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Summary:

This is a critical view of the hypothesis that better access to a broader repertoire of media resources will significantly enhance our ability to communicate more effectively. It begins by laying down a foundation of some basic principles concerning the nature of knowledge creation. This foundation is framed in a manner that involves the potential relevance of two particularly creative activities, storytelling and making jazz. This foundation provides the basis for a critical examination of several media-rich presentations that were delivered at the Institute for the Future Outlook Exchange in November of 1997, since these presentations actually pertained to the practices of digital storytelling and jamming. This critique is followed by a more detailed examination of what we may learn from jazz if we wish to invoke it as a metaphor for knowledge creation. The report then concludes by discussing the implications of these observations for a new world of work experiences in which knowledge creation is a critical element.

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Keyword(s) [Separated by ';']:
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Storytelling, Jamming, and All That Jazz: Knowledge Creation in the World of New Media

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1 The Challenge: Communicating Effectively in the World of New Media

In November of 1997, the Institute for the Future organized an Outlook Exchange entitled "Beyond Knowledge Management: A Strategic Conversation on Evolving Organizational Knowledge" [Institute for the Future, 1997]. Several themes recurred over the course of the two days of this event, two of which were particularly interesting from the point of view of group communication. The first was that the two evening events were entitled "Jamming" and were both concerned with viewing the practice of making music as a metaphor for knowledge creation. The second was that each of the three daytime sessions began with a "digital story," presented by Bob Johansen, Director of the Institute for the Future, with the assistance of Lin Knapp, Chief Knowledge Officer for Coopers & Lybrand.

The integration of these two themes with the presentations and discussions that constituted the heart of the Outlook Exchange made the whole experience a very media-rich event. Thus, the event itself became an excellent opportunity to test what may be the most important hypothesis underlying multimedia research: that better access to a broader repertoire of media resources will significantly enhance our ability to communicate more effectively. Unfortunately, when viewed critically and with half a year's distance from the enthusiasm of the event itself, the Outlook Exchange does not appear to have provided much evidence to support this hypothesis; and this report will attempt to examine why this is the case. It begins by laying down a foundation of some basic principles concerning the nature of knowledge creation, framed in a manner that justifies the potential relevance of storytelling and jamming. This foundation provides the basis for a critical examination of what took place at the Outlook Exchange that actually pertained to digital storytelling and jamming. This is followed by a more detailed examination of what we may learn from jazz if we wish to invoke it as a metaphor for knowledge creation. The report then concludes by discussing the implications of these observations for a new world of work experiences in which knowledge creation is a critical element.

2 The Nature of Knowledge Creation

Many approaches to knowledge management tend to begin by taking on the thorny philosophical problem of defining or characterizing knowledge, as if it were an object that admitted of analytical investigation as readily as a suspension bridge. Our own investigations have tried to concentrate on the nature of work practices; and, as a result, we have shifted our attention from noun to verb. From this point of view, we assert that *knowing* involves making "informed" decisions with incomplete information or incomplete decision models. The key attribute here is *incompleteness*. If our information and model resources were complete, we should not need anything more than a powerful theorem-prover to make those decisions; but it is unrealistic to assume that we shall ever be able to model the real world that extensively. Thus, our capacity for knowing is basically our capacity for coping with incompleteness.

Taking this as a working hypothesis, we may now propose that creating knowledge involves increasing this capacity. This proposition can then be elaborated along two axes: the nature of the increase and the nature of the capacity itself. Along the first axis we can identify three ways in which the capacity for knowing may be increased:

1. It may be more *productive*, to the extent that the decisions made are more "successful" (according to some accepted criterion for success).
2. It may be more *efficient*, enabling those decisions to be made more rapidly.

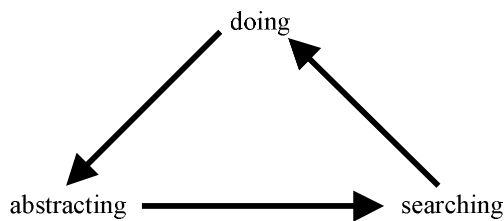

Figure 1: The activities of knowing

3. It may increase the *scope* of the decision-making process, taking into account factors that may have previously been ignored.

