Learning Together and Working Apart: Routines for Organizational Learning in Virtual Teams

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Abstract

Purpose

- Research suggests teaming routines facilitate learning in teams. This paper identifies and details how specific teaming routines, implemented in a virtual team, support its continual learning. The study's focus was to generate authentic and descriptive accounts of the interviewees' experiences with virtual teaming routines.

Design/Methodology

- This case study gathered concrete, practical and context dependent knowledge about virtual teaming routines in a specific environment. The main source of data was narrative expert interviews with working members of the team.

Findings

- The study illustrates how a mix of face-to-face and virtual routines can ensure organizational learning in virtual teams.

Research limitations/implications

- This case study is limited to one virtual team in the information industry. Future research could build on this research to study virtual teams in other industries.

Practical Implications

- This research offers specific examples of teaming routines that managers of virtual teams might adapt in managing their own teams.

Societal Implications

- Given that the use of virtual teams is a growing phenomenon, understanding how to help those teams learn effectively is a critical issue.

Originality/value

- This case study extends the research on teaming routines to virtual teams.

Keywords: Virtual team, Trust, Team goal setting, Teaming routines, Psychological safety, Team work, Team experimentation, Knowledge management, team learning

Introduction

In the fast paced environment in which organizations now function, if they are unable to learn, they are left behind. Teams are the unit of learning within organizations and because teams are where strategy is turned into action, it is essential that teams be able to learn (Chrystal, 2015; Edmondson, 2012; Hackman, 2011). The aim of this case study is to review the literature on team learning, detail the actions of a specific virtual team that lead to learning, and add to the existing understanding of virtual team learning.

To learn effectively teams must a) have developed an agreed upon goal toward which their learning is aimed, b) have the independence to experiment with actions to reach that goal, and c) function within an environment of trust, so team members can engage in the necessary learning behaviors to invent new possible actions, evaluate the actions they take, and reflect on the outcomes they achieve. To create team learning in a virtual setting, team leaders must establish teaming routines that facilitate each of those conditions. The term "routine" can denote an unchanging and even unconsidered pattern, but routines can also be temporary, dynamic and changing in response to changing needs. Rerup and Feldman (2011) emphasized the dual nature of organizational routines as both enablers and products of change. As teams work together over time, members can examine outcomes and revise routines as a result. Zuzul and Edmondson (2016) in a case study of the Nona Lake project, describes the routines developed by project leaders that invited participation, and encouraged both experimentation and innovation. The current case study extends the existing work on teaming routines to virtual teams in an information company. It details teaming routines both when team is co-located and when virtual, that enable organizational learning among team members.

Review of the Literature

Develop an Agreed Upon Goal

An agreed upon goal is particularly important when teams are dispersed and members are busy attending to their own role. Under such conditions it is altogether too easy to become disconnected from the end toward which the team is striving. Leaders are instrumental in establishing a team goal, but they need to articulate that goal in a broad way, without providing specific direction, and by making it clear that the goal is dynamic and will be co-created with the team over time (Zuzul and Edmondson, 2016). Hackman (2011) notes that, "sense-making is an essential part of coming to "own" a piece of work, and that an overly explicit statement of direction can preempt that process" (p. 70). He explains that a leader's direction for a work team needs to be clear, palpable and incomplete; thus the necessity for a team to take the time to develop the specifics of an agreed upon goal.

