

■ Research Article

E-improvisation: Collaborative Groupware Technology Expands the Reach and Effectiveness of Organizational Improvisation

Brent McKnight and Nick Bontis*

DeGroote School of Business, McMaster University, Canada

With today's increasing pace of change, managers who are struggling to continuously adapt and survive are turning to an emerging management technique known as organizational improvisation. This field of management science draws from a metaphor based in improvisational theatre and jazz music and is defined as: *The ability to spontaneously recombine knowledge, processes and structure in real time, resulting in creative problem solving that is grounded in the realities of the moment.*

As part of these changes, organizations are working across great distances and in groups that include diverse constituents such as suppliers, partners and customers. The distance separating these team members poses a problem for improvisation as improvisation relies heavily on interpersonal communication between group members. The collaborative wealth of creativity, innovation and productivity flows in part from this real-time interaction. The increasing distance between group members hampers the effective reach of organizational improvisation. The proposed concept of e-improvisation suggests that the adoption of groupware collaborative software, in particular a peer-to-peer offering called Groove, can extend the reach of improvisation and enhance its effectiveness. Copyright © 2002 John Wiley & Sons, Ltd.

The 21st century will be about velocity: The speed of business and the speed of change. Bill Gates (1999)

INTRODUCTION

Today's business world is evolving at an accelerated pace and companies are faced with the reality that there is not always time to plan. As a result, employ-

ees are frequently forced to act before they can fully analyze all available options. Organizational improvisation is an emerging management science that promises to help organizations adapt to this new reality. The benefit to managers comes from both applying the improvisation metaphor to an organization and by adopting a set of improvisational principles that help promote a more effective working environment (Brown and Eisenhardt, 1997).

A close look at the roots of organizational improvisation, jazz music and improvisational theatre reveals that although they are different in many ways, at the heart of each is the same skill set that interests management theorists. This skill set embodies adaptability, spontaneity, teamwork and collaboration skills.

*Correspondence to: Dr Nick Bontis, DeGroote School of Business, McMaster University, 1280 Main Street West, MGD #207, Hamilton, Ontario L8S 4M4, Canada.
E-mail: nbontis@mcmaster.ca

Contract/grant sponsor: The Management of Innovation and New Technology Research Centre.

Table 1 Definitions of organizational improvisation

Author(s)	Definition
Miner and Moorman (1998b)	Actions, both spontaneous and novel, that result in the creation of something while actions are unfolding.
Ciborra (1996)	Efficiently generating new combinations of resources, routines and structures which are able to match the present, turbulent circumstances.
Hatch (1997)	Intuition guiding action upon something in a spontaneous but historically contextualized way.
Vera (2000)	The ability to engage in a spontaneous process of creative thought or action.

Sources: Cunha *et al.* (2001); Vera (2000).

Jazz music originated in New Orleans, USA, around the mid-1890s. Jazz musicians use melody ideas or chord sequences as focal points around which they collectively create a song. They use a set of shared rules and intensely refined listening skills to build on each other's music. Musicians work together resulting in a performance that is an emergence of the collective actions of each musician (Hatch, 1999).

Improvisational theatre first appeared in sixteenth-century Italy as performed by the Commedia Dell'Arte. Traveling troupes of actors worked with stock characters and basic plot premises, constructing scenes in response to their fellow actors and audience reaction. Although the Commedia Dell'Arte style is considered to have died out in the early eighteenth century (Geisinger, 1971) the art was modernized by Viola Spolin (1999) as a training and development method for traditional theatre actors.

IMPROVISATION IN BUSINESS

Improvising in business requires analytical knowledge (although not all knowledge must reside with the individual improviser) and the ability to act purposefully and appropriately in a novel situation. For example, a CEO may not be able to develop or manage the data warehouse of his or her business but recognizes the value of data warehousing and identifies and employs experts to enable strategic tasks.

Managers spend their time absorbing, processing, and disseminating information about issues, opportunities, and problems. But in the business environment of the information age, information flows incessantly, grows exponentially, and is constantly changing and morphing as new technologies emerge and competitive environments alter. Indeed, managers' most basic challenge may be that their information worlds are extremely complex, ambiguous, and munificent (King and Ranft, 2001: 256).

