

Journal of
**Social
Media for
Organizations**

**Evaluating the Uses and
Benefits of an Enterprise
Social Media Platform**

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Volume I, Number 1
October 2013



Evaluating the Uses and Benefits of an Enterprise Social Media Platform

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ABSTRACT

While a number of enterprises are now using social business platforms, there have been few studies of the benefits to the organizations using them. This paper aims to fill that gap by documenting the results to date of a longitudinal study of an integrated social software platform, called Handshake. We studied individuals' usage patterns and characterized the business value of a social platform in the enterprise. Our multi-step investigation included conducting 63 in-depth interviews, analyzing log data from 4600+ users, and administering an online survey. We found that both the level and type of participation affected whether users experienced value from being a member of the social platform. Active participants, for example, said that it supported collaboration, strengthened social connections, fostered awareness of connections' activities, and facilitated knowledge management. In general, people participating in different types of groups reported qualitatively different types of benefits from their participation. This case study captures a snapshot of behavior that we anticipate will change and grow over time.

KEYWORDS

Social business software, enterprise 2.0, evaluation

INTRODUCTION

Enterprise social media platforms have seen increasing use during the last few years. The popularity of Facebook and other social media has caused businesses to ask the question: Can a Facebook-like application be used to help our staff members work together? In fact, a 2011 survey conducted by British job site Reed.co.uk found that one-third of employees used social media while at work; and of those people who logged into social networks on a daily basis, 35% claimed that they did so solely for business purposes (Flacy, 2011).

The market has responded by providing enterprise social media, also known as social business software platforms, that combine many of the following functions into an integrated environment: user profiles, wikis, blogs, microblogs, activity feeds, group support, tagging, tag clouds, RSS feeds, photo and file repositories, and discussion threads. Forrester cites IBM Connections, Jive, Telligent, and Newsgator as some of the leaders in this market (Koplowitz, 2011).

While a number of organizations have provided anecdotal reports of the success of these platforms, few studies have examined their performance in detail. Notable exceptions are studies by DiMicco et al. (2008), Steinfield et al. (2009), Nelson et al. (2011), and Muller et al. (2012). Despite the work of these researchers, however, it is still difficult to measure objectively how individual staff and the organization as a whole benefit from using social business platforms and how specific usage patterns impact their effectiveness.

These evaluation challenges may result from several factors. First, adoption of new social software tools is often slow. The interactions among users, the changes in work practices, the relationships among how different tools are used, and the impact on business outcomes all take time to emerge. These "long-tail effects" are only realized when social communities reach critical mass, and impacts are seen in a large population over an extended period of time (Brenner, 2009). Second, in many cases, appropriate metrics for tying user behavior to business value do not exist. In addition, studies on small, local pilots do not always extrapolate well to the enterprise scale.

Our company, The MITRE Corporation, is interested in using social business tools effectively, consistent with many other enterprise organizations. We have developed and implemented a social business platform called Handshake.

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Handshake serves several purposes: to provide staff members and their collaborators outside the company with those benefits that may be derived from social media, to provide researchers with a test bed for determining the extent of those benefits, and to provide a platform for further experimentation with social tools developed by researchers at MITRE.

Accordingly, we initiated a longitudinal evaluation to assess the business value of emerging social business tools, platforms, and models over an extended period of time. The goals of this evaluation are to assess the benefits of long-term social business tool usage for three audiences:

- a) Individual staff members, including investigating how particular patterns of tool usage affect their perceived benefits,
- b) The organization as a whole, including developing and supporting new and emerging models for collaborating and sharing information across the corporation, and
- c) MITRE's partners, sponsors, and other experts from outside the company, including understanding how well interactions between MITRE and non-MITRE people are supported.

As the first piece in the larger longitudinal evaluation, this case study reports on research activities that address the first of these three goals: evaluating the impact that individual patterns of tool usage have on the value that staff members derive from using a social business platform. We view this case study as a snapshot of behavior and anticipate that behaviors will change as the social business platform usage grows further, work practices change over time, and new business models emerge.

BACKGROUND

The MITRE Corporation is a not-for-profit organization chartered to work in the public interest. MITRE manages six Federally Funded Research and Development Centers in addition to its own independent technology research and development. MITRE's 7000+ employees are distributed worldwide to support their sponsors' needs in systems engineering, information technology, operational concepts, and enterprise modernization. Most of MITRE's staff members are considered to be "knowledge workers:" individuals who engage in 'non-routine' problem solving requiring convergent, divergent, and creative thinking (Reinhardt et al., 2011).

As part of normal business processes, staff members are expected to seek out the expertise of technical and domain experts distributed across the company. As a result, the corporation places a high value on sharing knowledge across individuals, projects, and business units. Prior to 2009, information was typically shared internally and persistently through email and Listservs, internal wikis, internal blogs, communal disk space, and Microsoft SharePoint– the corporate standard for information sharing. Internal, non-persistent information sharing took the form of face-to-face and video teleconference meetings, telephone, chat, and a screen-sharing application. To collaborate with external partners, MITRE employees traditionally relied on email, telephone, face-to-face meetings, a screen-sharing application with password-protected sessions, and a separate external instance of Microsoft SharePoint site.

MITRE has a knowledge management (KM) strategy and has adopted SharePoint as an official repository of record. However, many employees have found that SharePoint did not meet their needs: they could not easily find SharePoint repositories, they found that searching within SharePoint repositories was difficult, there was no easy way to tie comments to document versions, it was cumbersome to set up externally-accessible SharePoint sites for work with our partners, it was not socially enabled, and, without training, some people found SharePoint to be non-intuitive. As a consequence, some employees have migrated towards other electronic knowledge repositories. Because the other repositories were unofficial, however, there was no convention regarding where a certain type of information would likely be stored. Besides being on SharePoint, any single document or piece of information could be located on the "MITREpedia" internal wiki, in a person's folder in the communal disk space, in an archive for one of the thousands of Listservs, or attached to an email message or calendar invitation.

It is important to MITRE staff members to be able to share materials with academic collaborators and other partners from outside the organization. Staff members are permitted to collaborate in externally hosted spaces such as Google Drive as long as the material they share has gone through a release process, but this process takes weeks to accomplish. For

material that is appropriate for trusted partners to view, staff members may set up external SharePoint sites outside the firewall, but doing so requires a lengthy process because of security requirements.

To improve collaboration and knowledge management, a research team embarked upon building a trusted environment for MITRE and its partners to connect, collaborate, and share new information in a more integrated and social fashion. The goals were to facilitate establishing and maintaining relationships across organizational boundaries, to form communities and facilitate multi-organizational collaboration around key topics, to leverage expertise across MITRE and MITRE's partners, and to bring broader segments of the world to bear on important sponsor problems. At the time the research team embarked upon this effort, there were no commercially available systems satisfying all of these goals within a single system; hence an in-house solution was implemented. An advantage of building a "homegrown" system is that the team was able to instrument it extensively for fine-grained data collection in order to study usage patterns and assess what was working and what could be improved.