The Independence to Experiment with Actions

A team learns when it has the discretion to try out new ways to meet its goal. Expecting teams to follow a defined set of steps assumes that the solution can be completely known in advance and the path to that solution can be charted fully ahead of time. A complex goal requires that teams continually make adaptations, reflect on the outcome, and then make course corrections. Hackman (2011) explains that "as team members try out alternative ways of proceeding with the work, they are likely to enrich their understanding of what they are supposed to achieve. And in the process, they may even come up with some clarifications, elaborations, or revisions that they would want to explore with the leader who created the team" (p. 74). Hackman's ends/means chart (Figure 1) illustrates that teams function most effectively when the

ends or goal is broadly defined and the means is left to the team. The upper right hand quadrant labeled, "Self-managing. Goal-directed teamwork" creates the space for experimentation, which produces learning, while the lower left quadrant labeled "Turn-off" illustrates the space in which no experimentation is possible. Joshi *et al*. (2009) found that being virtual strengthens the relationship between inspirational leadership, commitment, and trust as illustrated by the upper right quadrant. While being virtual diminishes the relationship between hierarchical leadership and performance (Hoch and Kozlowski, 2014) represented in the lower left quadrant of Hackman's chart.

	Ends specified?		
		No	Yes
Means Specified?	No	Fragmentation	Self-managing. Goal-directed teamwork
	yes	Turn-off (worst cell of all)	Wasted human resource

FIGURE 1 Specifying Means vs. Ends (Reprinted with permission of the publisher. From Collaborative Intelligence copyright©, 2011 by Richard Hackman, Berrett-Koehler Publishers, Inc., San Francisco, CA. All rights reserved. www.bkconnection.com)

Trust

For a team to learn members must act in ways that make what each member knows available to the whole team. Edmondson (1999) has identified the kind of actions that members need to take for full knowledge to be available:

- Seeking feedback
- Sharing information, in particular, the unique information each member holds
- Asking for help

- Testing assumptions
- Discussing differences of opinion openly rather than privately or outside the group
- Talking about errors
- Experimenting
- Reflecting together on results

"It is through such activities that teams can detect changes in the environment, learn about customers' requirements, improve members' collective understanding of a situation or discover unexpected consequences of their previous actions" (Edmondson, 1999, p. 2).

The usefulness of such actions for team learning is perhaps obvious. But the difficulty team members face in performing such behaviors is that they can put members at risk for losing face. For example, to ask for help requires admitting ignorance, which risks the possibility of other members thinking less of the asker. Likewise seeking feedback or admitting an error may cause others to view a member as incompetent. Members may fear that revealing mistakes will reduce their prospects for promotion or bonuses. Research has shown that members tend not to share the unique information, which only they have, out of concern that the group will dismiss, or worse, disdain those ideas (Stasser and Titus, 1987). Yet without members' willingness to make available the unique information they hold, a team cannot make use of all its knowledge.

Given the prevalence of such concerns, in order to be willing to enact learning behaviors, team members must feel psychologically safe. Edmondson describes psychological safety as a "sense of confidence that the group will not embarrass, reject or punish someone for speaking up" (Edmondson, 2012, p. 119). Psychological safety goes far beyond interpersonal trust to include, 1) respect for each other's competence, 2) caring about each other as people, and 3) trust in each other's intentions. It is a group, rather than an individual concept, which involves a

shared sense of safety that is developed out of shared experience. Edmondson explains that group members, "will conclude that making a mistake does not lead to rejection when they have had a team experience in which appreciation and interest are expressed in response to discussion of their own and others' mistakes" (Edmondson *et al*., 2004, p. 243). Such shared experiences, occurring over time, create the shared, tacit belief that that the team is a psychologically safe place to enact the learning behaviors listed above.

Similarly, Nilsson and Mattes (2015) define trust as "the intention or willingness to accept vulnerability based on positive expectations of the intentions or behavior of others" (p. 231). They describe two types of trust, initial and gradual. Initial trust is based on a) belonging to a group, b) information about team members from third parties, c) trusting the system, and/or d) perceived shared interest. Gradual trust results from repeated first-hand interaction over time. It is based on a) experiencing another's *capability* to perform a specific task, b) that person's *reliability* to perform the agreed upon task, and c) witnessing the *integrity* and *kindness* of another in the work situation. Because initial trust is not based in first hand experience it remains fragile; a misunderstanding or mistake can easily destroy initial trust (Bigley and Pearce, 1998; McKnight *et al*., 1998). Gradual trust is more resilient and can withstand such incidents. To build gradual trust requires being face-to-face with other members in order to experience other members' capability, reliability, integrity, and kindness.

