as icebreaker activities in both face-to-face as well as virtual teams.

Method

A questionnaire was used to collect data on common information element preferences to inform trustworthiness assessments as well as justifications of these preferences. Based on a ranked list with the fifteen most commonly selected information elements, we analyzed the explanations respondents gave for their preferences with the help of a coding scheme.

Participants

Data were collected among bachelor level students, enrolled in a research course in the Educational Sciences program at the Ghent University. 226 students (mean age = 18,2 years, SD= 1,85; 93% of whom were female and 7% male.) filled out the questionnaire: 99% of the respondents had previous experience with collaboration in a face-to-face project team, either in a (part-time) job or during their study. 95% had previous experience with collaboration in a virtual project team. 88% of the respondents had experience with online conversations with people they had never met before. The majority of online conversations took place via text-based media only, either via chat and/or e-mail (78%) or in combination with SMS (9%).

Instrument

The questionnaire consisted of two parts and contained open as well as closed questions in the respondents' native tongue (Dutch). The first part questioned respondents on their information element preferences to inform trustworthiness assessments. It contained an open brainstorm followed by the rating of elements (useful to inform their assessment/practical for collaboration) from a pre-defined list. The second part aimed to provide insight in the foundation of these preferences. In this paper we restrict ourselves to the analysis of the second part. Here, participants selected the 10 most important information elements to inform their trustworthiness assessments from all elements obtained in the first part of the questionnaire. They were instructed to justify their choices by explaining what 'facts' they thought they could derive from an information element and why this was important to inform their trustworthiness assessments.

Procedure

The participants filled out the questionnaire after a short presentation that clarified our definition of virtual project teams and that showed some examples. The presentation also discussed the role of interpersonal trust for collaboration and the objectives of the questionnaire. At the start of the questionnaire, respondents were prompted by a scenario in which they acted as a member of a new European project, which required them to collaborate in a virtual project team. They were told that they had to form a first impression of their team members' trustworthiness. Respondents were told that the responses to this questionnaire would be kept anonymous and that it would take about 30 minutes to complete this part of the questionnaire. Table 1 provides an example (translated) of the collected responses.

Table 1: Example response.

Preferred information element	Facts which can be derived from this information element	Explanation of preference
Personal motivation for project	Reason for participation; expectation(s) of project	You get to know whether you are on the same wavelength. Do you have the same expectations?

Data Analysis

We first identified the 15 information elements that were most commonly mentioned as highly informative for trustworthiness assessments. Secondly, all explanations linked with this top 15 were gathered and coded with the help of a coding scheme. The coding scheme was derived from a theoretical framework for interpersonal trust building in virtual teams, called TrustWorthiness ANtecedent schema (TWAN) (Rusman et al., 2010). Some categories were added to allow for explanations which were not related to trust building at all, or that were examples of antecedents of interpersonal trust or trustworthiness not yet mentioned in any of the

predefined categories. We coded 1) whether trustors' explanations of their information preferences match with the trustwarranting properties of a trustee; 2) whether and how they adhere to the trust formation process in general or 3) whether they are not related to interpersonal trust at all. We report the results of the first part of the coding scheme.

Each explanation was considered as a coding unit, multiple different codes were allowed, but no similar double codes were allowed. Two raters individually coded 10% of the explanations with the help of the coding scheme (Neuendorf, 2002). The interrater-reliability (Cohen's Kappa) was 0.79 for the coding with the TWAN schema only and 0.73 for the coding with the complete coding-scheme. According to Fleiss (1981), this can be considered a good (0.6-0.75) to excellent (> 0.75) interrater-reliability. The remaining responses were analyzed by one rater only.

Not all respondents provided explanations of their information preferences. We counted the possible-to-code explanations per information element and expressed the frequencies of 'code-use' in percentages relative to this number of explanations.