Organizational improvisation has been defined in many ways. Table 1 contains select definitions as reported by Vera (2000) and Cunha *et al.* (2001). The following definition is offered as a recombination of those selected: *The ability to spontaneously recombine knowledge, processes and structure in real time, resulting in creative problem solving that is grounded in the realities of the moment.*

Improvisation exists to fill the gap between that which is planned and that which is required at any particular moment (Sharkansky and Zalmanovitch, 2000: 4). Planning complements improvisation by providing the context upon which employees can improvise. It outlines the general strategy and direction of the firm and provides employees with a tool with which they can measure their actions.

The field of organizational improvisation touches on a variety of other management disciplines and concepts including: employee empowerment, organizational learning, emergent strategizing and knowledge at the edges.

The precursor to improvisation is empowering employees to use the knowledge and skills they have independent of senior management's guidance. This involves a great deal of trust and respect between organizational leaders and their subordinates. Once rapport has been established over time and trust levels are adequate, successful improvisation requires an attitude that quickly forgives and builds off of mistakes. It is with trial and error that organizational learning takes place especially at the individual level of learning (Bontis *et al.*, 2002). Several authors (Crossan *et al.*, 1999; Choo and Bontis, 2002; Bontis, 2002) have operationalized individual-level learning constructs with improvisational measures. Bontis (1998, 1999) with his colleagues (Bontis *et al.*, 2000) have also operationalized intellectual capital constructs using improvisational items.

The debate of whether strategizing is intended or emergent is also germane to improvisation (Mintzberg, 1987). The resulting strategy executed by a firm is rarely the one that was originally

intended but rather the one that emerges. Improvisational actors acknowledge this and instead of focusing on a single intended strategy for a scene, work towards understanding the strategy as it unfolds. In improvisation, each individual must have knowledge that they can add so that there is a continual incrementalization occurring.

For a more comprehensive review of the organizational improvisation literature see Cunha *et al.* (2001) and Vera (2000). This paper does not seek to replicate previous reviews, but leverage off them. While most of the literature in the field is of a metaphorical nature, this work takes improvisation beyond the metaphor by distilling key improvisational principles and using them to better develop an organization's capacity to improvise in a technological context.

IMPROVISATIONAL SKILLS

Improvisers leverage a set of unique teamwork skills and rules in the performance of improvisation. These rules require participants to build on, not block, the ideas of the team members through a process improvisers call 'yes and-ing'. In addition, the leadership of the improvisational team is dynamic and fluid as different members 'give and take' leadership at different times. In order for this to occur, improvisers must have well-developed listening skills and be able to pick up on the cues of others so as to take leadership when appropriate.

This process certainly involves taking risks that the working environment must appreciate, but the risk also brings great rewards. The use of improvisation often results in innovative problem solving, a convergence of planning and action, increased flexibility in response to changing external and internal stimuli, and increased team and employee satisfaction. The result is a strategy that is an emergent of the collective group (Crossan, 1997).

Vera's (2000) model for organizational improvisation, consisting of six moderating variables, can help us better examine the environment in which improvisation is most successful. The moderating variables proposed by Vera (2000) on improvisation and group performance are: (1) real-time information and communication, (2) organizational memory, (3) culture, (4) teamwork skills, (5) environmental turbulence, and (6) individual expertise and skill. The first four are proposed as necessary for improvisation, while the last two exist to improve or moderate the quality of the improvisational performance. All six variables can vary in the degree that they are present, affecting the level and quality of the improvisation that occurs.

By examining these variables, one can imply certain practitioner recommendations. Namely, management can ease communications between people, help develop bodies of knowledge that employees share, and provide a culture where employees build on others' ideas. These three implications map very well to the first four moderating variables as presented by Vera (2000). The final two variables, environmental turbulence and individual expertise, although important to improvisation are left for future work. Environmental turbulence refers to changes in the market, technology and the organization itself. Individual expertise is the knowledge that employees have and can bring to bear to solve problems. This construct is also often referred to as human capital (Bontis, 1996).

Ease communications between people (real-time communication)

Traditional improvisation, in theatre for instance, takes place through face-to-face communication where improvisers are capable of expressing ideas and emotions using a wide range of communication channels in real-time. In part, it is this intensity of communication that allows improvisation to function properly. Employees, however, are often working at great distances from each other, posing significant problems and hampering the effective reach of improvisation. Even within the same physical proximity, barriers (both psychological and physical) exist to limit communication. By easing and developing greater levels of communication between employees, improvisation can be encouraged.