In August 2009, MITRE launched its social business platform called Handshake (Damianos et al., 2011). Based on the Elgg (2011) open source platform, Handshake was designed to enable employees and their trusted partners from outside the company to form connections and create their own profiles. The platform was designed to span MITRE's firewall, allowing MITRE employees to engage with each other internally and also interact with external partners – all within a single system. MITRE users could establish groups and facilitate multi-organizational collaboration around topics, projects, or communities of interest. Group tools included a discussion forum, basic file repository, wiki, blog, message board, activity feed, and tag clouds. Handshake was also implemented to promote awareness of relationships, activities, topics, and communities through the use of email notifications and both group and individual activity streams. By June 2012, the Handshake user base had grown to almost 8000 members who belonged to one or more of the 850 Handshake groups. It is worth noting that the use of Handshake was purely optional to MITRE employees. Even after its transition from a research prototype to a corporately-supported tool in September 2012, its use was not mandated.

Besides supporting KM and collaboration broadly, another goal of our research was to take lessons learned from deploying the social platform and use them to improve the corporate KM strategy. For example, were there specific aspects of Handshake that resulted in increased adoption? If so, could these aspects be tailored into the SharePoint environment so knowledge capture gravitates towards the corporate-sponsored repository of record? Or does the Handshake experience point towards a completely different KM approach? A prerequisite for answering these questions is an understanding of the uses and benefits of a socially enabled platform.

RELATED RESEARCH

Research on social business applications pertains to a variety of functions that these tools support, benefiting users in a number of different ways. Many of these tools support acquiring, organizing, and sharing knowledge within a corporate environment. For example, corporate wikis (Arazy et al., 2007; Holtzblatt et al., 2010; Majchrzak et al., 2006) and blogs (Efimova and Grudin, 2007) provide repositories of employee-generated content. Social bookmarking tools (Damianos et al., 2007; Millen et al., 2006) and micro-blogs (Zhang et al., 2010) provide employees new ways of disseminating links to useful information and other resources. Effimova and Grudin (2007) report that the resulting "wealth of information" provided by employee-generated information often helps save staff time by reducing the effort required to learn about new technologies and tools, quickly getting answers to questions, and identifying experts both within and outside the company.

In addition to these information-centric functions, studies by IBM researchers on Beehive have demonstrated that social networking tools enhance staff's social capital by expanding social networks, strengthening existing ties, and enhancing staff's connection to the organization (DiMicco et al., 2008; Steinfield et al., 2009). Brzozowski (2009) observed the potential business value of expanding and strengthening network ties within the enterprise, noting that these networks help disseminate information throughout the organization as well as provide opportunities for collaboration. Furthermore, other studies document that staff with extensive networks of weak ties within a corporation are more productive (Aral et al., 2007) and generate greater revenue for the corporation (Wu et al., 2009).

Another major function highlighted in research on social software applications is the use of these tools to support collaboration. Matthews et al. (2011) note that collections of people may work collaboratively to produce new knowledge

in different contexts such as teams or communities of practice. Their research suggests that different tools may be better suited to support collaboration under these different contexts.

Muller et al. (2012) studied different patterns of collaborative tool usage to understand how they support the work practices of enterprise communities. As part of that work, they defined types of groups in a large organization that used an enterprise social platform called Communities. They found that the different types of groups had different numbers of owners, participation rates, visit frequencies, numbers of forum entries, and accumulation of social connections.

Nelson et al. (2011) examined the use of an organizational social business platform, called Mail2Tag, during a 20-month deployment within the Xerox PARC organization. The emphasis of the Mail2Tag study, however, was on measuring adoption, whereas the emphasis of this paper is on characterizing the benefits of a social business platform in the enterprise.

Matthews et al. (2012) did not focus on social business platforms per se, but their study characterized how individuals organize work across multiple collaborative groups. They found that teams formed productive interrelationships among collaborative groups to ease some challenges of dynamic teaming.

The studies described above have generally not assessed how broadly users experience benefits nor looked at how users' patterns of activity impact the value they experience from a social business platform. We are aware of only a single study that has looked at the relationship between tool usage and the benefits users experience. In their evaluation of IBM's social business platform, Beehive, Steinfeld et al. (2009) report a significant correlation between intensity of tool usage and measures of social capital. However, their research did not distinguish how different types of users engaged with the platform. Many researchers have contrasted "contributors" from "lurkers" based on whether users contribute new content (e.g., file, wiki entry, blog post, discussion topic, bookmark, comment) in a particular social software application (Farzan et al., 2010; Farzan et al., 2009; Muller et al., 2010). Others (e.g., Wu, 2010) have suggested that it is useful to further distinguish between occasional and frequent contributors. Preece and Shneiderman (2009) propose four distinct patterns of user activity: reader, contributor, collaborator, and leader. However, to date, researchers have not assessed how these distinct patterns of activity impact the benefits users gain from social business applications.

This case study builds on our previous work (Holtzblatt and Damianos, 2011), which examined candidate measures of success for an enterprise social media tool. We proposed that there is no single measure of success for an online community, although the overall level of group activity appeared to predict a community's success. The current study provides an opportunity to evaluate empirically how knowledge workers within a corporation use and benefit from using a social business platform and how different patterns of activities (e.g., contributing content vs. lurking/reading) impact the benefits staff experience.

METHOD

Our investigation took place in multiple steps, which can be summarized as follows. First, we categorized the groups on the social platform (e.g., Projects, Communities of Practice, Peer Support, MITRE Organizations) because we wished to explore the patterns of activity in different types of groups or how each type of group contributed value to participants. Once we defined group types, we invited users from a sampling of group types to participate in in-depth interviews.

Analyzing the interviews enabled us to identify findings regarding the value of enterprise social systems. We used a combination of contextual inquiry affinity diagramming (Beyer and Holtzblatt, 1998) and grounded theory techniques (Glaser and Strauss, 1967) to identify different benefit-related categories or themes across all interviewees. Then we sorted and compared the data by group type to see which themes were most often associated with which types of groups. Next, because we wanted to estimate the generalizability of these findings to the user population at large, we accessed usage logs to determine usage levels. Finally, we constructed a survey based on the recurring themes that emerged from the interviews. The survey enabled us to determine which benefits mentioned by interviewees were, in fact, experienced more broadly.

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Each of these steps is described in more detail below.

Characterizing groups

Any MITRE employee can join the social platform and create a group on any topic or theme. The 850 groups have thus been created on a wide variety of subjects, activities, relationships, interests, projects, organizations, and affiliations - with sizes ranging from a handful of members to 1109. We looked across all groups and identified categories based on the primary purpose of the groups.