Results

Competence (40%), Commitment (26%), Responsibility (17%), Availability (12%) and Communality (7%) were the most frequently mentioned antecedents of professional trustworthiness across all explanations given with the 15 most selected information elements (percentages are expressed relative to the total number of used codes). Table 2 gives some example quotes of the top 3 antecedents mentioned with regard to different information elements. The first and second example also illustrate how a single explanation can be coded with more coding categories, since they contain elements of competence as well as of the route through which information was obtained.

Table 2: Example quotes.

Antecedent	Example quotes with adjoining information element
Competence	<p>"I will perceive someone with more work experience as more reliable as this person will probably do his job well when he could work for several years within a company and he will also, through experience, know more" (<i>work experience</i>)</p> <p>"An older person has more work experience and if he/she is selected to participate in the project he/she has proven to be reliable" (<i>age/date of birth</i>)</p> <p>"How well one can manage languages, positive or negative. It is important to master some languages to advance communication, especially in an international project" (<i>language proficiency</i>)</p>
Commitment	<p>"Number of professions someone had. Rising functions relative to their age. If someone works one's way up, they will also spend more time and energy in the project, therefore you can count on this person" (<i>work experience</i>)</p> <p>"Why someone participates in a project. If someone participates involuntary, he/she will probably less motivated than someone who participates voluntarily" (<i>personal motivation</i>)</p>
Responsibility	<p>"You will know whether someone will dedicate him/herself [to the project] and of what one is capable of. Someone who makes sincere choices is more reliable in accomplishing the task. Someone with ambition already proved that he/she is suitable." (<i>personal motivation</i>)</p> <p>"Someone older has usually more life and work experience. Therefore he/she can also take more responsibility and is autonomous" (<i>age</i>)</p>

Respondents also mentioned various other antecedents (11%), which were not part of the trustworthiness antecedent schema, such as stubborn, enterprising, creative, flexible, respectful, independent/autonomous, enthusiastic and cheerful. Table 3 provides an overview of the code frequencies expressed in terms of percentages calculated relative to the number of obtained explanations for each information element. Different codes per explanations where possible, which explains why sums of percentages exceed 100. The percentage indicates how often respondents mentioned one of the antecedents in the explanations for their information element preferences. As we are interested in the relation between the preference of information elements and the rationale behind this preference, antecedents mentioned in more than 10% of the provided explanations are highlighted.

Table 3: Code frequencies expressed as percentages of the number of obtained explanations.

Codes	Availability	Caring	Communitarity	Commitment	Competence	Consistency	Discretion	Fairness	Faith in intentions	Friendliness	Willingness to help	Honesty	Integrity	Knowledge	Loyalty	Openness	Other Antecedent	Persistence	Receptivity	Reliability	Responsibility	Sharing	Skills
1. Personality traits/character	4	11	8	27	15	10	0	0	2	7	1	6	5	0	0	13	69	10	10	4	5	0	1
2. Work experience	1	2	0	14	91	11	0	0	0	0	8	2	1	9	0	0	10	4	1	2	27	0	9
3. Personal motivation for project	12	1	6	92	8	1	0	0	2	0	0	0	7	0	0	0	4	13	0	5	34	0	0
4. Education/studies/training/diplomas	1	0	1	27	88	0	0	0	0	0	0	0	1	23	0	0	0	6	0	0	35	0	4
5. Age/date of birth	0	0	22	3	73	5	0	0	0	0	0	1	0	5	0	1	3	0	0	6	2	0	0
6. Availability during project/agenda	89	0	1	30	4	4	0	0	0	0	0	1	0	1	0	0	0	1	0	7	22	0	0
7. Recommendations/references/reviews by third parties	0	0	0	15	32	0	0	0	0	0	0	6	0	0	0	0	0	0	0	3	27	0	0
8. Project work experience	0	0	0	14	51	0	0	0	0	0	5	0	0	0	0	0	0	2	0	2	7	0	7
9. Language/language proficiency/language skills	2	0	8	11	81	0	0	0	0	0	3	0	0	5	0	0	5	0	0	0	8	0	45
10. Photo (formal/informal)	0	0	2	2	2	0	0	0	0	2	0	0	0	0	0	5	5	0	0	0	0	0	0
11. Interests/hobbies	13	9	21	34	11	0	0	0	0	0	0	0	0	2	0	2	7	0	0	0	21	2	0
12. Family situation/marital status	36	2	4	10	12	0	0	0	0	0	0	0	6	0	0	4	8	0	0	0	10	0	0
13. Ideas in relation to project	0	0	21	54	33	0	0	0	0	0	3	0	0	3	0	3	15	0	3	0	10	3	8
14. Occupation/function/role/job	7	0	2	17	76	2	0	0	0	0	0	0	0	13	0	2	13	7	0	0	20	0	9
15. Nationality	19	2	28	0	2	0	0	0	0	0	0	0	0	0	0	2	5	0	0	0	0	0	0

