A Model for Assessing the Performance of Virtual Teams

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1 Introduction

Virtual teams have been subject to discussion for over a decade ranging from Lipnack and Stamps (1997) through to Wakefield et al. (2008). Generally speaking, virtual teams have members in geographically dispersed locations who have a common purpose and interact through various communication technologies.

This paper introduces a model that is an initial attempt to unify different models through the inclusion of all potential factors that can impact virtual team performance. The model, called Virtual Team Assessment (VTA), seeks to explain virtual team performance in terms of 19 outcomes, 60 factors and 23 processes. The outcomes are spread over four domains to provide a broad view of team performance. The factors and processes are an attempt to describe every potential impact on team performance. The VTA model is based in an extensive literature review and has been used to capture data and explain results in three case studies. It was developed because there was no existing model that would provide a frame of reference sufficient to contain all the data collected. While the model itself is not a predictive theory, it has proved useful in classifying research findings and for understanding team performance in the field.

2 Description of the Model

The VTA model consists of outcomes, factor and processes. Table 1 is a description of outcomes, factors and process that comprise the model. Table 2 is a list of the outcomes, factors and processes. Figure 1 is a diagram of the model. It illustrates that the outcomes are a result of the impact of factors, processes and past outcomes. Factors are used to assess the context in which the team operates. The processes model the activities for creating or maintaining the team, and the methods, structures and procedures it uses to communicate.

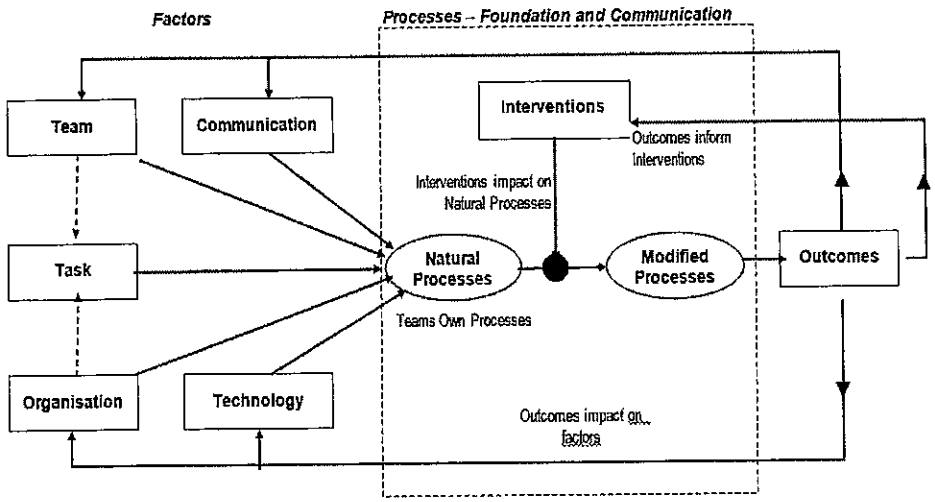

Fig.1. A model for assessing the performance of a Virtual Team

Table 1. Categories of Factors Influencing Virtual Team Performance

Outcomes	Outcomes are the results produced by a team and provide an assessment of team performance. These are products of the individual and group efforts. They are classified into four sub-categories: Production, Capability, Growth and Well Being, and Technology outcomes.
Organisational Factors	Organisational factors refer to those factors beyond the direct control of the team, and usually set by the organisation of which the team is part. These include the organisational culture, organisational structure, support for virtual teamwork, rewards structures and IT implementation approach.
Team Factors	Team factors are those factors that are internal to the team with the exception of external team relationships. Examples are role clarity and diversity, proximity, status differences, work experience of members, technical skills, team history, leadership styles and leadership changes.
Technology Factors	Technology factors are those related to dimensions of the technology. These factors are relevant to any technology and include availability, compatibility, reliability, functionality, and available support. Factors related to individual technologies are included under media choice and are classified as an Intervention factor.
Task Factors	These are related to the nature and types of tasks that are undertaken by the team. Task factors include size and scope, complexity, importance and task experience of team members.
Communication Factors	Communication factors represent a range of factors that are related to communication. They include shared background, extent of proactive communication, response times, tone of communication, and media choice.
Processes	Processes are the actions, techniques, structures, methods, and activities used by the team to create and maintain the team, and to manage its interactions. Sub categories: Foundation and Communication.