Note that these improvements do not always align with each other, so they do not necessarily all contribute together to knowledge creation at the same time. Along the second axis the capacity for knowing itself may be translated into the abilities to perform three interrelated tasks illustrated in Figure 1. The decisions we actually make arise from our facility for *doing*, this facility, in turn, is based on our ability to *search* the resources of the information and decision models we can access, and our ability to search productively and efficiently is a consequence of our faculty for *abstracting* our experiences of the world and previous decisions we have made into models that add to the resources we have at our disposal.

Given this particular framework for talking about knowledge creation, we would now like to provide a brief introduction to why topics such as storytelling and jazz, the origin of the practice of jamming, should have been considered as a key factor in a meeting concerned with "evolving organizational knowledge." Consider first the value of storytelling. There has been a long tradition in literary theory that views stories as a representation of knowledge [Brooks, 1984], but how is this point of view relevant to our capacity for making informed decisions? The answer to the question is that many, if not all, stories inform us about the three tasks illustrated in Figure 1. They give us *examples* of how these tasks are performed, they impose *values* on the selection and consequences of those tasks, and they embed the execution of the tasks in a *cultural context.* Stories thus not only report *what* decisions are made but also account for *how* those decisions were made with respect to the activities of abstracting, searching, and doing.[1] "Reading"[2] a story thus provides an opportunity to exercise those tasks, since the reader can internalize experiences of engaging in the tasks without actually doing them (in circumstances in which doing them might be difficult and/or dangerous).

These tasks are also exercised by the activity of *telling* a story. Indeed, there are actually *two* activities involved in telling a story: making up the story (composing the story to be told), and recounting the story (deciding how to present that story to an audience). Both of these activities involve exercising the tasks of abstracting, searching, and doing; and each one does it in a different way. This decomposition of storytelling into two activities is also part of the tradition of literary theory [Brooks, 1984]. A variety of terms have been engaged to disguish the results of the two activities. The most commonly used terms in English label the result of making up a story as the "story" and the result of recounting the story as the "discourse."

An important consequence of this two-fold view of storytelling is that it explicitly acknowledges that the *relationship* between a storyteller and an audience is a key element of the activity of telling the story. Jazz is also about such relationships, but it translates the somewhat polarized orientation of storyteller and audience into a more general set of interpersonal dynamics that is more like the relationships one is likely to find in a brainstorming group. In a group that is making jazz, *everyone* has incomplete information and decision models; and everyone needs to be actively involved with the tasks of abstracting, searching, and doing. Furthermore, everyone is informed by what everyone else is doing in exactly the same ways that we are informed by stories, through exposure to examples, through evaluative feedback, and through a mutual process of defining a cultural context. We may thus conclude that making jazz is an instance of knowledge creation; and, while we are inclined to think of the instance as metaphorical when we are worrying about making informed decisions in the world of work, the instance is actually a literal one.

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[1] Can this claim really be generalized to most stories? The book *Reading for the Plot*, by Peter Brooks [1984], provides an abundant collection of examples. These examples are drawn from not only a variety of periods in literary history but also the non-fiction reports of Sigmund Freud.

[2] The scare quotes have been inserted to indicate a generalization of reading that includes not only examining a manuscript on paper but also listening to a story being told, watching a film, or even extracting the narrative element of a painting.

Indeed, because making jazz is a literal instance of knowledge creation, we feel it is valuable to explore the conjecture that we can translate what we know about how one learns to make jazz into lessons for creating knowledge. In other words, if we know how to look at it the right way, then studying jazz pedagogy should inform us about knowledge creation. We shall provide a framework for just what that "right way" should be in Section 6; but first we shall compare our foundational view of knowledge creation with the approaches to digital storytelling and jamming taken at the Outlook Exchange.

3 Digital Storytelling

Just what *is* digital storytelling? On the basis of the Outlook Exchange, the question may be answered by drawing upon the commonalities of the three digital stories presented by Johansen and Knapp. Those commonalities involved these two speakers sitting in armchairs on either side of a screen on which was projected images provided by presentations that had been made using Macromedia Director [Melnick and Olsen-Dunn, 1996]. These presentations did not involve very much interactivity on the part of the speakers, but they *did* incorporate some rather elaborate video production. Indeed, it would probably be fair to say that at least some of these videos could, themselves, be viewed as stories unto themselves and that what Johansen and Knapp were doing was engaging in a sort of "fireside chat," in the course of which they could share several external resources with the audience, rather than simply speaking from the tops of their heads, as it were.