Several antecedents were not at all mentioned as a rationale in the explanations of the 15 most commonly preferred information elements, respectively discreteness, fairness and loyalty. For most information elements, respondents used explanations which could be analyzed in terms of the trustworthiness antecedent schema. Only for the information element 'photo' no clear relationship with any trustworthiness antecedent was obtained.

Conclusion and Discussion

Results indicate that trustors value information elements that may reveal information that corresponds to multiple properties of a trustworthy person (as represented in the TWAN schema) most. Especially the antecedents of competence, commitment, responsibility, availability and communality were most often referred to in their explanations. However, respondents did not refer to all antecedents in the TWAN schema: Discreteness, fairness and loyalty were not mentioned at all in the explanations provided with the top 15 most preferred information elements. This could be a result of the focus on the *initial phase* of trust formation, in which some antecedents can be assessed more easily than others. It might also indicate that some antecedents are more heavily emphasized than others when assessing professional trustworthiness.

Participants seem to select information elements that provide multiple cues for multiple antecedents. We could not find proof for the hypothesis of the uniqueness of information elements as cues; most information elements functioned as cue to more than one trustworthiness antecedent. This could be an indication of an 'information efficiency' strategy of trustors; preferring elements that provide cues for more than one trustworthiness antecedents. Reversely, some patterns between information elements and antecedents could also be identified. There seem to be stronger relations between for example the information elements 'work experience', 'education', 'age', 'language skills' and the antecedent 'competence'. Likewise relations can be seen between the elements 'personal motivation', 'ideas in relation with a project' and the antecedent 'commitment'. Results also reveal that not all information preferences can be explained with the cognitive schema of trustworthiness: some information elements, such as a photo, seem to be selected because they provide trustors with a certain 'feeling' about a trustee.

Results of this study are twofold. First, insight in the foundation of information preferences can guide the design of artifacts to get acquainted and to inform trustworthiness assessments in virtual teams, such as profiles. These designs might also prove useful within the context of CSCL. Second, the coding scheme could also function as an analysis framework for interpersonal trust related problems in collaborative settings. Further research is needed to verify whether the scheme can indeed fulfill this function.