Virtual teams

Although it has long been understood that virtual teams function more effectively if they initially meet face-to-face (Gilson *et al*., 2015), there is growing evidence that teams that build routines that include periodically meeting face-to-face maintain a level of psychological safety that supports learning behaviors and increases connectivity and belongingness (Business Insider,

2013; Cisco, 2007; Mulhern, 2012). Maznevski and Chudoba (2000) found that, with tasks that require a high degree of interdependence, conducting regular meetings in person is essential to global virtual team effectiveness. The authors say that the frequency of face-to-face meetings is related to the level of interdependence required by the task, the degree of shared view and the strength of the relationship among members.

Maznevski and Chudoba (2000) explain that, over time, members of virtual teams are able to make effective choices about what technology mediated communication to use to address different types of issues. They also found that having regularly scheduled technology mediated communication, in addition to ad hoc communication, increased team effectiveness. In a study of consulting and software development teams, Suh *et al*. (2011) found that personalized technology mediated communication (i.e., e-mail and instant messaging) exhibited a positive effect on extra-group network size and structural holes, whereas communal technology mediated communication (i.e., group discussions, group calendars, audio conferences, and videoconferences) increased intragroup tie strength.

Research Methodology

The aim of this study was to gather concrete, practical and context dependent knowledge about virtual team routines in a specific environment. A comprehensive inductive case study was used to collect the data required. Case studies allow for a detailed contextual analysis of a limited number of events or conditions and their relationship (Yin, 2014). The main source of data for this study was narrative expert interviews with working members of the team. The study's focus was to generate authentic and descriptive accounts of the interviewees' experience with virtual teaming routines (Silverman, 2001). In 2013, the researcher conducted twelve, hour long, Skype

interviews with individual team members of a thirty-person division. All the interviews followed an open interview guideline with narrative elements. The interviewer took care to cover the intended topics, but encouraged interviewees to add other issues they considered relevant (Bryman, 2008). The completed case study, using quotes from the interviewees, was returned to all interviewees for confirmation and corrections. Previously developed theory from the review of the literature is used to compare empirical results to the case study.

Virtual Team in Practice: A Case Study of ProQuest, an Information Company

Profile of ProQuest

ProQuest is an information company that connects people with vetted, reliable information, ranging from dissertations to governmental and cultural archives to news. By 2013, the company had grown to 1500, through acquisition and mergers, as new technology made increasing amounts and types of information available.

ProQuest's Research Solutions Division, the subject of this case study, is a newly restructured part of ProQuest, started in 2010. It offers online products for researchers, for example, tools to manage research, and applications that help to connect researchers to grants. The Research Solutions product development team consists of thirty people divided into three sub-teams, made up of programmers, analysts, product managers, and designers. The members of the three teams are scattered from San Diego to Amsterdam.

The Research Solutions division uses a modification of "Scrum," a methodology of Agile, a software development framework. Nonaka (1995) argued in "The Knowledge Creating Company" that the framework for product development is a form of organizational knowledge creation. Nonaka explains the approach to managing projects is to bring decision making to the operational level.

Analysis of the Use of Virtual Teaming Routines at ProQuest

ProQuest brings the team members of the Research Solutions Division face-to-face, three times a year, each time for a three-day "Summit." In between Summits, team members are in constant communication with each other using various forms of social media. For example, they Scrum several times a week using visual media such as Google Hangout or Skype, hold Hangout meetings between individual members or small groups to address problems, and use Flowdock as their group chat room.

Routines for Developing Agreed Upon Goals.

The three day Summit is the most prominent teaming routine that ProQuest employs for developing an agreed upon goal. In addition the Summit provides the environment and time in which other routines about decision-making, experimenting and trust can be enacted.