Develop shared knowledge (organizational memory)

In order to build on others' ideas, those ideas must be available to all that seek to build on them. Improvising groups build shared knowledge, both tangible and intangible, which they draw upon. In an organization, methods can be developed to capture intellectual capital and make it accessible to all. These could include sophisticated technology and knowledge-sharing events or simple bulletin boards and hardcopy documents.

Build on others' ideas (culture and teamwork skills)

Improvisation is an art that builds on existing ideas; jazz musician Charles Mingus insists 'you can't improvise on nothing; you've gotta improvise on something' (Kernfeld, 1995: 119). In the same

way, organizational improvisation builds on the ideas, processes, and business strengths of a company and its employees. The skill of 'yes and-ing' is not an intuitive one and requires both training and company-wide support for its effective use. Additionally, the concept of giving and taking leadership as well as a general level of experimentation must be encouraged.

In this paper, the concept of e-improvisation is proposed, suggesting the adoption of technology, and in particular groupware technology, to empower employees to improvise. Emerging collaborative groupware technologies can help employees build on other's ideas, ease connections between people and develop shared knowledge. The result will be an organization with greater velocity and greater capacity to adapt to changing environs.

GROUPWARE TECHNOLOGY

The growth and development of the telecommunications industry is introducing fantastic new communication applications. Some of these applications are drastically changing the way we can communicate in groups. Complexity theorist Brian Arthur reports:

The Web provides access to the stored memories, the stored experiences of others. And that's what is also particular to humans: our ability not just to think and experience but to store our thoughts and experiences and share them with others as needed, in an interactive culture. What gives us power as humans is not our minds but the ability to share our minds, the ability to compute in parallel. And it's this sharing—this parallelism—that gives the Web its power (Homer-Dixon, 2000: 307).

Groupware technologies are designed to allow users to communicate more effectively, improve productivity at meetings, provide access to knowledge repositories, and/or manage projects. These systems are currently, for the most part, single-purpose applications designed for specific tasks (meetings, project management, communication, or knowledge management). However there is a convergence towards more robust and generalized communication systems as the recognition of their return on investment is realized (Shani *et al.*, 2000; Yen *et al.*, 1999).

The new systems that are evolving will combine project management tools (for meeting/event scheduling and milestone management), real-time voice/chat/video communication tools, meeting productivity tools (for opinion polling, anonymous

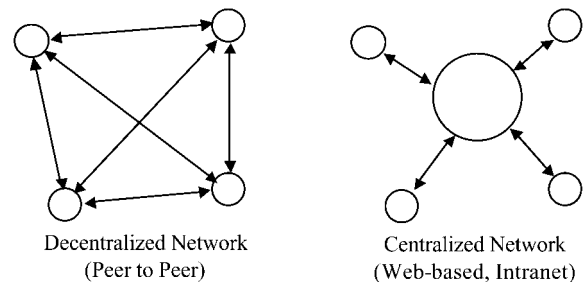


Figure 1 Centralized versus decentralized networks

brainstorming, and shared solution generation), and knowledge management tools (to create, maintain and access information from both internal and external sources).

These groupware applications are offered across three main Internet technologies: the World Wide Web, corporate intranets/extranets and peer-to-peer (P2P) networks. Although each of these technologies can be used to build applications that support teamwork, collaboration and even improvisation, P2P networking lends itself particularly well to the task due to its decentralized nature. P2P networking has recently been brought to widespread public attention through the online music-sharing efforts of Napster. Napster allows users to share music files that are stored on their machines around the world. Computers in P2P networks communicate directly with each other without the need for centralized control. Figure 1 shows the difference between computers connected in a P2P fashion and those connected in a centralized manner. Groove (www.groovenetworks.com) and Napster (www.napster.com) are good examples of P2P applications.

The decentralized nature of P2P means that self-organizing teams can form spontaneously without the need for a central organizing server. They form out of the common need to solve a problem or complete a project and can disband just as quickly. Groove is an application that is emerging as a powerful tool for facilitating virtual teams.

Groove

Groove was launched at the beginning of April 2001 by Ray Ozzie, creator of Lotus Notes, and seems to have been written with improvisation in mind. The creator of the software has drawn the parallel himself stating that 'Groove works like a jazz band. It's intended for people who want to get together and jam—to interact and improvise with each other' (Breen, 2001: 192).