References

- Aranda, A., Vizcaíno, A., Palácio, R. & Morán, A. (2010). *What information would you like to know about your co-worker? A case study*. Paper presented at the 5th International Conference on Global Software Development (*ICGSE'10*), 23-26 August 2010. New Jersey. USA.
- Castelfranchi, C., & Falcone, R. (2010). Chapter 2. Socio-Cognitive Model of Trust: Basic Ingredients. In C. Castelfranchi & R. Falcone, *Trust Theory. A Socio-Cognitive and Computational Model* (pp.35-94). Chichester: Wiley & Sons.
- Chopra, K., & Wallace, W. A. (2002). *Trust in electronic environments*. Paper presented at the HICSS 03, Hawaii.
- Corbitt, G., Gardiner, L., & Wright, L. (2004). *A comparison of team developmental stages, trust and performance for virtual versus face-to-face teams*. Paper presented at the 37th Hawaii International Conference on System Sciences, Hawaii.
- Donath, J. (2007). Signals in social supernets. *JCMC*, 13(1), article 12
- Feng, J., Lazar, J., Preece, J. (2004). Empathy and online interpersonal trust: a fragile relationship. *Behaviour and Information Technology* 23 (2), 97–106.
- Fleiss, J. L. (1981) *Statistical methods for rates and proportions*. New York: John Wiley.
- Gambetta, D. (1988). *Trust: making and breaking cooperative relations*. Oxford: Basil Blackwell.
- Häkkinen, P. (2004). What makes learning and understanding in virtual teams so difficult? *Cyber Psychology & Behavior*, 7(2), 201-206.
- Hardin, R. (2002). *Trust and trustworthiness*. New York: Russell Sage Foundation.
- Hung, Y. C., Dennis, A.R., & Robert, L. (2004). *Trust in Virtual Teams: Towards an Integrative Model of Trust Formation*. Paper presented at the 37th Hawaii International Conference on System Sciences, Hawaii.
- Jarvenpaa, S., & Leidner, D. (1998) Communication and trust in global virtual teams. *JCMC*, 3(4)
- Jarvenpaa, S., Knoll, K., & Leidner, D. (1998). Is Anybody Out There?: The Development of Trust in Virtual Teams. *Journal of Management Information Systems*, 14(4), 29-64.
- Mayer, R. C., Davis, J. H., & Schoorman, D. (1995). An integrative model of organizational trust. *Academy of Management Review*, 20(3), 709-734.
- Neuendorf, K. A. (2002). *The Content Analysis Guidebook*. Thousand Oaks: Sage Publications, Inc.
- Riegelsberger, J., Sasse, M. A., & McCarthy, J. (2004). The mechanics of trust: a framework for research and design. *International Journal of Human-Computer Studies*, 62(3), 381-422.
- Remidez, H., Stam, A., & Laffey, J. (2007). Web-Based Template-Driven Communication Support Systems: Using Shadow netWorkspace to Support Trust Development in Virtual Teams. *IJeC*, 3(2), 65-83.
- Rousseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). "Not so different after all: a cross-discipline view of trust". *Academy of Management Review*, 23(3), 393-404.
- Rusman, E., Bruggen, v., J., Cörvers, R., Sloep, P., & Koper, R. (2009). From pattern to practice: Evaluation of a design pattern fostering trust in virtual teams. *Computers in Human Behaviour*, 25(5), 1010-1019.
- Rusman, E., Van Bruggen, J., Sloep, P., & Koper, R. (2010). Fostering trust in virtual project teams: Towards a design framework grounded in a TrustWorthiness Antecedents (TWAN) schema. *International Journal of Human Computer Studies*, 68(11), 834-850.
- Six, F., Nooteboom, B., & Hoogendoorn, A. (2010). Actions that Build Interpersonal Trust: A Relational Signalling Perspective. *Review of Social Economy*, 68(3), 285-315.
- Ten Kate, S. (2009). *Trustworthiness within Social Networking Sites: A study on the intersection of HCI and Sociology* (Unpublished Business studies master's thesis). University of Amsterdam, Amsterdam.
- Ulivieri, F. (2005). *Trust across disciplines*. T3Group - Trust: Theory and Technology. Rome: Institute of Cognitive Sciences and Technology.
- Wilson, J. M., Straus, S. G., & McEvily, B. (2006). All in due time: The development of trust in computer-mediated and face-to-face teams. *Organizational Behavior & Human Decision Processes*, 99(1), 16-33.
- Zolin, R., Fruchter, R., & Hinds, P. (2003). *Communication, Trust & Performance: The Influence of Trust on Performance in A/E/C Crossfunctional, Geographically Distributed Work*. Stanford: Center for Integrated Facility Engineering (CIFE), Stanford University.

Acknowledgments

We would like to thank the Ghent University students for their dedicated collaboration.