Team Virtuality Scale: Validity evidence based on the internal structure

Patrícia Costa (Instituto Universitário de Lisboa (ISCTE-IUL)), Pedro Marques-Quinteiro (School of Economic Sciences and Organizations, Universidade Lusófona) and Jorge Sinval (Instituto Universitário de Lisboa (ISCTE-IUL))

Abstract. Kirkman and Mathieu (2005) coined the term team virtuality to describe a continuum, consisting in three dimensions: the extent to which teams use virtual tools to address work tasks, how much informational value those tools provide and how asynchronous are team interactions. Yet, research on virtual teams typically measures virtuality by the percentage of time teams spend working via technology (e.g. face-to-face, videoconference, e-mail...). This simplistic way of assessing team virtuality does not account for those dimensions.

To address the extent of reliance of virtual tools (ExtRVT) to execute team processes, we selected 10 items from Mathieu, Luciano, D'Innocenzo, Klock & LePine (2019) team processes survey measure, and adapted the instructions to "To what extent do team members use virtual tools (e.g. e-mail, videoconferencing and work tools such as Google Docs, Trello, calendar, etc.) to".

Informational value (IV) includes 7 items from Ferry, Kydd and Sawyer (2001), based on media richness theory (Daft & Lenger 1984, 1986), with the instruction to reflect on "When team members use virtual tools to interact with each other, how often does the chosen virtual tool allow for" things such as understanding others through voice inflection, intonation, body language and/or facial and non-verbal expressions. To account for the conceptual definition of informational value, we created two additional items that tackle whether the used virtual tools convey data that is important for the team to be effective.

Synchronicity (Sync) was measured with 8 items from Denis et al. (2008) (e.g. "The sender to consider possible interpretations of the message beforehand").

Participants are 239 individuals organized in 52 teams, with an average age of 31.2 (SD = 9.71) years old, most of which female (55%) with at least a bachelor's degree (76%).

Using the data aggregated per team, we tested an initial CFA (M1) and retained three items in each dimension, for parsimony. The selection of the final 9 items was done considering both statistical (i.e., factor loadings) and theoretical considerations which shed a different light into the construct of team virtuality. Specifically, we kept one item for transition processes, one for action processes and one for interpersonal processes in the first dimension; we selected items that represent effectiveness of information sharing for the second, and we selected items that represent asynchrony rather than synchrony for the third.

Next, we tested a parsimonious second-order model (M2) with those 9 items. It showed a good fit to the data ($\chi2(25) = 32.324$, $p = .149$; CFI = .970; TLI = .957; NFI = .884; SRMR = 0.078; RMSEA = 0.075), and good convergent evidence validity in terms of the internal structure, with the items converging to the same factor (AVEExtRVT = .49; AVEIV = .77; AVESync = .65). All factor loadings were satisfactory ($\lambda i \geq .68$).

Considering the reduced version of the scale both the reliability estimates were good (αExtRVT = .75; rwg(j) ExtRVT = .80; αIV = .88; rwg(j) IV = .85; αSync = .79; rwg(j) Sync = .78). While the second-order factor also presented good reliability evidence (ωL2 = .83).

The results of M1 and the consequent selection of items for the final scale were extremely interesting theory-wise. Indeed, they point to two main theoretical implications. First, the need to conceptualize synchrony and asynchrony as two distinct dimensions, instead of a single continuum. Second, to the need to consider that media richness is no longer a valid assessment of information value. The experience with technology that this young sample likely had from a young age probably allowed them to media expansion (REF). Therefore, virtuality nowadays, and for the digital natives, is more linked to a positive capacity to perform team processes asynchronously, while keeping information exchanges effectively. This argues for a new conceptualization of team virtuality.

We provide then a theory-driven instrument that captures distinct virtuality dimensions, representing a solid tool to assess team virtuality in a consistent way, while providing thought provoking considerations about the construct itself.As limitations, we highlight the small sample size for addressing the models at the team-level. We are working on further data collection to increase sample size and to conduct further analysis on convergent and discriminant validity, as well as predictive validity.

Track: DIGITALIZATION AND TECHNOLOGY
Keywords: team virtuality, scale validation, virtual teams, synchronicity, informational value