Groove provides for the integration of all the features that single-function groupware systems aim to satisfy. Users form shared workspaces where

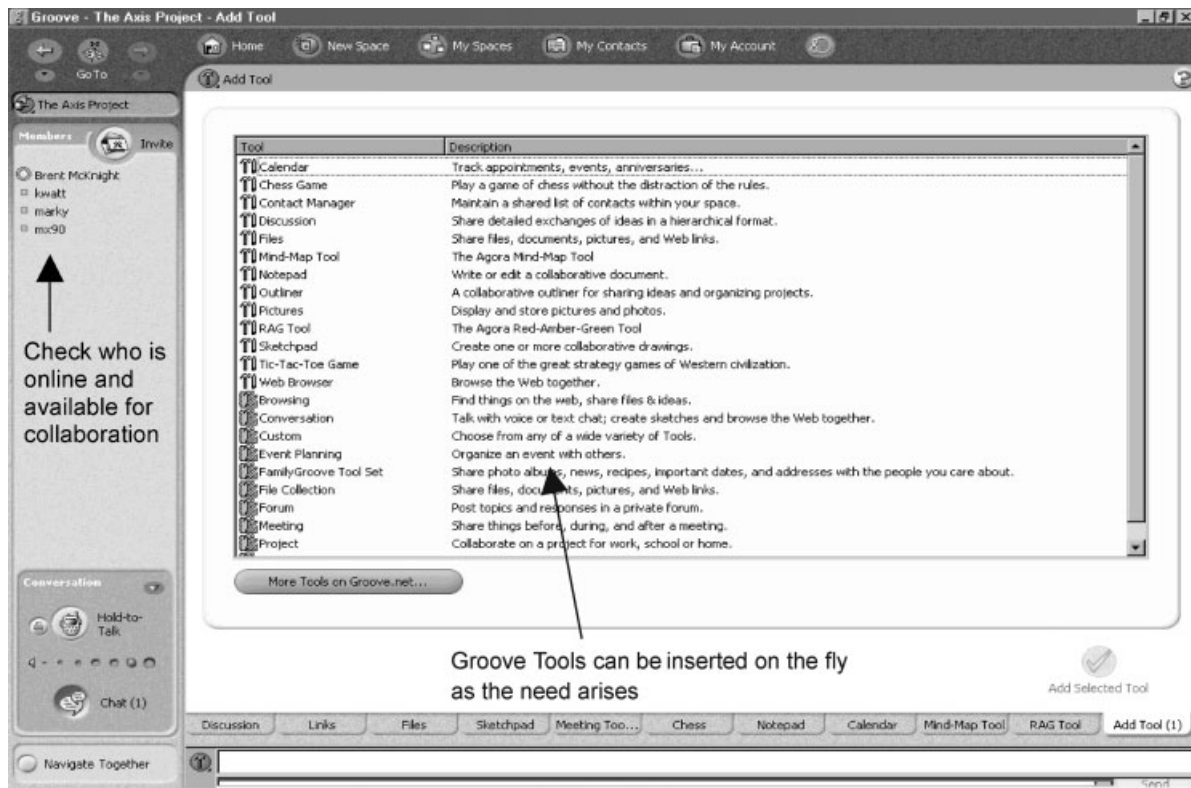


Figure 2 Add a new tool to a shared Groove workspace

they are able to engage in real-time text and voice chat, create and edit a wide variety of documents together, manage project progress information, engage in discussion groups, share files, access data from competitive intelligence and enterprise resource planning (ERP) databases, and browse the Web together. Groove is designed as a platform and uses third-party 'Groove tools' that can be built and tailored to an organization's specific requirements. These tools are installed on the fly as the need arises (see Figure 2 for a screenshot). Examples of possible tools include:

- video conferencing to display real-time video of each online team member;
- specialized viewers and editors to enable collaborative creation of building blueprints, CAD documents, software programs and web-sites;
- project management tools to manage timelines, due dates and responsibilities, and
- productivity tools for anonymous brainstorming and idea selection as well as argument resolution.

The ways in which Groove users communicate and collaborate are limited only by the imagination of Groove tool developers. Each member of a Groove space stores a copy of the group's files, chat logs, and discussions. As members modify files and discussion forums, changes are transmitted to all the members of the Groove space.