3.1 The Significance of Storytelling at the Outlook Exchange

This technique provided an appealing approach to the presentation of content; and, if nothing else, it certainly contributed to making the Outlook Exchange a memorable occasion. Nevertheless, there remained the question of why Johansen and Knapp were attaching so much importance to storytelling in the first place; and it was only with the final story, on the topic of diversity and creativity, that they began to give some indication of why storytelling was an important issue. They set the stage by laying out a challenging problem [Institute for the Future, 1997]:

> Diversity is a well-spring of creativity, and the good news is that many trends are intensifying diversity in the workplace. Globalization is increasing cultural diversity. A new generation of workers is adding to age and skill diversity—this is the "wired" generation. Also, the increasing connectedness of society provides more opportunities for contact with diverse co-workers, colleagues, and friends.
>
> The bad news is that we don't know the best way to work with diversity. In particular, we face challenges of reality drift, fear of the unknown, and a potentially deep human identity crisis as we try to redefine ourselves in a globally wired context.

The remainder of the presentation tried to address the question of how we *could* work with diversity. Storytelling was proposed as a solution, being justified as follows [Institute for the Future, 1997]:

> Storytelling can weave us together by creating characters that define new roles and relationships, by embodying our principles, by speaking to our hearts, and by bringing people together.

In other words Johansen and Knapp were not thinking about storytelling in relation to the processes of making up a story and recounting a story discussed in Section 2. Instead they were interested in storytelling as a *social process* through which even the most diverse groups of people could be brought together and begin to build up shared understandings [Schrage, 1995].

While this is an interesting and potentially valuable perspective, it overlooks a significant problematic issue: The danger of placing too much emphasis on the social process of storytelling is that one can lose touch with whether or not any story is actually being told. The problem with the three digital stories that were offered by Johansen and Knapp is that one could come away with the impression that presentation was simply a matter of delivering media objects to the audience, that "The Medium Is the Message" [McLuhan, 1965]. However, this approach neglects the role of stories in *imposing values* (Section 2); and

it is only through having a story that an audience can assign any value to the media objects it receives [Smoliar, 1998a]:

> If the audience does not treat those objects as valuable information, the delivery is virtually irrelevant. One of the key factors that contributes to the value of information is its accessibility; and within the recent past people for whom presentation is a significant part of the work process have begun to discover what literary theorists have known for some time [Brooks, 1984], that storytelling is a powerful device for making the knowledge that arises from the interpretation of information accessible [Wurman, 1990].

Thus, it is very important that there really be a story being told as part of the storytelling experience, since that story provides a key to the accessibility of the entire experience. If the experience is not accessible, it is not likely to be remembered; and, if it is not remembered, was it worth telling in the first place?[3]

This returns us to the two processes of storytelling addressed in Section 2. When we view storytelling as a social process, we address the process of recounting a story as a means by which knowledge can be *shared*; and, as Johansen and Knapp observe, sharing knowledge is particularly problematic in a context that is rich with diversity. However, if that context is to serve as "a well-spring of creativity," then *creating* knowledge is as important a problem as sharing it; and this is a matter of making up a story. By dealing with both processes, storytelling serves to integrate issues of both creating and sharing knowledge.

What goes into making up a story? Viewed as a problem of knowledge creation, this was actually the primary topic of discussion at the Outlook Exchange. That discussion centered on a hypothesis that knowledge creation could be viewed in terms of a continuum that had, at one end, "knowledge by design," where everything was formally planned, and, at the other end, "knowledge by emergence," where, rather than being planned, knowledge emerged from the social dynamics of the workplace [Institute for the Future, 1997]. Making up a story is frequently a matter of knowledge by emergence. The storyteller has an experience, an observation of the world, an overheard remark, or an exchange with someone in the audience; and that experience provides the inspiration from which a story unfolds. However, narratological theory has also informed us that making up a story can have a strong element of knowledge by design [Eagleton, 1983]:

> The Russian Formalist Vladimir Propp [1968] had already made a promising start with his *Morphology of the Folk Tale* (1928), which boldly reduced all folk tales to seven 'spheres of action' and thirty-one fixed elements or 'functions'. Any individual folk tale merely combined these 'spheres of action' (the hero, the helper, the villain, the person sought-for and so on) in specific ways.

While this may seem like a rather extreme approach to designing how we make up a story, it is actually not that different from how we can use one of the presentation templates included with PowerPoint [Moseley and Boodey, 1997]. Thus, making up a story usually involves a *balance* of both knowledge by emergence and knowledge by design. This is because, while inspiration may involve the conditions under which knowledge can emerge, the form in which it emerges is not always the form in which it may best be communicated. Arriving at such a form requires the sort of systematic planning that goes into design.