One of the pre-Summit routines the research division employs to build an agreed upon goal is to involve everyone in developing the agenda for the Summit. Taco Ekkel, the team leader, explains, "*We find a date and email team members to ask if the date works for everyone. Once we have a date and location I ask the team what do you want to talk about? What sessions we should have? What needs to be whiteboarded?* A team member might respond with a topic like, "We should talk about becoming more international so we can sell in China." When all the ideas for sessions are in, Taco and Anne Veling, the Scrum master, plan the agenda, keeping in mind what topics could be held in parallel, then send the agenda out to everyone to review. Taco explains, "*When people actually see that what they suggested is on the agenda, then they know if they respond with an idea it will impact the agenda. And I also want to give everyone an opportunity to edit the agenda once we have put it together, for example, Is this where the energy is? Is it the right mix of heavy and light topics?"* The leaders, Taco and Anne, not only offer the

opportunity to impact the agenda, but ensure that team members *do* impact the agenda by multiple iterations in the planning.

A retrospect, held at the end of each Summit, is a routine that focuses on both means and ends (goals) (Hackman, 2011). During the retrospect, team members discuss how to improve the Summit, how the teams are working as a whole, and the goals toward which the teams are working. Virtual retrospects are also held at the end of each Sprint (2-3 week period) of work on a particular feature or product. Setting aside the time to jointly reflect, whether in-person or online, is critical to sustaining and renewing the team's goals.

Routines for Experimenting

On the morning of the first day of the Summit, the meeting starts with an overview by senior management providing updates about the business context, finance, sales, and new products. It will then be the responsibility of each of the three teams to decide how their features of the new products that have been sold to customers will be developed. In keeping with Hackman (2011), management provides broad goals for the Research Solutions Division (e.g. here is what our customers want), but it is left to each team to determine how to achieve those goals. In addition during the development of the products the teams will be in on-going conversation with the customers through the chat software, Flowdock. This routine of on-going conversations often alters or adds to what the customer wants and the on-going conversation among team members over Flowdock creates new possibilities to offer customers.

Following the morning overview on the first day, the remainder of the three days are spent alternating between teams working at the whiteboard to sketch how a feature is going to work, and meetings of all three teams to integrate their work. At the whiteboard team members try out different ways of building a feature, what will work best, how long each might take, and

how one feature might interact with another. Members speak of whiteboarding as a verb – something they do rather than the surface they write on.

Another routine that supports experimentation is having both a facilitator and a session leader for each session. The facilitator is a team member, selected from another team, so he/she will not be tempted to get overly involved in the content. The facilitator's task is to keep the team on track and to make sure everyone gets into the conversation. The task of the session leader, who is different for each session, is to research the background of a problem or opportunity including causes, numbers, market data, etc. Before the meeting the facilitator and session leader come together to prepare a list of questions, related to that product, that the team will need to address as they design the product. Taco explains, "*Whoever is going to lead the session makes sure we know the background of a problem, but we are careful not to think everything out ahead of time – we don't go in with solutions."*

Thinking together at a whiteboard is another routine that encourages experimentation. There is a quality about a whiteboard that makes it inviting to contribute or change what is already there. With a whiteboard, as opposed to PowerPoint or a document, there is less of a feeling that the idea a team member proposes is decided or complete. Rather, once an idea is on the whiteboard it belongs to everyone in the room and anyone is free to jump up, often with an eraser in hand, to make a change – and of course what is added is just as easily changed again by another. This quality of changeability results in team members, who are standing around the whiteboard, viewing what is emerging as "our" idea. Accordingly, as the design develops, team members consider themselves mutually responsible for the resulting answer, reflecting Hackman's upper right hand quadrant.