Others have characterized online community groups. For example, Lazar and Preece (1998) state that online communities can be classified in four different ways: by attributes (such as shared goals or activities), supporting software (such as a Multi-User Dungeon), relationship to physical communities (that is, the degree to which the online community mirrors a non-virtual community), and/or “boundedness” (the degree to which social relationships remain within the virtual community). Muller et al. (2012) have defined a classification scheme that is perhaps most relevant to our situation, however, because theirs was developed specifically for an enterprise organization. We created our classification scheme while taking these other schemes into account.

In-depth interviews

We arranged interviews with 63 people from 22 groups: seven Project groups, seven Community of Practice groups, three Peer Supported groups, two Application Support groups, and three MITRE Organization groups. We chose groups and (primarily) individuals who were actively using the system because we were seeking to learn about how the platform was being used by, and benefiting, active users. We interviewed between two and four people in each group, choosing mostly interviewees who participated regularly in activities, although some were less active users. Besides level of participation, the choice of interviewees was also driven by availability. The majority of interviewees were MITRE employees, but we did interview five non-MITRE users.

We developed a set of interview questions designed to characterize the usage and value of social systems in the enterprise. The interview focused on the interviewee’s experiences of participating in a single, specific group. We included questions on the business goal of the group, how the group members were trying to accomplish that goal, and whether the goal had been achieved. In addition, we probed how the different ways staff members used Handshake affected its perceived value. Additional questions examined whether (and why) users turned to Handshake instead of other collaboration tools provided by the corporation, such as Microsoft’s SharePoint or an in-house Wikipedia-like tool, MITREpedia.

We also asked questions regarding how the system could be improved, particularly in helping users collaborate with external partners and what obstacles to use they experienced. Doing so was important for two reasons. First, it enabled us to provide feedback to the design team. Equally important, these questions signaled to interviewees our willingness to hear about the negative – as well as positive – aspects. Note that areas for improvement are out of scope of the analysis discussed in this paper.

Although we used the interview script in each case, we diverged from the prepared questions to probe for underlying reasons for answers to questions and also to capture stories that illustrated use. We were guided by contextual interviewing techniques (Beyer and Holtzblatt, 1998) in how we probed for rationale and detail. One team member interviewed a person while another captured notes. The interviews took between 30 and 60 minutes each. To help ensure objectivity, none of the interviewers or analysts was a member of the design or development team.

We analyzed the interview data in two ways, by examining the results across all interviewees, and also examining the results for each group category.

Characterizing individual users via log data

The interviews yielded many anecdotes that begged the question: is the experience of these 63 users typical of the entire user population, and if not, what types of users are most likely to experience these benefits? To start answering that question, we characterized the population by collecting data from the system database and logs and computing the following metrics for each user:

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- **Length of time** since they joined the system
- **Percent of days** that users **logged in**
- **Number of connections** a user has established
- **Number of groups owned or co-owned**
- **Number of groups** a user was a member of
- **Number of items posted** by each user

These metrics helped us to put the results of the survey into context.

Survey

We extracted recurring themes regarding value from the interviews and used them as the basis for questions in the survey. This web-based survey consisted of 19 Likert-scale questions, described in more detail in the results section below. At that time, there were 4600+ MITRE users who were invited via an email message to take the survey. The survey was not administered to the then 1625 external participants.

RESULTS

Results of characterizing groups

Below we present our five categories along with the closest analog from Muller et al. (2012). Both schemes use the “attribute” approach for classification.

- **Projects:** A team of individuals collaborating on a funded project or a work team for an assigned group project. This is similar to the “team” category in Muller et al. (2012).
- **Communities of Practice (CoPs):** a group of people who exchange information about a common domain, field, or profession. Our definition of CoP groups is a bit narrower than that used in Muller, et al. (2012), which defines a CoP group as people with a common interest or practice (not necessarily restricted to a particular domain, field, or profession).
- **Peer Supported Groups:** a self-forming group of people created to share tips, experiences, and Q&A. These groups would also fall under the CoP category in Muller et al. (2012).
- **Application Support Groups:** a group geared towards answering questions, accepting feedback, and taking input from users of a particular product or service; run by an application owner. These groups are called “Technical Support” in Muller et al. (2012).
- **MITRE Organization Groups:** a group whose membership is restricted to a MITRE organizational unit; e.g., a department or division. This type of group would likely be subsumed into the “team” category of Muller et al. (2012), because that definition includes “Communities working on a shared goal for a...business function.”

We noted other categories of groups, as well, such as those supporting academic or industry collaborations or purely social groups created around a hobby. We focused on the above five categories, however, because they covered a large number of very diverse groups that were likely to provide business value.

Interview results: Looking across all users in all groups

We analyzed our interview data by identifying all statements that contained benefits and clustering them using a process similar to affinity diagramming in contextual inquiry (Beyer and Holtzblatt, 1998), which consists of grouping similar statements into a hierarchical tree structure. We examined the resulting clusters of statements and saw that six major categories, which we called themes, emerged. This process of categorizing data is also in accordance with the open coding step of grounded theory (Glaser and Strauss, 1967). Open coding is the process of “discovering” categories in the data: the idea is to start with the data and allow the content of the data to suggest which categories ought to be defined, rather than starting with categories and attempting to force-fit the data into them (Strauss and Corbin, 1998).

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The six themes were:

- Supporting team-based collaboration: in particular, aiding the mechanics of interacting with team members
- Enabling collective intelligence: facilitating bottom-up development and aggregation of new knowledge
- Strengthening social connections: augmenting or replacing informal, in-person meeting opportunities
- Facilitating knowledge management: providing a preferred place for consolidating and organizing knowledge
- Fostering situation awareness: helping people to monitor what is happening
- Enhancing measurable business value: providing quantifiable benefits

The six themes characterized the ways in which interviewees perceived the social platform as benefitting them. In the subsections below, we describe the themes and illustrate how the interviewees expressed the benefits they received from usage.

Supporting team-based collaboration

Besides Handshake, MITRE has provided other enterprise tools to support team collaboration, as described above. One of the questions we explored was: does Handshake's collaboration support offer anything that distinguishes it from all of the other collaboration tools available to staff members within the organization's firewall? In fact, we found that many interviewees valued the combination of collaboration functionalities available in Handshake, which was a design goal when the platform was developed. MITRE employees often used SharePoint only as a shared document repository, for example; the MITREpedia wiki enabled team members to aggregate information in a single document and/or work collaboratively on a document; our blogging software enabled people to post or comment on ideas. Handshake users employed these three, and other functions in one package, however, and this consolidation yielded benefits to interviewees.

One MITRE project leader stated that the consolidation of different types of project material instilled confidence in his customers, whom he invited into his project's group. "They have instant access; the deliverables are there, they can look at the requirements and the whole audit trail, along with what has been said in discussions. I think they have better insight into the program itself," as a result.