3.2 Why is **Digital** *Important?*

So why is it important that storytelling be *digital*? This question can only be answered effectively if we recognize the twofold nature of storytelling as a synthesis of making up a story and relating that story. Digital technology is not likely to have much effect on how we make up stories beyond the role that PowerPoint-like presentation templates can have in getting us started. However, when it comes to the social process of relating the story, digital technology can have a major impact through the richness of the

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[3] The author had to deal with the problem of memorability when preparing a trip report for the Outlook Exchange [Smoliar, 1998b]. In accounting for the three digital stories, only the one about diversity and creativity was memorable for its content. The first was memorable for Johansen's informal discourse regarding the matter of bringing technology to bear on telling digital stories, while all that was memorable from the second was one of the embedded videos (the most memorable part actually being the audio narration).

media objects it can provide and support. Returning to how that social process was characterized by Johansen and Knapp (Section 3.1), there is now a substantial tradition of the use of digital technology for bringing people together; and much of that tradition has been excellently reviewed by Michael Schrage [1995].

Does this mean that the importance of digital storytelling is simply a corollary of the hypothesis that "more bandwidth is better?" The failure of the Outlook Exchange to support that hypothesis decisively would place such a corollary in jeopardy of defeat. The challenge facing digital technology is not one of bringing people together but of contributing to building up *shared understandings*. FXPAL has begun to explore this problem in terms of how a well-equipped conference room can be cultivated as a "Knowledge Place." This environment has been envisaged "as a *laboratory in which one can study the nature of knowledge work in a shared space*" [Smoliar, 1998a]. Needless to say, social goals for the design of this space are as important as the technical ones; and identifying those technical goals has become our most important design priority.

4 Jamming

The theme of jamming was actually based on the title of a book by John Kao [1996], who was responsible for the first of the two evening events. At this event Kao tried to develop the idea of jazz improvisation as a metaphor for knowledge creation, lacing his presentation with anecdotes about and quotations from many of the jazz "greats" and occasionally trying to demonstrate a point by "playing it out" on an electric keyboard. However, in spite of the appealing nature of the topic and the innovative device of including piano improvisation as a media object, the presentation was not particularly memorable; and it was not memorable because, at the end of the day, it was unclear just what story was being told. This was an ironic turn of events in light of the position in Section 2 that making jazz is an instance of knowledge creation (rather than being a metaphor) based on an argument that relates the social processes of making jazz to the social processes of storytelling.

However, as we just observed, social processes are primarily concerned with how a story is recounted; but jazz improvisation also has a lot in common with the process of making up a story. Both involve being able to create and cultivate conditions of inspiration under which one begins to conceive of a story to tell in the first place; but they also both depend on the constraint that, without continuity and cohesion, it may be impossible to relate that story in a manner that communicates effectively.[4] In other words, like making up a story, jazz improvisation is a matter of finding a proper balance between knowledge by emergence and knowledge by design.

Achieving such a balance involves considerable technique and experience. Nevertheless, the second evening's exercise in jamming, which involved *making* music by all the participants in the Outlook Exchange, most of whom were rank amateurs, turned out to be far more successful than the expository approach to jamming that Kao had taken.[5] This event was called "Synergy Through Samba," it was organized by Gary Muszynski, President of One World Music; and it was basically an exercise in making music in an ensemble. The objective of Musynzki's exercise was to turn all Outlook Exchange participants into a samba band in a matter of a few hours. The exercise began with each participant having to learn a very specific part to play, so each participant acquired knowledge by design. However, when the entire ensemble was assembled, each participant then learned how to work with his own "designed" part to get it to "engage" with all the other parts he was hearing; and this was very much a matter of knowledge by emergence.

Two very important lessons thus "emerged" from this experience. The first lesson was that, given a simple enough musical performance task, one can begin to get a feel for the process of jamming without

[4] The roles of continuity and cohesion in both storytelling and jazz improvisation has been discussed in an ethnographic study of jazz improvisation by Paul Berliner [1994].