The team meetings are not just about sharing information and working out new ideas, they are also about making decisions. Anne provides an example, *"There was a feature in a software product that we were trying to make 'smart.' I was playing the role of a dummy and I remarked that 'it was not very clever.' Then someone sketched on the whiteboard how it could actually work. But another team member said, 'You're doing that same function in two places, here and here.' Finally someone said, 'This is how to improve it' and drew it on the whiteboard. Everyone could see that it worked. So we put an exclamation point by it, which is our sign that a decision has been made. When the exclamation point goes up it almost never changes.*" The use of the exclamation point is a useful routine, in this case, to signify that the group has made a decision.

Jason, a team member, explains the value of joint decision-making, *"With everyone in the same room decisions can happen quickly. It is nice you know the reasons behind a decision. When developing there is always something that is left out - that wasn't included in the plan - and if you were there, you can fill in those pieces."* Being a part of making the decision, team members can remember why they championed certain aspects of a feature and why they agreed to support even those aspects they didn't initially agree with. Anne notes, *"People have to learn that the team can make decisions, especially team members from the US. In Holland we speak out. But we had to teach American colleagues that we can choose."* Joint decision-making in the whiteboarding sessions is a routine for organizational learning.

For every whiteboarding session one team member is asked to make sure that what has been diagrammed on the whiteboard doesn't get lost. He or she takes pictures of the diagrams and the pictures become part of the storyboard that resides in the Dropbox that team members work from. Taco explains, *"There is usually no in between the white board and the deliverable.*

What you use to do the actual work is the storyboard with the pictures on it." Jason adds, *"You remember the conversation when you see the picture in the storyboard."* For each session 6-10 action items may be developed. Often there are too many ideas in a session and the group has to figure out how to group the ideas together and how to prioritize them. The rotating roles for the session, including the session leader, facilitator, and the above mentioned picture taker is a routine that is helpful for building knowledge about each others' competence and reliability, knowledge that increase gradual trust (Nilsson and Mattes, 2015).

All three teams come together each day at 4:00. All the whiteboards are rolled into the main room and the session facilitators use their whiteboards to show the problems each team worked on as well as how each problem was solved. There is a 2-minute time limit imposed on facilitator reports and no questions are permitted. But as Lita, a team member, explains, *"The person who is the facilitator says, 'Here are our action items and why.' So we all know what they decided. If it flagged something that impacts our project then we think to ourselves, 'Okay we need to talk about that.'"* This routine integrates the work of the separate teams, as well as holding each team accountable for the quality and quantity of their work.

Routines for Building Trust

The last item on the agenda each day is Lightning Talks. Lita comments, *"Lightning talks are voluntary. Different team members talk about something they thought was neat or interesting, for example, 'I programmed in some different language' or 'I thought of a different kind of identifier for people.' Each person is given 5 minutes."* There is a large clock displayed with a loud buzzer that sounds when time is up. Lightening Talks have a fun and energizing spirit to them. There are typically five or six Lightning Talks at the end of the day – no more than about 30 minutes. As Anne explains, *"We stop at 5 and will be at the bar at 5:30, because*

the work is intense in the sessions, the energy of everybody is depleted." Lightning talks, is a routine that informs members about what other members are interested in, which helps to develop gradual trust (Nilsson and Mattes, 2015). Lighting Talks serve as a bridge between the serious work of whiteboarding and the social time to follow. They produce laughter and are a shared experience, both of which increase psychological safety (Edmondson, 1999).

The evening social time is a routine that serves to strengthen relationships and trust. Jason says*, "My favorite part is the time after the meetings over drinks and dinner, a time to be more social. A lot of times you're not talking about exactly what happened in the meeting but you get an idea of how people are about different things. Hear about people's family. We are a pretty informal team and at a planning meeting on Google Hangout someone's kid will walk by in the background."* Anne notes, *"It is in social time that team members discover what they have in common, e.g. kids, sports, hobbies, that helps to cement the relationships that are vital for their virtual work."* The team leaders, Taco and Anne, are as deliberate about creating routines that build psychological safety as they are about developing routines for establishing goals and experimentation at the Summit. The gradual trust that is built at the Summit is critical to sustaining the group through the four months of virtual work.