A different Project group consisted of MITRE software engineers/project managers and student software developer interns working remotely at a university. This cross-organization team was unable to share a common code repository because of security considerations imposed by the two different organizations. Early in their collaboration and before using Handshake, the MITRE team members had difficulty knowing when the students had finished a code update, and, once it was noticed, it was not easy for all members to keep track of everyone's comments on the updated software. In one case, the students used File Transfer Protocol (FTP) to upload a new software build to a university server that could be accessed by the MITRE team members. Because there was no automated alerting ("we never knew when a new build was there"), the MITRE team did not know about the new build until the next day. By the time they got the build and installed it, another half-day had elapsed. Meanwhile, three students had stopped their work to wait for the comments, resulting in a loss of productive time that the project could ill-afford.

Our interviewee contrasted this situation to the process that the social platform enabled. "After deciding to use Handshake, they would throw the zipped build on Handshake...we knew down to the minute when there was a new build. All they had to do was post it. ... Using Handshake, it was two minutes from the time it was posted until the time we got it up and running. We did 30 builds over three months. ... It's a lot of work and Handshake enabled it all, really."

The interviewee went on to explain how the quality of their software improved because of the ability to comment on a file or other uploaded artifact. Testers would see the new build, install and execute it, and then write up their findings, bug reports, or questions in the comment thread associated with the file. In this way, all material relevant to a build was automatically located together. Thus quality was improved because "there was less chance of a problem getting overlooked using this process." This situation illustrates a case where enterprise social software filled a gap that was caused by difficulties of cross-organizational collaboration (that is, the challenges in establishing a shared code repository across organizations).

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Interviewees valued smooth collaboration support between MITRE and non-MITRE team members. Very few of MITRE's other collaboration capabilities worked well across the corporate firewall. "When you say to a partner, we want to invite you into our [Handshake] team site, they think, this is nice. ... This allows us to say 'we can' [collaborate electronically] instead of 'we can't do that.'"

Enabling collective intelligence

Matthews et al. (2011) have noted that individuals may also collaborate in an organization by producing knowledge through bottom-up, unscripted activities of collections of people who, through their aggregate activities, codify and share new knowledge. These activities are often referred to as collective intelligence.

The most striking example of collective intelligence in action was in a group created by the application support team for a gadget-based homepage on MITRE's intranet. Interaction from users of the homepage resulted in several benefits. First, the tool provided a lightweight method of collecting feedback, compared to conducting more time-consuming interviews or focus groups. By posting design alternatives or ideas in the group, the application support team got both a broad diversity of ideas as well as a sense of which ideas had the greatest support. This input allowed them to create a product that fulfilled the needs of the greatest number of active group members. As one participant said, "Having the members talk to each other has value to the team; we can see that an idea has bounced around this group and there's more than one person behind this opinion." In the same way, discussions about bugs in the current revision of the homepage allowed the product owners to see how widespread the issues were and how much they affected users. This awareness was noted by a product team member when he explained, "A Firefox upgrade was released overnight, and we didn't know about it. There were severe problems with what it did to the rendering of the gadgets, and this was a surprise to us. We found out about the problem from the users in this group. We wouldn't have found out about it so quickly if it wasn't for the group, and wouldn't have known how widespread the problem was."

The second way that collective intelligence came into play was in using the "crowd" to generate new ideas and solutions. As one product team member put it, "Overall, the big thing is that our designs get more iterative feedback. ... We're having users be participants in the design process, which helps to develop more polished software faster and better. There are things that come up in the Handshake group that we didn't think about." Similarly, in the case of the Firefox issue above, the combined intelligence of the group helped with determining a solution, as the team member continued, "The group helped in the solution and...the value to the team was that it improves the quality of the product. It helps us to deliver on our promise of creating software that works." Overall, these types of discussions in the group opened the team members' minds to alternative designs and solutions, improved the product and changed their thinking on important ideas. As one interviewee explained, "Some discussions changed the way that we thought about something. We have found innovative solutions – something we didn't anticipate – from the discussion."

Strengthening social connections

Members of groups spoke of how participation in these groups helped foster a greater sense of cohesiveness and community among group members. A senior MITRE manager, for example, noted, "There's something about seeing the photos [on a group page] that makes you feel closer to the group. ... It motivates you if you see the pictures." This manager went on to highlight the effect these feelings had on team dynamics: "The Handshake group was part of what made the team feel cohesive." That sense of community extended to non-MITRE participants, as well. One external member of a Community of Practice observed, "For me, the relationship building that Handshake permits seems to be richer than what you find on the listserv. On a listserv, all you see is the name of a person. On Handshake it...feels more like a community. ... I think it is the fact that you have a profile."

Both participants highlighted features of the social tool – the pictures and profiles – that created the feeling of connection to the members of the group. These features were particularly relevant in strengthening connections across organizational boundaries and geographic distances. A non-MITRE member of a Community of Practice, for example, noted that participation in the group "helped solidify relationships" with MITRE staff. As result, he observed, "When we go to a conference or developer base, we recognize each other and can talk."

Group members also felt that participation in groups reduced the effect of geographic distances among staff at different locations. As one member of a Peer Support group observed, "Since I'm at a site, I don't have an opportunity to engage

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in conversations in the hallway. This group lets me tap into what goes on in these areas of technology; it compensates for a lack of hallway discussion.”

Facilitating knowledge management

According to interviewees, the social tool is an “essential repository for storing thoughts, discussions, and anything that would be valuable to record for a later date. ... Everything is consolidated.” Because it was consolidated, the information became easier to find: “...otherwise it would get lost on my hard drive.” In particular, Project group members said that it was easier than email for managing information: “The advantage was, instead of having to subdivide your email and go back to a thread, all the discussion was in one place. Instead of having to open an old email to open an attachment, the files were all here [in Handshake] and it worked quite well.” This knowledge capture worked for final products and for works-in-progress: “It is a group website/blog/file sharing mechanism to give us an informal persistent store for the things we’re doing” and to maintain dynamically changing status information.

Fostering situation awareness

Endsley defined situation awareness (SA) as the perception and comprehension of relevant information within an environment and the projection of the state of the environment into the near future (Endsley, 1988). Members described how the activity streams and alerts helped them maintain awareness of information that was pertinent to their work. Groups provided SA for project members in varying degrees of detail based on their different roles: non-manager staff members, project leaders, higher-level managers, and others on the periphery. Team members observed that they used alerts and activity streams to get immediate notification of version updates to team documents, reports of bugs found in software updates, and status updates on issues that needed immediate attention.

The SA provided by the aggregation of information in groups’ pages also helped project leaders respond quickly to issues arising on a project. For example, a project leader on a cross-organizational team noted that the social platform “... gives me better insight into ... anything (that) needs more attention or needs to be brought to the attention of one of the customer program managers. ... I will do it via a phone call. But I learn whether I need to make that phone call via Handshake.”