[5] Ironically, while Kao's intentions were expository, he never actually got around to providing any definition of jamming that members of his audience could take away with them. The closest he got was the claim that "If you 'jammed' well you had a good conversation—an interaction that leads somewhere new" [Institute for the Future, 1997]. However, he never addressed the question of whether jamming was anything more than conversation in music.

having first to acquire many years of technique to master an instrument. The second lesson was that doing carries a lot more weight than theorizing. Regardless of all the energy and experience that drove the Outlook Exchange discussions about design and emergence, there was no substitute for being engaged with both knowledge by design and knowledge by emergence in the course of becoming a samba band [Smoliar, 1998b]. This is probably also the ultimate lesson in knowledge creation: Whatever theories may have to say about the nature of knowledge and the technical, social, and aesthetic conditions under which knowledge is communicated, there can never be any substitute for actually being engaged in a knowledge creation task.

5 From Storytelling to Jazz

One of the reasons that the samba exercise was successful was that it was based on a relatively simple form of music that involved participation by a large number of performers without heavy technical demands. The knowledge creation "worked" because a relatively limited body of knowledge was involved in the first place.[6] However, because that body of knowledge was so limited, the exercise could not really get at the connection between storytelling and jazz.

Coming to this connection is not an easy matter. As was observed in Section 2, it involves a transition from a relatively unilateral relationship between a storyteller and an audience to a more intricate set of group dynamics. Indeed, it is because all members of the group should be treated as having equal footing that the metaphor for jazz is one of *interactive* storytelling. Furthermore, the interactions that arise from the participation of all members of the group will impact both aspects of the storytelling process: making up stories and recounting them.[7] Thus, the problem of knowledge creation that we face in dealing with group interactions is how we can acquire and cultivate the skill of being good interactive storytellers. One way to address this problem is to build of the jazz metaphor and identify how certain fundamental principles of jazz education may also teach us about interactive storytelling.

6 Learning from Jazz

How, then, can we learn from what is currently known about jazz education? One way to approach this question is through an ethnographic study of how jazz is taught, learned, and practiced. Such a study has now been published [Berliner, 1994]; and much of its value lies in how it has tried to frame this educational process into three categories of activities: getting prepared, succeeding as a soloist, and improvising with a group. The third of these activities is the only one that really involves issues of interaction storytelling within the dynamics of group interaction. Nevertheless, each of the categories has its own role in the practice of knowledge creation; so they will all be examined in a bit more detail.

6.1 Getting Prepared

The very first lesson to emerge from Berliner's study may also very well be the most important: *There is no substitute for exposure to the material*. This seems obvious; and yet there are those who believe that

[6] What does it mean to say that knowledge was created as a result of this exercise? It means that a large body of individuals acquired information that they had not previously possessed, having to do with the elements of samba music; but, rather than just *receiving* this information, they were required to put it into *action*. However, to return to the argument of Section 2, it was not only by *doing* that they were engaged in knowledge creation. They were also engaged in *abstracting* what they learned about how their individual parts were designed in order to fit those parts into the behavior of the group as a whole, and those with more complicated parts were probably *searching* the memories of their initial training in order to continue to get those parts right in the more complicated context of the ensemble sound. This may be a far cry from being able to make up and relate stories, but it still touches upon the fundamental tasks that constitute the process of knowledge creation in a substantive way.

[7] Indeed, these two aspects can be (and generally are) very tightly coupled. This can be observed in the dynamics of oral storytelling, and it flourishes to a greater extent in many great works of literature. (See, for example, [Brooks, 1984].) This coupling must be exploited and exercised to an even greater extent when storytelling becomes interactive.

any body of knowledge, even making jazz, may be susceptible to study "in the abstract." Similarly, no attempt at a formal representation of the structure of a story [Barr and Feigenbaum, 1981] can ever substitute for the experience of actually listening to a story being told, let alone the experience of making up a story. Before a would-be jazz performer can even begin to think about becoming a practitioner, it is necessary to build up a base of experience that, ultimately, can only be acquired through "hanging out."

Berliner [1994] actually uses the term "hanging out" with a certain amount of precision, applying it to informal study experiences that involve "a mixture of socializing, shoptalk, and demonstrations." Through such exposure, one can gradually approach a point where one can begin to participate actively, through casual jamming,[8] sitting in at concerts, or forming a professional affiliation with a band. Nevertheless, the acquisition of experience rarely derives strictly from "hanging out" because just about all jazz musicians also have a strong sense of "paying dues." Sometimes formal education is part of this dues paying process, since it can provide the necessary foundations of familiarity with the material; but it is also a matter of becoming a member of a community and then cultivating one's own individual skills to distinguish oneself within that community. However, the point is that "paying dues" has to be preceded by a strong desire to pay those dues; and that desire can only grow out of the emotional pleasures one gets from those initial experiences of "hanging out."