Because the information is stored on each member's computer, changes made when a user is offline are both transmitted and received when the offline user logs back on. Figure 3 shows a screenshot of a Groove file repository.

Groove provides a technological tool that is designed to be diverse and powerful. It is used in this paper as an example of a groupware technology that helps employees communicate more effectively, build on others ideas, and generate shared knowledge.

Easing communication among employees

Real-time communication is proposed by Vera (2000) as a moderating variable of improvisation. It is defined as 'information about a firm's operations or environment for which there is little or no time lag between occurrence and reporting' (Vera, 2000: 30). This information can take the form of news and market information or, as will be discussed in this section, the real-time interaction between employees.

Face-to-face, employees have a wide range of communication media to use. These include verbal language, body movements, facial expressions, and even choice of clothing and style. As a result, a significant amount of information is conveyed in addition to words. Traditionally, employees working at

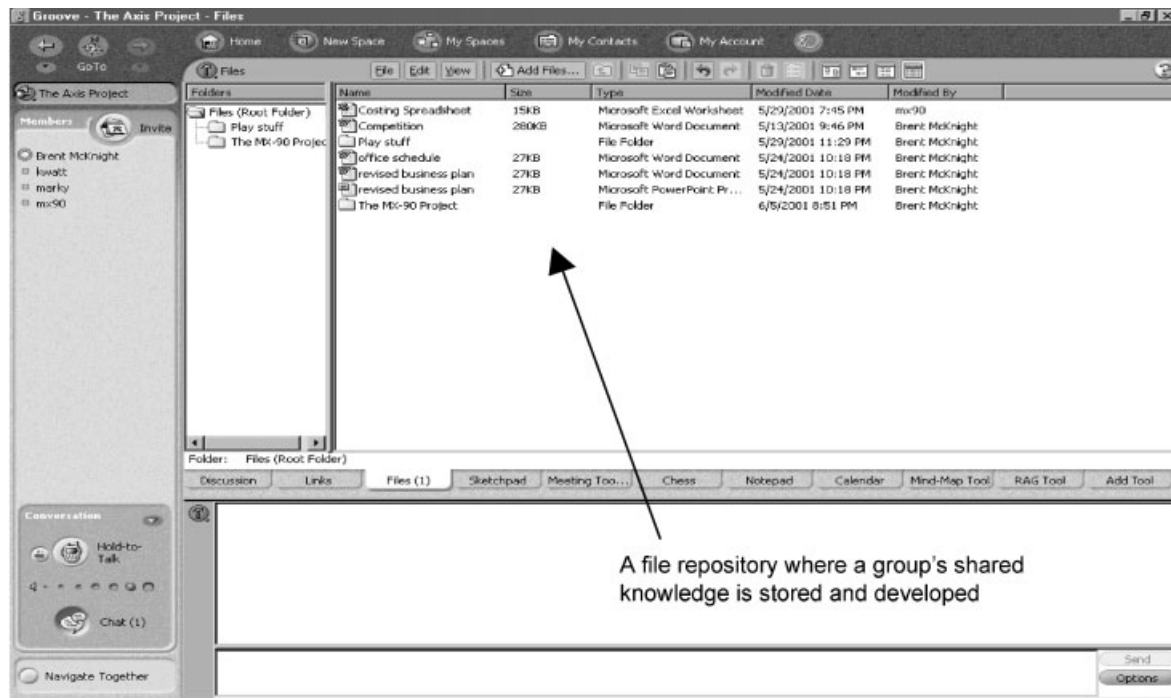


Figure 3 A file repository where files and documents are stored

distances had available limited communication tools such as the telephone, email, chat rooms, and occasionally video conferencing. Individually these technologies may not provide the richness of communication required for improvisation to occur. The challenge is to capture in groupware as many elements of human communication as possible. Groove opens up many of the communication and collaboration media available in face-to-face meetings, offers some new mediums and holds promise for continued development.

When Ray Ozzie began designing Groove, he started by examining the sociology behind how people interact and identified 20 dimensions of human interaction. The main dimensions revolve around how we communicate emotions and visual items with each other in different time zones. He then challenged himself to build a technology that allowed a full variety of human interaction (Breen, 2001). In addition to voice and text chat, instant messaging, file exchange, and lagged-time discussion boards users of Groove are able to benefit from collaboratively creating and editing documents in real-time, navigating web spaces and file repositories together, and sharing version controlled file repositories that are generated specifically for and by each group. In Figure 4 a business plan is being collaboratively created.