MITRE’s customers also valued the insight they gained through monitoring project activity. As a customer program manager noted, “(Handshake) saved me lots of time and effort because, at any given time, I knew what was going on in the project.”

Enhancing measurable business value

All of the above benefits enhanced business value indirectly. This theme focuses on activities that led directly to cost savings or product quality improvement. Example metrics for determining business value include amount of time saved, either in terms of a unit of time or the corresponding amount of salary that therefore could be used for other purposes; or a customer’s assessment of a product’s quality on a numeric scale.

One recurring comment from users mentioned under the Knowledge Management theme was that the consolidation of information made it easier to find, and therefore users saved time. Peer Supported group members benefited because the answers to questions and information were easier to find. People did not tend to ask questions that had already been asked, and respondents did not need to answer questions that had already been addressed in the group. As one person put it, “Handshake is probably faster than other methods to get information ... because I can see historical content in a meaningful way. I could just go to a listserv and ask the same question that people asked 20 times previously. ... On Handshake I am more inclined to look than to blurt out a question that people have asked before.”

In Project groups, the platform helped streamline processes, and therefore saved time, particularly in teams that included external partners. As one group member of a cross-organizational team said, “Did Handshake produce better code? Probably not. But with regard to the number of iterations to get to the level of coding we got, Handshake definitely helped. It would have taken much longer, many more iterations, without it.” Elaborating, he explained that that all the build comments, bugs etc. were associated in the tool directly with the build file. As a result, team members could “see which build had which problems and when they were fixed. There was less chance of a problem getting overlooked because of the process.”

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The platform also helped increase quality by streamlining communication and creating shared understanding between project members and members of a customer team. A team leader, for example, noted, “The customer has instant access to the deliverables there. They can look at requirements and the whole audit trail and what has been said in discussions. I think they have better insight into the program itself.” A customer team member similarly noted, “I think it has definitely improved the quality of products because you have instant feedback [about a design feature].”

Thoughts on themes

As described above, the themes emerged via the open coding step of a grounded theory approach because they characterized the data effectively, despite not being strictly mutually exclusive. In fact, relationships can be established among the themes. For example, collective intelligence is a type of team-based collaboration (although the latter category is more about how people collaborate rather than the fact that they are doing so around new knowledge aggregation). Social connections can be strengthened through the act of collaborating, engaging in collective intelligence, or knowing what others are doing. Knowledge management needs to occur after episodes of collective intelligence if the knowledge created in a ground-up fashion is to be accessible by others. Mechanisms that enable teams to collaborate well, create and manage knowledge, have strong social connections, and have good awareness of others’ activities have definite business value (although perhaps in a way that is less directly measurable). Thus these themes do not strictly partition benefits into a highly-structured taxonomy. Despite this fact, we found that the themes constituted a useful way to aggregate interviewees’ experience of benefits because they allow us to summarize what is important to interviewees. In addition, the themes were also useful in further analyzing the benefits based on the type of group (e.g., Application Support, Project, etc.).

Interview results: Analyzing benefits for each group

After identifying the themes, we sorted the benefit statements by type of group to determine whether the different group types tended to experience different benefits. As a preview of the results described below, Table 1 identifies the themes most strongly emphasized by the five types of groups. Note that in two types of groups, Communities of Practice and Peer Support, the benefits were distributed broadly rather than clustered into a few themes.

To better understand what group members would be likely to consider beneficial, we looked more closely at the purposes of the groups and the motivations for participation.

Table 1. Overview of Benefits Emphasized by Different Group Types

Benefit type Group	Team-based collaboration	Collective intelligence	Social connections	Knowledge management	Situation awareness	Business value
Application support		✓				✓
CoP	-----No specific emphasis-----					
Peer Supported	-----No specific emphasis-----					
Organization			✓		✓	
Project	✓				✓	✓

Application Support: Collective intelligence and measurable business value

Application Support groups are focused on sharing experiences with, or getting help on, a particular software application. These groups are usually open to anyone who wishes to join and thus are comprised of people from all across the company. Core members of the group are normally associated with the corporation’s support team for that particular application, and the group becomes a mechanism for asking questions or making suggestions for improvements to the application, especially in the case of applications developed or tailored in-house.

Using groups to discuss applications has the effect of spreading the work of application support among a volunteer, ad-hoc group rather than leaving the support responsibilities solely in the hands of the IT staff. Because staff members, in

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general, are expected to develop and share areas of expertise, many people develop habits of broadly sharing their knowledge even when that knowledge lies outside of their core specialty areas. Thus the members of the groups act as extensions of the application support teams, helping to answer others' questions about the products, providing feedback, alerting team members when there are problems, and suggesting ways to fix those problems. The social platform thus becomes a mechanism for this collective intelligence to flourish.

Because group members are, in essence, supplying "free" labor, the result is a long list of ways in which Application Support groups provide measurable business value. For example, an application supporter from the IT staff noted that "there were times that people asked questions, and I did not have to answer because someone answered it for me. In some cases, they answered it better than I might have myself... some people really got down to the nitty-gritty, such as posting exact system response times that they had measured in response to a performance-related question, and I thought that was fantastic." In other words, the application supporter saved time and the community received a better, more detailed answer. In one month alone, this application supporter estimated that volunteers answered 20 out of the 55 questions posted.

As noted previously, the application supporters also spent less time answering the same question repeatedly because the information was available for people to read in the group once the question was answered the first time. Some of these question-and-answer threads were continued long after they were first initiated, as new updates to a function prompted additional conversation.

IT staff have also saved time and money that used to be spent on formal usability testing. For example, one team member stated, "We're doing fewer in-person exercises in favor of using Handshake after releasing a feature to receive feedback. I estimate that it's now one-third less effort." Usability testing can be quite expensive, so being able to reduce it results in significant cost savings.

Besides usability testing, groups provide feedback that amounts to volunteer bug testing. For example: "We had a discussion that ended up making us realize that we had a bug—it was clipping the URL length at 50 characters instead of 500." Also, product quality was improved when group members provided innovative solutions that the application development team members would not have known to consider.

Not surprisingly, people receiving the most benefit from Application Support groups appeared to be those whose roles were to support corporate-sponsored applications. Beyond these roles, benefits were widely dispersed among the wide variety of roles populated by people who were trying to use the applications.

CoP: A variety of benefits

Communities of Practice groups coalesce around a particular skill or interest. Wenger et al. (2002) emphasize that a CoP is different from an informal interest group because "It is not just a set of relationships. Its domain gives it an identity, and the commitment to care for this domain gives it a cohesiveness and intentionality that goes beyond the interpersonal nature of informal networks" (Wenger et al., 2002, p. 43).