Table 2. Outcomes, factors and processes

Outcomes	**Organisational Factors**	**Technology Factors**
Product Outcomes	– Organisational Culture	– Technology Implementation
– Goals and Objectives	– Organisational Structure	– Technology Training
– Budget Performance	– Influence Structure	– Technology Competence
– Deadlines	– Management Culture	– Technology Choice & Availability
– Work Quality	– Management Style	– Technology Design and Functionality
– Organisational Change	– Management Feedback	– Technology Access
– Consistency of Approach	– Management Competency	– Technology Compatibility
Capability Outcomes	– Management Support	– Technology Reliability
– Trust	– Organisational Uncertainty	– Document Management/Team Memory
– Cohesion	– Management Team Goal Congruence*	– Security and Access
– Consensus	– Reward Structures	– Version Control
– Conflict	– Organisational Support for Technological Changes	– Functional Systems*
– Participation	– Organisational Support for Virtual Teams	– Technology Support
– Satisfaction	– Organisational Role Clarity	**Task Factors**
– Satisfaction with Management	**Team Factors**	– Human and Material Resources
– Employee Turnover	– Team Diversity	– Interdependence
Growth and Well Being Outcomes	– Attitudes & Values	– Task Experience
– Loneliness and Isolation	– Geographic Location	– Competing Priorities
– Relational Communication	– Time Differences	– Task Changes*
– Stress*	– National Culture	– Task Importance
Technology Outcomes	– Organisational Boundaries	– Urgency & Deadlines
– Critical Mass	– Team Size	– Task Experience
– Technology Satisfaction	– Team History & Development	– Task Complexity
Processes	– Membership Stability	– Task Size and Scope
Foundation Processes	– Team Type	**Communication Factors**
– Planning and Goal Setting	– Team Leadership	– Relational Communication
– Role Definition	– Leadership Style	– Shared Knowledge & Context
– Selection of Team Members	– Leadership Experience	– Process Clarity
– Relationship Building	– Leadership Changes	– Proactive Orientation
– Induction of New Team Members*	– Leader Availability	– Frequency of Communication
– Design of Work & Communication Processes	– Goal Clarity and Congruence	– Task vs Procedural Communication
– Media Choice	– Role Clarity	– Response Timing
– Design of Team Norms & Expectations	– External Relations	– Tone of Communication
– Meta-Process*	– Attitudes to Change*	
– Expert Assistance	**Communication Types**	
– Face-to-Face Meeting Schedule	– Coordination	
– Communication Training	– Information Distribution	
– Virtual Team Training	– Contributing	
	– Organising	
	– Evaluating	
	– Deciding	
	– Feedback	
	– Storage	
	– Reporting	
	– Conflict Management	

2.1 Outcomes

Outcomes are a range of benchmarks or evaluations through which to assess the performance of the team. Rather than relying on quantitative measures which consider

the team's performance against a normative scale of team performance, the model uses mainly qualitative measures to assess the team. By having a range of measures it is possible to gain a more holistic picture of team performance. The four outcomes dimensions are Production, Capability, Growth and Well Being, and Technological (Hackman and Walton, 1986; Furst et al. 1999). To capture the iterative or dynamic nature of ongoing teamwork, the model indicates that outcomes may, in turn, impact factors or processes.

2.2 Factors

Factors are the individual elements that comprise the context of the team and contribute to team performance. There are 59 factors included in the final version of the model in an attempt to ensure all potential influences on team performance are included. There is nothing to prevent additional factors being added to the model – as occurred in using the model in case study research.

2.3 Natural and Modified Processes

A number of models utilise an Input-Process-Output model (Powell et al, 2004; Wittenbaum et al., 2004). As well as suggesting the outputs as potential inputs, the model differentiates between an earlier and a later process to be able to represent the use of an intervention.

Natural processes are the team's own recipe to fulfil requirements and may be adapted from the collective knowledge of the team members or from pre-existing processes. Teams adapt the technology and processes according to their own requirements and the context in which they are working. Where processes are considered to be ineffective, an intervention can be made to modify the natural processes and improve outcomes.

Foundation processes are put in place at the establishment of a team, the commencement of a new project, a significant change in team membership or a significant change in technology. These include activities such as team selection, planning and goal setting, role setting, and relationship building.

Communication Types are the methods, procedures, structures or protocols used to complete tasks, and support the management and well-being of the team. The concept of communication is drawn from communication genres and repertoires of Yates and Orlikowski (1992; 2002) and others.

2.4 Interventions

In the Hackman and Walton (1986) model, the role of leadership is the diagnosis and prediction of deficiencies impacting the team's performance and to take actions to remedy any defects. In the VTA model these actions are defined as interventions. Interventions are processes which are intentional. Interventions are designed to improve the performance of a team by altering the natural processes. Interventions can be new or modified foundation processes or an alteration to a communication type. Interventions might be implemented by the leader of the team, team members or persons outside the team such as managers or facilitators, or by organisational mandate.

3 Limitations and Conclusions

The contextual model is not predictive in nature and does not incorporate a level of rigor that would usually be considered requisite for empirical research. This criticism dates back to the original development of these models. The functional perspective presumes simple causal relationships between factors and outcomes where, in practice, one factor can impact many outcomes, and one outcome can be a result of many factors (Wittenbaum et al. 2004). The complexity of natural teams does not make it possible to generalise about the relationships between factors, processes and their effects on outcomes. This paper presents a model for assessing the performance of virtual teams which is an initial attempt to include all factors and processes that may impact on virtual team performance.

References

Available on request.