Groove is designed to be an 'always on' application. Users work at their desks and contact is maintained with all members of the group. While at

their desks, employees have access to the phones, peripherals, paper documents and other tools that are still required for work to get done. In essence, although individuals cannot touch each other and may miss out on some of the more subtle nuances of communication, their real-time communication is sustained as they work.

Groove offers compelling real-time communication channels and some even more intriguing collaborative media. Groove succeeds in providing a sustained real-time communication channel that permits users to continuously interact in real-time from wherever they are.

Supporting the development of intellectual capital

One of the three main sub-constructs of intellectual capital is structural capital. Bontis (1999) defines structural capital as the intellectual capital stored in an organization's memory through its culture, procedures, libraries and information technology tools: in other words, the organizational memory resident in the non-human storehouses of firms. Organizational memory as it relates to improvisation has a paradoxical relationship. Although greater degrees of memory will generate more effective improvisation, improvisation is less likely to occur as employees will tend to rely on existing solutions and procedures. Miner and Moorman (1998a) break organizational memory into two components:

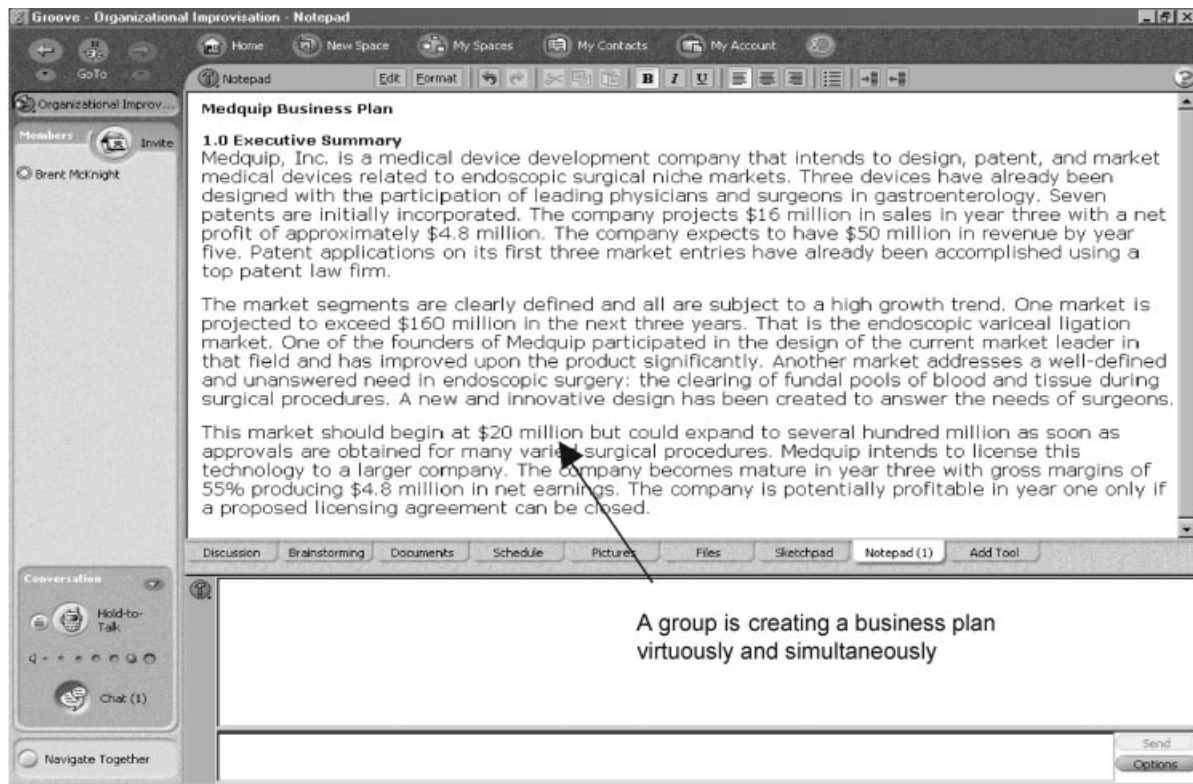


Figure 4 A business plan being created by team members

procedural and declarative memories. Procedural memories involve skills, routines, and cultural norms that are learned by employees. Declarative memories are facts such as competitive intelligence and market realities.