CoP groups are comprised of people from across, and sometimes outside, the company. Since people with similar skills often seek each other out, some people know each other prior to joining a CoP group, but others do not. Because the focus of these groups are, by definition, congruent with the career focus of the people who elect to join them, getting to know others with similar skills can bring real value.

In contrast to Application Support groups, whose benefits primarily pertained to the themes of collective intelligence and measurable business value, the benefits mentioned by CoP group members were distributed more widely across the six different themes. But a number of these benefits pertained to the fact that these groups bring together people who were initially unknown to each other. For example, the social platform supports learning about others' interests, even—or especially—among people who belong to different divisions or organizations (an example of both situation awareness and strengthening social connections). CoP group members have learned new facts from these fellow members (facilitating knowledge management).

CoP group members benefit from the collaboration support. "It has enabled two-way sharing. Listservs tend to be more one-way. Handshake has more conversations...it's more of a forum, an enclosed area for ideas. People feel more

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comfortable using Handshake than listservs, because with listservs you're broadcasting to 'whitespace,' where you have no idea who is out there" (an example of supporting team-based collaboration).

Sometimes unexpected group members contributed to a work product-in-progress (supporting collective intelligence): these were people that the product originators would not have known to invite to contribute if they were using other means of inviting participation, such as email. For example, one group was developing scripts that they wished to get feedback on. "We did not put them on the public site since we felt they were not mature enough for the public, but people on Handshake tried them, found bugs, and made comments. Some people found new uses for these scripts that we hadn't really thought of." The script files were posted (facilitating knowledge management), since "the ability to post comments on a file is quite helpful, to have the file and comments all in one place."

CoP group members felt that the products developed via the social platform could tap into a wider variety of people with relevant expertise than would have been involved without the tool. Group members cited examples when product quality was improved by learning about and implementing a new technology approach (a measurable business value). "Someone defined their problem and parameters, and, as a result, two people mentioned a technology that the original poster hadn't thought of."

The people who benefit most from CoP groups were likely those technical staff members at low- to mid-levels who depended upon keeping up with technology.

Peer Supported: More variety

Peer Supported groups are similar to CoP groups because they are both formed around a common interest. In the CoP groups, the common interest is a specific expertise or area of work practice. In the Peer Supported groups, the common interest is something other than specialized expertise: for example, it may be related to a general-purpose skill such as writing (e.g., a group called "Grammar Guides and Gaffes"), the use of a technology (such as the group called "iPads at MITRE"), or a mode of working (such as "Teleworkers at MITRE"). Like CoP groups, Peer Supported group members found that the benefits were varied in nature, although Peer Supported group members experienced few examples of collective intelligence.

In general, people from across the company came together in Peer Supported groups to share tips, experiences, and questions/answers. Thus group members might not have known each other and may have had different levels of skills and motivations related to the group's emphasis. Despite these hurdles, Peer Supported group members often mentioned that their groups eased connecting with experts and collaborating with people across organizations. These groups facilitated intentional, rather than incidental, knowledge sharing.

Peer Supported groups also helped to create or strengthen social connections. Group members spoke of how their membership helped keep them from feeling "disconnected" even though they may not have been physically collocated with the majority of their colleagues (for example, in the case of the Teleworker group). Interviewees spoke of how these virtual groups cut across organizational boundaries yet felt like a community. They cited the presence of photos and profiles as helping to make the information exchange "more personal" than the other collaboration mechanisms supplied by the company.

These groups facilitated knowledge management because they consolidated best practices, tips, and answers to questions in a single, searchable location. As in the case of CoP groups, Peer Supported groups fostered situation awareness by enabling participants to "see what's going on" (as one interviewee put it), when it was convenient for members to take a look.

Also similar to CoP groups, members of Peer Supported groups cited examples of measurable business value from their participation. They stated that Peer Supported groups made it easier to find enthusiastic participants who were well suited to helping in activities such as trial rollouts of MITRE-generated software applications. For example, some members of the iPad group wanted to do a limited pilot of a Citrix receiver. Based on people's participation in the iPad group, "we knew who we wanted feedback from... people who are engaged and working with the technology. We didn't want to send out an invitation to a big list and get 10% participation. We wanted feedback every day, and we got it. ... If I hadn't had the iPad group to know who would be good for the Citrix receiver experiment, I would have privately asked around to try to find the right people. It was much easier to find these people on the Handshake group. The Handshake group also

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accelerated the pace at which the feedback was gathered. Also, these people evangelized to others, which spread the word further.”

Members of Peer Supported groups were extremely varied. There did not seem to be any one set of people who benefited more than others from their participation in Peer Supported groups.

Organizational: Situation awareness and strengthening social connections

Organization groups are created for members of a specific business unit, such as a department of 20 – 50 people. Unlike CoP, Peer Supported, or Application Support groups, members of Organization groups tend to know one another. But Organization group members may often be working on many different projects and may have disparate areas of expertise, so it is difficult to know what any group member is working on at any given time. Interviewees noted that their Organization group fostered situation awareness regarding colleagues’ work. Further, it helped them to be aware of fellow group members’ questions or concerns (e.g., about a new policy articulated by Human Resources).

Besides situation awareness, Organization groups seemed to place most emphasis on the benefit of strengthening social connections. Organization groups are often closed groups that do not allow non-members to see the content. Thus, these groups become “safe” places to air opinions: “department members value the group as a place where they can say what’s on their mind without a lot of self-censoring. The fact that ours is a closed group means that what we say remains ‘in the family.’” Managers sometimes used their group’s site to “wax philosophical” (to use one manager’s words) or otherwise express their beliefs about how the organization behaves, or should behave. For example, a series of blog entries in an Organization group was entitled “management musings” and consisted of one manager’s views on how the company works. By including this type of material, these groups helped to reinforce the organization’s cultural identity and strengthen the connections among group members.

Further, Organization group members often pointed to the ability to minimize geographic distances. Unlike the “water cooler” conversations that occur only in geographic proximity, it was as easy for the teleworker in Oregon to create or respond to a posting as it was for a Massachusetts group member. More precisely, it was as easy for the people in Oregon and Massachusetts to interact with each other via the tool as it was for collocated people. This leveling of the playing field has, in the opinion of some Organization group members, strengthened social connections among far-flung colleagues.

Some Organization group members said that the platform has enabled more efficient department meetings because part of what used to be covered in these meetings could reside in the group. These people have also found measurable business value in using social media to ask questions of fellow group members, whose answers enabled them to make progress faster than otherwise might have been the case.

The Organizational group members who seemed to benefit the most from their participation were the managers or leaders of the organization, the newest members of the organization, and those who were “on the fringes.” The managers were able to efficiently and persistently provide information to the organization’s members. They also reaped the benefit of improved organizational cohesion, which tended to be manifested in fewer personnel problems and lower turnover. New employees could learn about the culture and personalities of their organization via their participation. Other staff members could interact freely despite a remote geographical location or a work assignment that was removed from what others were doing.