Routines During Virtual Work

For the Research Solutions Division the interval between virtual work and Summits was arrived at through trial and error. Initially the group met four times a year, but then realized that often they had not finished what they had discussed in the last Summit. So over time they moved to a four-month cycle. However, Taco explains, *"After four months we are out of steam and have a loss of shared sense of direction."* So for the ProQuest coming together for three days every

four months helps the teams stay focused on the shared goal (Edmondson, 2012; Hackman, 2011).

Cost and speed of development are also major considerations in determining the frequency of Summits. Anne explains, *"The cost of our team is quite large because we want the best of the best, who are usually freelance people. This means the hourly cost of the team is more than the travel costs."* Taco adds, *"We would need four scheduled calls to accomplish what we get solved at the white board in an hour. Without the Summits it would definitely slow things down."* For the ProQuest team, the routine of the Summits both reduce cost and reduce development time.

There are routines that are embedded in the Agile Scrum process, including starting with a planning meeting that initiates a two-week sprint and ending in a review meeting, then a Retrospect. In between are daily "stand up" meetings of 15 minutes where team members talk about what they have done the day before and what they will do tomorrow. Jason explains how the ProQuest team has modified the Scrum process, *"We use Agile practices but have adapted them. We always felt like we were rushing at the end of a sprint and that was a problem for Quality and Testing. It seemed like it was an artificial deadline, so we started doing more of a continuous deployment. Whenever something is done and tested, we release it. And sometimes we also have extra planning meetings*."

While virtual, the teams use a number of online tools to meet, organize their work, and stay in touch throughout the day. Trello is an online organizing tool that lists actions that need to be taken. Both Google Hangout and Skype are visual tools used for the Scrum meetings. At the Planning meeting the team looks at what is on the incoming list and estimates the time it will take. Some of the teams hold Standup meetings about three times a week and some daily, both

only for 15 minutes. Standup meetings are for reporting what each team member has been working on but there is no discussion – it's not for sorting out problems. The Standup meetings keep the team aligned and also work as an anchor, with people often setting up other meetings right after. The Review meetings are demonstrations to customers of completed features and are followed by a Retrospect on the two-week Sprint. Jason notes, "*The Retrospective leads to changes in our process. Someone might say, 'In the development process more bugs are creeping in.' or 'Some of the code is getting sloppy.' So we might decide to have another developer check what we do, then we change the process again in Trello."* Flowdock is a sophisticated chat tool. Jason explains, *"Flowdock shows errors on products, additional requests, and customer comments. Some of those things get discussed on chat and they are useful. Chat is on the right hand side and on the left are the errors. You feel really connected through Flowdock. You can see who is online and people make jokes."* Like most team members, Lita keeps Flowdock open on her desk. She explains. *"I keep it up all the time and if someone types in, '@ and my name' then I'm alerted that someone wants me."*

The agreed upon virtual tools are routines to keep the team on task, coordinated and continue the relationships that were built during the Summit.

Table 1 summarizes the specific routines that ProQuest uses for each of the three conditions for team learning that were identified in the literature, first for when ProQuest team members are co-located at the Summits and then when they are working virtually.

ProQuest Co-located Routines for Team Learning		
Agreed Goal	Independence to Experiment	Environment of Trust
The three day Summits attended by all team members	Whiteboarding sessions provide the opportunity for team members to	Lightning talks expose team members t knowledge and capability of other mem