Groupware technologies can provide quick and timely access to organizational memory, both procedural and declarative. Within a shared Groove workspace participants create chat logs, sketches, and notes and bring files from external sources into a workspace file repository. This pool of data or memory is geared specifically to each group and grows as the project develops and progresses. In addition, organizations are increasingly accumulating and leveraging databases of competitive intelligence, news, product specifications, customer information and peer experience to gain competitive advantage. There is so much data to store that Bontis (2001) proposes the cumulative codified knowledge base of the world will double every 11 hours by the year 2010! Tools built for use with Groove can access these massive data storehouses thereby significantly expanding available organizational memory.

Knowledge, both from past experiences as well as current ones, provides the impetus for improvisation to occur. In an April, 2000 Compaq Canada news release, Knowledge Manager David Gendron is quoted as saying that a shift towards decentralized

employee decision-making is helping the rank and file employee deal more effectively with customers and with process issues. This creates a need for immediate knowledge that, often, must cross functions and transcend hierarchies. More important than the basic requirement for this knowledge is the need for it to be accurate, complete and timely. The collective knowledge must be a good enough approximation of the true environment in which the organization is operating so that improvising employees can respond correctly.

A knowledge management system that actively searches for information that employees need, delivers it to them in the way it is needed, and does this just as it is needed should be able to significantly enhance the effectiveness of improvisation. The use of effective knowledge management addresses the combined need for competitive and market organizational memory with the need for this information to be delivered in real-time. By adding tools to Groove that push relevant information to the improvisers, more effective improvisation can result.

Assisting employees in building on the work of others

An improvising organization must be 'tolerant of experimentation and errors, provide for continuous

learning from these experiences, and empower employees to take spontaneous action' (Vera, 2000: 35; Crossan, 1997: 3). This is not an easy task but its achievement can be assisted by the adoption of groupware, and in particular, by Groove.

Improvisers are continuously experimenting by recombining knowledge and procedures in new ways. They learn from both their successes and their failures and it is important that employees are rewarded for this risk-taking and for competent experimentation (Vera, 2000: 35). As an improviser learns, greater skill and information can be leveraged in future situations resulting in more effective improvisation. Organizations whose cultures encourage learning are often called *knowledge-centric* or *inquiring organizations*. 'Developing an inquiring organization involves building a community of minds, fostering effective dialogue, avoiding bureaucracy, occasionally rocking the boat and reinventing the organization, and building a storehouse of knowledge, that is, a knowledge management system' (Courtney, 2000: 141). It is evident that these qualities are very similar to those needed for an improvisational culture such as: wide information distribution, shared responsibilities, less structured management, and continuous learning with a willingness to take risks.

Improvisation is spontaneous, yet at some point, action and analysis must converge, requiring employees to have the ability to work both independently and collectively in an iterative manner. Employees must be empowered with the proper tools, resources and knowledge to make the analysis and take the action required within a very short time frame. The very nature of Groove's peer-to-peer architecture means that teams are empowered with communication tools and access to the expertise of their groups. The knowledge that users of Groove have access to is created by the group itself and brought in from the edges of the organization. Although for employees to be empowered to improvise properly the organization must truly value the freedom it has provided, the adoption of Groove can help organizations enable employees to act spontaneously.

CONCLUSION

Since employees are generally required to improvise regardless of their intent, it will rest on senior management to provide the appropriate environment. Management must ease communication between employees, support the development of shared knowledge and assist employees in building on others' ideas. While Groove presents itself

as a ready tool for improvisation, the three basic principles can be applied to other technologies and business practices to increase the organization's ability to improvise.

Further development in the use of software tools at the intersection of knowledge management and improvisation holds great promise for improvising managers. It is early, however, in the adoption of groupware and the evidence is not clear. With greater adoption of groupware, its effects on organizational improvisation can be examined more thoroughly.

ACKNOWLEDGEMENTS

The Management of Innovation and New Technology Research Centre provided financial assistance for the presentation of an earlier draft version of this paper at the 1st International Symposium on Organizational Improvisation in Lisbon, Portugal and at the 5th World Congress on Intellectual Capital in Hamilton, Canada.