Project: Team-based collaboration, situation awareness, and measurable business value

Members of Project groups normally know one another prior to working together on the platform by virtue of working on the same project. There is less emphasis on using the tool to strengthen social connections than with other types of groups because interactions occur naturally in the course of doing project work, which usually provides sufficient opportunity to strengthen connections. One possible exception is for new team members, in which case, the social tool helps with “onboarding:” helping new colleagues to understand what has gone on before their arrival, read about previous discussions, review reference material, and view profiles of the other team members.

Perhaps more than with any other type of group, Project group members made extensive use of the social tool to aid team-based collaboration. For example, Project group members spoke of how it supported discussions and feedback: “I obtain more feedback using Handshake than with other methods.” The social platform was taking the place of email on

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some projects for intra-team and team-to-sponsor communications because it was “easier than looking for email threads.” Project teams with members external to MITRE stated that it helped them to collaborate across organizations because it was an “approved” place to keep project materials outside the MITRE firewall. The social platform was also noted for minimizing geographic distance when team members were distributed or on the road. The tool was prized as a central repository for work-in-progress that was both still being coordinated and/or jointly authored as well as for finished work. The repository served as both a collaboration and knowledge management facilitation tool.

Project groups also depended heavily on the ability to foster situation awareness. Project team members often used their group as the first place to check to see if there had been progress made or changes in work status. The discussion threads helped them to understand the evolving thought processes behind their direction. And a benefit seen in no other type of group was the way groups facilitated sponsors, high-level managers, or others peripherally involved to see progress without having to call meetings or explicitly ask for status reports. “Our sponsors, either internal or external, can check in and see ‘oh, there are things going on, meetings being held, etc. ...’ It gives them that ‘warm and fuzzy’ feeling from seeing progress.”

Partially due to the benefits of team-based collaboration and situation awareness, Project groups experienced a high degree of measurable business value. Project members saved time because the collaboration support meant that they did not have to look through their inboxes to find project-relevant messages: “Handshake was definitely a time saver. I didn’t have to hunt for things.” Project members worked more efficiently because having more extensive feedback and comments attached to the work artifact enabled Project members to iterate fewer times on work products. A Project member stated, “It would have taken much longer, more iterations, without Handshake.” Efficiency also occurred due to Project members having good awareness of what other team members were doing; they were able to synchronize their work based on the discussion postings and the other material stored in their group’s site.

A further measurable business value occurred sometimes due to an improvement in product quality. As Project members put it, “Did it improve the quality of work products? Absolutely, because we now had 20 people looking at them and commenting on them” and “Quality is helped when using Handshake, partially because it enforces the structure and the patterns we want to follow.”

While all project members seemed to benefit from active use, arguably project managers and higher-level stakeholders reaped the most benefit. Project leaders could use the group to obtain quick overviews of project status, as could others at even higher levels.

Results of characterizing individual users via log data

Using the activity metrics described above, we first classified users into new and experienced users. Experienced users had been members for at least 90 days. We then classified experienced users along two dimensions, based on the level of contributions they made and the regularity with which they logged in. We classified users based on their level of contributions as:

- Active Contributors: Users that contributed at least 20 posts since they joined.
- Moderate Contributors: Users that contributed at least 1 post but fewer than 20 posts.
- Readers: Users that never contributed any posts.

Users were also classified based on the regularity with which they logged in as:

- Active Users: Users that logged in, on average, at least once a week.
- Occasional Users: Members who logged in less than once a week on average. These members may have regularly tracked postings via their email (since users were notified of postings automatically via email), but we had no visibility into the level with which they followed group activity via email.

Note that MITRE users could be active without logging in because they could read postings via automatically sent email messages and respond to those postings directly from their email client. Our login data does not account for MITRE users reading email notifications or contributing content via email because no login is required to do so.

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As of September 1, 2011, there were 4145 experienced users. Table 2 shows the percentage of users who contributed actively, moderately, or not at all (that is, they were “readers,” as described above) in the “Total” row. The table further breaks down users into active or occasional user classes according to the definitions above. As Table 2 illustrates, the level of contributions users made was related to the regularity with which they logged in. Active Contributors were much more likely to log in regularly than Moderate Contributors who, in turn, were more likely to log in regularly than Readers.

Table 2. Active and Occasional Users and their Contribution Levels

	Active Contributor	Moderate Contributor	Reader	Total
Active User	4%	7%	18%	29%
Occasional User	1%	7%	63%	71%
Total	5%	14%	81%	100%

We then compared the activity of each of these types of users on several dimensions, including the length of time they were members, the number of connections they formed, the number of groups they owned and were a part of, and the number of posts they had made. Tables 3 and 4 show the means for the experienced user population of 4145. Table 3 indicates that Active Contributors were, on average, fairly early adopters the social platform – with half of the Active Contributors having joined within the first four months after it was released. Active Contributors also had a much broader community and network than Moderate Contributors or Readers; belonging to nearly two times as many groups and having four times as many connections as Moderate Contributors. The average Reader had only one connection and belonged to only one group. Smaller but still observable differences were also noted between the level of social connectedness of Active and Occasional users (Table 4).

Table 3. Mean Handshake Activity for Contributors and Readers (n = 4145)

	# Connections	# Groups	# Groups Owned	# Posts	# Months Member
Active Contributor	17	11	1	49	20
Moderate Contributor	4	5	0	4	16
Reader	1	1	0	0	12

Table 4. Mean Handshake Activity for Active and Occasional Users (n = 4145)

	# Connections	# Groups	# Groups Owned	# Posts	# Months Member
Active User	3	4	0	0	13
Occasional User	1	2	0	0	13

Survey results

We received survey responses from 354 members, including 36% of the Active Contributors, 14% of the Moderate Contributors, and 6% of the Readers. Respondents answered 19 five-point Likert scale questions, where they were given a statement and then asked for their level of agreement with that statement, with the five choices ranging from strongly agree to strongly disagree. The questions were grouped into five categories: business value, knowledge management, situation awareness, collaboration support, and social connections. Example business value statements were: “saves time on the job” and “improves product quality.” Example knowledge management statements were: “helps me keep abreast of new developments in my field” and “helps me find experts.” Example situation awareness statements were: “communicates progress on task to co-workers, managers, task or project leads” and “helps me stay aware of my connections’ activities.” Example collaboration support statements were: “helps me collaborate with others at MITRE” and “helps me collaborate with others outside of MITRE.” Example social connections statements were: “helps create a community around topics of interest” and “helps me expand my social network.” We tabulated the combined percentages of respondents who chose either “agree strongly” or “agree” for each question, and then took the average of all the questions for each category.