Even though this is only a preparatory phase for the mastery of jazz skills, it still has implications for a broader view of knowledge creation. Working with knowledge is no more a matter of working with abstract sentential forms in some logical calculus than working with music is a matter of working with notes. That "mixture of socializing, shoptalk, and demonstrations" has just as much impact when one is trying to make sense out of the content of a massive database as it does when one is trying to figure out what was going on when John Coltrane formed his ensemble to record *Ascension* [Wild, 1992]. Similarly, "paying dues" is an important element of knowledge work for both technical and social reasons. On technical grounds it is necessary to establish that one has a sufficient body of experiences to participate in knowledge creating activities with the other members of a group without first having to consume considerable time establishing just what the shared experiences of that group are. On the social side an individual's experiences can only be valuable to a group if that individual can communicate them effectively, and effective communication is as much a matter of socialization as it is one of getting the facts right. Finally, there is the underlying theme of emotional pleasure. Knowledge creation can only come from a passionate desire for involvement with the content. Sometimes that desire can come solely from exposure to the content; but, more often than not, it arises from "hanging out" with others who are already infected with that desire.[9]

6.2 The Skillful Soloist

Much of the process of "paying dues" involves building up a basic core of experiences as a soloist; and these experiences are no different for jazz than they are for classical music, learning how to get the right sound out of an instrument and applying that sound to the basic vocabulary of scales, chords, and harmonic progressions. However, again as in the case of classical music, these abstract concepts only make sense in terms of the roles they play in actual musical compositions. Thus, it is equally important to begin to learn a basic repertoire of tunes and arrangements, since these will be the fundamental vehicles for improvisation. Furthermore, learning to play is as much a matter of learning to listen as it is one of gaining a command over material that has been notated in charts. Ultimately, the first steps in improvisation are going to follow in steps that have already been taken, either through practicing improvisations that have been transcribed into notation or by trying to imitate what one hears in another performance [Berliner, 1994]. This is ultimately what Charles Mingus was getting at when he said, "You can't improvise on nothin' man, you gotta improvise on somethin'" [Kao, 1996].

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[8] Berliner [1994] tries to be a bit more specific in providing a definition of jamming; he describes jam sessions as "informal musical get-togethers [where] improvisers are free of the constraints that commercial engagements place upon repertory, length of performance, and the freedom to take artistic risks."

[9] Another moral to this story is that education can rarely be confined to the classroom. One may pick up the content in the classroom, but the classroom seldom deals with how content is turned into practice. Ultimately, one only comes to deal with practice by "hanging out" with practitioners.

An important consequence of this approach is that one's ability to *hear* the subtlety and detail that constitute an improvisation improves along with one's ability to create one's own improvisations. This often begins with exploring the different ways to "play with" a melody, extends into discovering how to take liberties with harmonic and rhythmic progressions, and eventually culminates into having the courage to take liberties at the level of the overall formal structure. However, as these elaborations get more sophisticated, there is always the danger that one performs them for the sake of their own challenges and difficulties; and such performance tends to lose touch with the music itself. This is where an intuition for storytelling can be engaged to maintain a clear sense of continuity and cohesion (Section 4).

Another important approach to performance that becomes recognized as one acquires more and more skill is that not all of the things one may want to do are necessarily spontaneously improvised. Sometimes, in order to get what one wants, it is necessary to sit down, compose out, and practice what one *really* wants to do in "playing with" some material. Berliner [1994] uses the phrase "eternal cycle" to describe this alternation between discovery through the spontaneity of improvisation and discovery as an act of planned composition; and this cyclic metaphor may ultimately be one of the more productive ways of viewing the relationship between knowledge by design and knowledge by emergence. Furthermore, the cycle is eternal because one can always discover new ways to work with one's material. Berliner [1994] calls this "the never-ending state of getting there." It has also been called "learning how to tell your own story" [Hentoff, 1995]; and, because life is always changing, this is a process than can (and should) never converge on any single ideal story.

From the more general point of view, there is another "eternal cycle" that occupies the process of knowledge creation. This is the cycle between reading and writing. One cannot write in a vacuum any more than one can "improvise on nothin'." Just as the music one makes is always inspired by the music one hears, and the way in which experience in making music also makes one a more skillful listener, knowledge creation rests on the skill of "reading" knowledge from other sources. This "theme" of knowledge creation will be revisited in Section 7.