REFERENCES

- Bontis N. 1996. There's a price on your head: managing intellectual capital strategically. *Business Quarterly Summer*: 40–47.
- Bontis N. 1998. Intellectual capital: an exploratory study that develops measures and models. *Management Decision* **36**(2): 63–76.
- Bontis N. 1999. Managing organizational knowledge by diagnosing intellectual capital: framing and advancing the state of the field. *International Journal of Technology Management* **18**(5/6/7/8): 433–462.
- Bontis N. 2001. Assessing knowledge assets: a review of the models used to measure intellectual capital. *International Journal of Management Reviews* **3**(1): 41–60.
- Bontis N. 2002. *World Congress on Intellectual Capital Readings*. Butterworth-Heinemann KMCI Press: Boston, MA.
- Bontis N, Chua W, Richardson S. 2000. Intellectual capital and the nature of business in Malaysia. *Journal of Intellectual Capital* **1**(1): 85–100.
- Bontis N, Crossan M, Hulland J. 2002. Managing an organizational learning system by aligning stocks and flows. *Journal of Management Studies* **39**(4): 437–469.
- Breen B. 2001. Jazzed about work. *Fast Company* **46**: 192.
- Brown S, Eisenhardt K. 1997. The art of continuous change: linking complexity theory and time-paced evolution in relentlessly shifting organizations. *Administrative Science Quarterly* **42**(1): 1–34.
- Choo CW, Bontis N. 2002. *The Strategic Management of Intellectual Capital and Organizational Knowledge*. Oxford University Press: New York.
- Ciborra C. 1996. The platform organization: recombining strategies, structures and surprises. *Organization Science* **7**(2): 103–118.
- Courtney J. 2000. Developing inquiring organizations. *Journal of the Knowledge Management Consortium International* **1**(1): 132–141.

- Crossan M. 1997. Improvise to innovate. *Ivey Business Journal* **62**(1): 37–42.
- Crossan M, Lane H, White R. 1999. An organizational learning framework: from intuition to institution. *Academy of Management Review* **24**(3): 522–537.
- Cunha J, Cunha M, Kamoche K. 2001. Organizational improvisation: what, when, how and why. Working Paper, Universidade de Lisboa.
- Gates B. 1999. *Business at the Speed of Thought*. Time Warner: New York.
- Geisinger M. 1971. *Plays, Players and Playwrights*. Hart Publishing: New York.
- Hatch M. 1997. Jazzing up the theory of organizational improvisation. *Advances in Strategic Management* **14**: 181–191.
- Hatch M. 1999. Exploring the empty spaces of organizing: how improvisational jazz helps redescribe organizational structure. *Organizational Studies* **20**(1): 75–100.
- Homer-Dixon T. 2000. *The Ingenuity Gap*. Alfred A. Knopf: Toronto.
- Kernfield B. 1995. *What to Listen for in Jazz*. Yale University: New Haven, CT.
- King A, Ranft A. 2001. Capturing knowledge and knowing through improvisation: what managers can learn from the thoracic surgery board certification process. *Journal of Management* **27**: 255–277.
- Miner A, Moorman C. 1998a. The convergence between planning and execution: improvisation in new product development. *Journal of Marketing* **62**: 1–20.
- Miner A, Moorman C. 1998b. Organizational improvisation and organizational memory. *The Academy of Management Review* **23**(4): 698–723.
- Mintzberg H. 1987. The strategy concept 1: Five Ps for Strategy. *California Management Review* **30**(1): 11–24.
- Shani A, Sena J, Stebbins M. 2000. Knowledge work teams and groupware technology. *Journal of Knowledge Management* **4**(2): 111–124.
- Sharkansky I, Zalmanovitch Y. 2000. Improvisation in public administration and policy making in Israel. *Public Administration Review* **July–August**: 321–329.
- Spolin V. 1999. *Improvisation for the Theatre*. Northwestern University Press: Illinois.
- Vera D. 2000. *Improvisation and Its Impact on Group Performance: A Quasi-Experiment*. Thesis proposal, Richard Ivey School of Business, University of Western Ontario.
- Yen DC, Wen HJ, Lin B, Chou D. 1999. Groupware: a strategic analysis and implementation. *Industrial Management & Data Systems* **99**(2): 64–70.