allow them to experience themselves as a part of a larger, joint mission	experiment with ways to accomplish reaching the agreed goals	and creates a memorable share experier
Jointly hearing the overview and updates by leaders at the beginning of each Summit provides joint understanding of the goals among team members	Team decision making during whiteboarding sessions, reinforces their independence to self manage	Integration meetings at the end of each of the Summit increases members' understanding of the capability and knowledge of other members
Team members, participating in agenda setting before each summit, provides them the opportunity to influence the goal	The use of a facilitator and session leader for each whiteboarding session, rather than being lead by leadership, reinforces independence.	Evening beer and karaoke exposes mer to a wider range of understanding of ot members' family, hobbies, and interest
Team members jointly participating in the Summit Retrospects allow them to shape the next Summit and the work of the next four months	The changeability of what is drawn on the whiteboard enhances contributions from multiple members and increases experimentation	Evening dinner together is a shared experience that establishes a sense of community and relationship
		The role of the facilitator (from another team) acts to spread knowledge about members' competence and integrity be the three teams

ProQuest Virtual Routines for Team Learning

The frequency and regularity of the Summits supports the sense of "shared direction" that wanes during the four months of virtual work	Retrospects at the end of each 2-3 week Sprint provide the opportunity for members to improve/change the processes they are employing	Daily standup meetings illustrat team members that others can b depended upon to complete thei agreed upon task
The whiteboard pictures of the diagrams, become a remembered shared experience that enhances the sense of shared mission when the team is working virtually	Having chat (Flowdock), open on desktops, with both team members and customers participating, leads to continual change and experimentation	The use of video for virtual mee builds the relationship between members more effectively than only could accomplish
Virtual Retrospects, held at the end of each 2-3 week Sprint, provide the opportunity for members to reflect on both process and goals	Review meetings with customers at the end of a Sprint facilitates active response to customer needs	The use of video provides mem glimpse into the home life and working space of other member broadening their understanding other team members
		Through chat (Flowdock) meml know who else is on online, reinforcing the sense of connect
		Through Flowdock members jo with each other increasing the t

		and good will within the team.

Table 1. Routines That ProQuest Employs for Team Learning

Findings and Conclusions

The findings from the case study substantiate the three conditions identified in the literature that support team learning, a) agreed upon goals, b) independence to experiment, and c) an environment of trust. For each of those conditions learning routines were identified in the case study that occurred both during periods when the teams were co-located and when the teams were working virtually

Based on the case study it is possible to theorize the following about virtual team learning. It is the responsibility of the team leader to establish routines for learning, to observe teams' work over time in order to determine if those routines are sufficient, and to establish new routines when needed by the teams. Routines are specific to the environment and to the task of team members; therefore the specific routines of one organization may not be transferable to another organization.

Teaming routines employed when teams are co-located differ from routines employed when teams are working virtually, although they fulfill a similar purpose. In agreement with the literature, routines can and should change over time in response to the changes in the environment and the nature of the tasks. The frequency of each routine is established by the level of task interdependence, the greater the interdependence the more frequent the routine. Regardless of the frequency, routines occur at regularly scheduled times rather than being ad hoc events.

Routines that support Agreed Goals include receiving broad goals from leaders and time provided for the teams to jointly make sense of the received goal as well as input in to agendas for both co-located and virtual meetings.

Routines for Independence to Experiment include, removing hierarchy from team task interactions, while still supporting those interactions with facilitation; enabling team members to visualize their ideas to facilitate joint thinking and experimentation; time set aside for teams to reflect together on what they are learning and what they might do differently; and opportunities to continually interact with customers to meet customer requirements.

Routines that develop Trust and Psychological Safety include, first hand experience with other team members that occurs over time; opportunities for team members to learning about each others' experience, knowledge, strengths and weaknesses**;** the use of sophisticated virtual technology, particularly the use of video discussions and open chat; robust social routines enacted during co-location that then support teams through subsequent periods of virtual work where trust and a sense of mission wane.

Limitations

This study of routines for virtual teams is limited by its focus on only one organization. ProQuest employed the Agile process, which has embedded routines within the process. It would be beneficial to study the learning routines of virtual teams that have not implemented Agile as well as virtual teams in other industries.

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