6.3 Improvising with a Group

For most musicians, however, being a skillful soloist is only part of the experience of being a performer. The real challenges (and delights) of performance only begin to manifest themselves when musicians gather together to play in an ensemble. Under these circumstances no one ever holds the spotlight for all of the time, nor is life simply a matter of the spotlight passing from one soloist to another. Performance is only successful when the sense of the group is as strong as the contributions of the individual soloists.

How does one build such a sense of the group? Often this is a matter of working out what arrangements should be, starting, once again, with material that is composed and often relatively fundamental. This can then be used as a point of departure from which new material can be contributed. Nevertheless, that point of departure needs to be anchored down to a foundation that is honored by the entire ensemble; and it is usually the obligation of the rhythm section, particularly drums and bass, to make sure that this foundation is secure.

As performers become more familiar with their material and more disposed to work with it in new ways, they can begin to make the move from being unilaterial storytellers to interactive storytellers. Each member of an ensemble needs to think about how not only to make up and recount stories but also to integrate those stories into a general context of the conversation of the group as a whole. This may start with a basic intercourse of musical ideas, often built on exchanging the different ways in which a passage may be embellished or in which one set of embellishments may be further elaborated; but the conversation can sometimes get personal, as was the case in a notorious exchange between Mingus and Eric Dolphy in a performance of "What Love" [Berliner, 1994]. However, when things start to get so personal that individual passions get heated, it is also important to be able to assume a position of detached observation, from which one can listen to and evaluate what is actually coming out of the process. If one is making a commitment to play for the public, one needs to develop some sense of what the public is hearing and evaluate with respect to that sense, rather than any need for personal gratification or even the well-being of the ensemble. This returns us to how these interactive stories relate to the activities of knowing illustrated in Figure 1. As was explained in Section 2, they provide and develop *examples*, they impose *values*, and they establish a *cultural context*.

So it is that making jazz can inform us about the knowledge creation that takes places when a group works together at interactive storytelling. Sometimes the parallels are relatively straightforward. For example, just as an ensemble may require the guidance of an arranger or conductor, many group discussions require the presence of a facilitator to make sure that the agenda is honored and that everyone is participating. Also, the idea of a conversation based on successive elaboration and embellishment of some initial point is a useful paradigm for how knowledge is created in many discussion contexts. However, the most problematic issue may be that of achieving the right balance between active participation and detached observation. Research into the technology of Group Support Systems (GSSs) has addressed this problem in a variety of ways [Nunamaker *et al.*, 1998]; but it is important to recognize that much of the value of a GSS arises from how it provides a technology that serves socialization.

There remains the question of whether or not interactive storytelling actually works or what the circumstances are under which it is likely to be most effective. As was observed in Section 3.1, these are circumstances in which it is desirable to arrive at a shared understanding in the presence of differing points of view. An event debriefing is an example of such a situation. The discussion involves bringing together several individuals who have experienced the event with those who have not experienced it but still need to internalize experiences of it (Section 2). Inevitably, each person who has experienced the event will talk about it in a different way; and, if these differences cannot be reconciled, those who were not there may come away as perplexed as the commoner who is subjected to all the different versions of the *Rashomon* story [Richie, 1987]. However, if the group interaction is treated as an exercise in interactive storytelling, the interactions are much more likely to lead to providing a set of shared understandings that will benefit those who need to be informed by the debriefing.

7 Conclusions about Knowledge Creation

The path to the effective practice of jazz is a long and difficult one. It is also not particularly rewarding, as interest in serious jazz practice still tends to lag significantly behind interest in classical music (let alone the more popular forms of musical entertainment). So jazz stands as a discipline that demands extremely intense effort and offers relatively little by way of reward. Are these grounds upon which we can draw conclusions about knowledge creation?

Certainly the lesson of hard work is an important one. There is an old saw that the practice of any art is 90% perspiration and only 10% inspiration. This is definitely the story of jazz. Charlie Parker even coined his own phrase for the place where he could work off his perspiration in private [Kao, 1996]:

> When Charlie Parker, the great sax man, needed to work out new musical concepts, he would withdraw from the usual people, places, and things. As he put it, he would "go to the woodshed."