Results from the survey (Table 5) highlighted that the level of value users experienced in using the social platform was clearly related to patterns of users’ activity. The percentages indicate the portion of the user population that responded favorable (either Agree or Strongly Agree) to survey statements within each theme. Active Contributors in all areas experienced greater value than both Moderate Contributors and Readers. The majority of Active Contributors experienced the social platform as valuable on four themes:

- **Supporting Collaboration:** 58% of Active Contributors felt that the social platform broadly supported their collaboration activities, and, in particular, facilitated collaboration with staff in other locations. Over half of Active Contributors also felt that it facilitated collaboration with external partners.
- **Strengthening Social Connection:** 77% of both Active and Moderate Contributors felt that the social platform fostered community around topics of shared interest. Over half of Active Contributors felt that it helped them expand their social networks. Active Contributors did not agree that it strengthened existing ties, thus lowering the averages for this category to 57% and 46% for Active and Moderate Contributors, respectively.
- **Fostering Situation Awareness:** Over 60% of both Active and Moderate Contributors felt that the social platform enabled them to track their connections’ activities. However, there were no indications that it improved awareness of the ongoing activities on most users’ or others’ projects (thus lowering the average percentages to 41% and 47% for Active and Moderate Contributors responding to questions in this category).
- **Facilitating Knowledge Management:** Over half of Active Contributors felt that the social platform helped by consolidating information in a single place. However, most did not see it as helpful in connecting them to other experts or in marketing their own expertise, lowering the average response to 35% for questions in this category.

Readers did not experience the social platform as providing benefit in any of these areas. We examined whether the regularity with which Readers logged in affected the value users experienced. Although the majority of Readers who regularly logged in did not perceive value on any of the dimensions we measured, a significantly higher percentage of Readers who logged on regularly did perceive it as valuable ($p < .002$) than those who did not regularly log on. Our findings therefore are consistent with the conclusion that the regularity with which the system was accessed increased the level of benefit a user experienced.

Table 5. Results from the Value Survey, Favorable Responses

Category	Active Contributors	Moderate Contributors	All Readers	Active Readers only	Occasional Readers only
Business Value	37%	15%	6%	7%	5%
Knowledge Management	35%	21%	12%	16%	9%
Situation Awareness	41%	37%	15%	21%	13%
Collaboration Support	58%	30%	13%	17%	10%
Social Connections	57%	46%	19%	25%	15%

DISCUSSION

Adoption uptake has continued since the snapshot represented by this study; as of June 2012, the user base had grown to almost 8000 members who belonged to one or more of the 850 groups. This number can be compared to the number of MITRE employees, which is approximately 7000, and roughly 2000 users are external to MITRE. Based on the material being posted in groups and the rate of activity taking place in them, the social platform is in substantive use in areas of significant business value. We believe that this continued adoption is further evidence of the value experienced by its users.

Based on interview data, Handshake had become the sharing mechanism of choice for teams containing external partners. To be fair, this phenomenon may be due in part to the fact that there were few alternatives that did not require delays in set up (e.g., for SharePoint instantiations outside the firewall) or sharing documents (because to use applications such as Google Drive, MITRE's contributions must first go through a multi-step public release process). Nevertheless, cross-organizational project teams seemed especially enthusiastic about the way Handshake had eased collaboration with external partners.

The results from our case study provide at least partial validation for Preece and Shneiderman's (2009) Reader-to-Leader framework for characterizing Social Media users. Their description of readers, contributors, and collaborators maps well to our characterization of Readers, Moderate Contributors, and Active Contributors. Their framework provides implications for motivating and supporting each of these different types of users and suggests how to expand users' level of participation beyond their current level of participation. Building on their ideas, this longitudinal evaluation offers opportunities to explore how to increase the regularity with which Readers use the social platform, how to transform Readers into Contributors, and how to increase the level of contributions by Moderate Contributors so they become Active Contributors.

FINAL THOUGHTS

We conclude by returning to the goal of the study, which was to evaluate the impact that individual patterns of tool usage had on the value that staff members derived from using a social business platform. Our evaluation found evidence of value provided by Handshake because it supported cross-organizational team-based collaboration, enabled collective intelligence, strengthened social connections, facilitated knowledge management, fostered situation awareness, and enhanced measurable business value. These benefits derived from integrating multiple social business applications; supporting lengthy discussion threads on posted files, wikis or blogs; fostering a greater sense of personal connection via profiles, pictures, and discussions; and reducing the barriers to entry for external participants.

Participants in several of the different types of groups experienced qualitatively different types of benefits. Application Support group members primarily experienced benefits related to collective intelligence and measurable business value. Organization group members most often mentioned benefits that pertained to situation awareness and strengthening social connections. Project members most often described benefits regarding team collaboration, situation awareness, and measurable business value. (Note that if we had used Muller et al. (2012)'s classification of group types, we would have

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combined the Project and Organization groups into the same category. Based on the different needs and benefits experienced by the groups, we feel it was more useful to treat them as two separate types of groups.)

In spite of the benefits described by interviewees, our survey results indicated that many users did not directly experience these benefits. Active Contributors were the one group of users who appeared to experience many potential benefits consistently, particularly the support provided for collaboration and for broadening and strengthening social connections. Moderate levels of contribution to groups appeared sufficient to foster members' sense of belonging and being part of a group.

This study's partial reliance on self-reported experiences with a social business platform implies several potential limitations. While it is possible, we saw no evidence of the Hawthorne effect (the phenomenon of people changing their behavior when being observed; see Roethlisberger and Dickson, 1966). It is more likely that interviewees described benefits in somewhat more positive terms during interviews than they might have during casual (non-interview) workplace conversations. We tried to mitigate this possibility by stressing that we were not the software engineers responsible for developing Handshake and by soliciting, also, input on users' problems with Handshake. This study did not actually include investigating ways that Handshake could improve, but the evaluation team felt it was important to balance questions about value with those concerning potential improvements. Another way in which we attempted to mitigate bias was to analyze both qualitative and quantitative data to hopefully yield a more complete picture than either could provide independently.

Future work could include teasing out any potential confounders, however, including investigating whether statements of benefits were outgrowths of rationalizations for the effort that users put forth to engage with social business platform.

Finally, as we noted in our introduction, this study is part of a larger longitudinal study that is focusing on understanding the impact of social business applications on both individual employees and on the organization over time. Towards that end, we are planning additional studies that will focus on evaluating the growth of participation by users, how work practices change as a result over time, and the effect of the platform on new and emerging business models within the corporation.

ACKNOWLEDGEMENTS

We thank Betty Fisher for her help in creating and summarizing results of the survey. This study was funded by MITRE Sponsored Research project 01MSR001-EA and Information Systems, Infrastructure, & Services System Engineering project 01AAV105-AA. All product names, trademarks, and registered trademarks are the property of their respective holders.

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