This was where he could go back to work on parts of his technique that might have gotten weak, from the intricacies of complex scale progressions to perfecting a pure and simple sound from his instrument. Unfortunately, it is tempting to build on the metaphor of a woodshed as a place of retreat, rather than one of discipline [Kao, 1996]:

> The woodshed is a proverbial place of punishment, the spot where naughty country boys used to get a whipping. But if you think of the whippings as a chastening, a forced return to the condition of innocence, you will see that going to the woodshed is just another way to the beginner's mind.
>
> It's also a special place, though: out of the way, unadorned, and quiet, too, if you can ignore the cries of the naughty boy or the saxophone. That's what I want to discuss …: how managers can design places or spaces that will facilitate creativity in their organizations. The good news is that, for this purpose, managers needn't start building woodsheds out behind the mailroom. The bad news—perplexing anyway—is that *all sorts of spaces* can foster creativity, and that the creativity manager had better not ignore any of them. The ideal is to turn your whole company into Charlie Parker's woodshed. Think of it not only as a physical place, but as a state of mind.
>
> Let's look at a wish list of characteristics that you might ask for in such a place. Safe, casual, liberating. Not so small as to be limiting, not so big as to kill intimacy. Creature comfortable, stimulating, free of distractions and intrusions. Not too open, not too closed; sometimes schedule-bound, sometimes not. And so on.

One might almost respond to this description by saying, "No sweat," in which case the idea of having a place to work out that 90% perspiration would be, for all intents and purposes, entirely lost.

As was the case in the story of digital storytelling at the Outlook Exchange (Section 3), concern for social processes runs the danger of obliterating concerns for content. Kao's woodshed contributes to the social well-being of a workplace; but it does not address the problem that knowledge creation, if it is anything like jazz improvisation, is going to require a place where one can sweat through one's exercises without external pressures. In jazz everything falls back on whether or not one has the technique to express what one really want to express [Berliner, 1994]:

> Because of the constraints that musical instruments potentially place upon the expression of feelings and ideas, technical command over instruments—commonly described as chops—is a matter much discussed by artists.

However, having the technique is not sufficient. The technique is only the vehicle through which those "feelings and ideas" may be expressed; and, if those "feelings and ideas" are not there, no amount of technique is going to summon them into existence.

This returns to the theme that one cannot tell a story without *having* a story to tell (Section 6.2). *Digital* storytelling offers a new way to go to the woodshed to refine those techniques that can make the telling of a story compelling and memorable, but this only works if there is a story to be told. *Making up a story* requires its own woodshed for the cultivation of techniques concerned not with the mastery of an instrument but with the mastery of one's own mind. This woodshed for the mind is not necessarily a place designed with a concern for social processes; rather it is designed to cultivate critical thinking. To use the language of Mortimer Adler, it is a place where one can be not just an *active* reader, but a *demanding* reader [Adler and Van Doren, 1972].

Thus, just as the best jazz jammers are good listeners who know how to listen to both their fellow performers and performances in which they are not participating, the best storytellers (and, therefore, those most skilled in knowledge creation) are good readers. However, they are not just exposed to other stories; but also they know how to read the stories to which they are exposed in a critical and demanding manner. Furthermore, the best of storytellers know how to read *situations* as if they were stories, since those situations are often the "primal source material" from which stories can be fashioned. Isaiah Berlin [1996] has observed that the talent for reading situations is not always compatible with the talent for reading stories, particularly when one has to make a rapid decision to take action based on the situation one has read; but this should be taken as a sign that there are always more exercises to sweat out in the woodshed.

What does this tell us about the future of work experiences? It tells us that future workers are going to need a far stronger repertoire of skills to support listening and reading and that, therefore, they will likely benefit from technologies that contribute to those skills, such as the technologies of digital documents. It also tells us that collaboration will be a critical element of the work experience, but this lesson has already been well taught by Schrage [1995]. Is that all there is?

What storytelling and jazz have in common is not just a commitment to creativity but a commitment that is strongly rooted in human emotion. At the end of the day, we make and listen to stories and jazz because these are things that we *want* to do. It will not be sufficient to identify functionalities that support future work experiences involving reading and collaboration. Those functionalities will need to be embedded within an *aesthetic context* that will *encourage* workers to read and collaborate. The future of successful work will be a future of workers who "hang out" successfully; but even creating the right environment for "hanging out" is not enough. An environment that supports "hanging out" will only support the results of those encounters if it also supports what Richard Atkinson calls the "persistence of information" [Lindstrom, 1998]. This requires a technology that will encourage knowledge that arises from "hanging out" to undergo a smooth transition to knowledge that can be embedded into digital documents [Smoliar, 1998a].

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