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Collaborative learning in a high technology start-up business

Kimberly Jo Naujock
University of Tennessee

To the Graduate Council:

I am submitting herewith a dissertation written by Kimberly Jo Naujock entitled "Collaborative learning in a high technology start-up business." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Education.

John M. Peters, Major Professor

We have read this dissertation and recommend its acceptance:

William Q. Judge, John W. Lounsbury, Mary F. Ziegler

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Vice Provost and Dean of
Graduate Studies

COLLABORATIVE LEARNING
IN A HIGH TECHNOLOGY START-UP BUSINESS

A Dissertation
Presented for the Degree of
Doctor of Education
The University of Tennessee

Kimberly Jo Naujock
December 2002

DEDICATION

This dissertation is dedicated to:

My Parents
Don and Lee Ann Naujock

My Sister
Pamela D. Naujock

My Grandparents
Edward and Josephine Kelpine
Herman and Deloris Naujock (in memoriam)

To all who are living without electricity and material comforts
I often take for granted

And to those everywhere who are working for
social, environmental and financial responsibility
in business and other organizations

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ABSTRACT

This study investigated the role of collaborative learning in a new high-technology business. It included a description of the experience of the facilitator, who was also a co-founder and officer of the company. Peters' (1998, 2002) action research model was used to frame the research. Data were collected using phenomenological interviews, semi-structured interviews, and field notes.

A thematic analysis revealed four themes: relationship dynamics, knowing, the facilitator's role, and business outcomes. Four sub-themes appeared within the theme of relationship dynamics: team composition, early loss and change in team member participation, commitment to members, and virtual and face-to-face communication. Two sub-themes appeared within the theme of knowing: intuition and experience. These results indicated that company founders and other team members successfully engaged in collaborative learning as described by Peters and Armstrong (1998). Participants were able to jointly develop a dialogical space conducive to collaborative learning, practice cycles of action and reflection, utilize multiple ways of knowing, and achieve pre-start-up and start-up business outcomes such as completing incorporation documents, negotiating a technology transfer license agreement, and pursuing funding. Results also informed the way in which the researcher performed facilitator tasks within her role as company co-founder and officer. Implications for practitioners in similar start-up companies and recommendations for additional action research on collaborative learning in business contexts are discussed.

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CHAPTER I

INTRODUCTION

"It is not yet more or different theories that we need in management studies, but a better understanding of the intertwining of conversational talk with an organization's other activities, and of how events within such intertwinings can afford the creation of yet further kinds of conversationally structured realities by those involved in them"
(Shotter and Cunliffe, in press).

"In this relational world, it is foolish to think we can define any person solely in terms of isolated tasks and accountabilities...Why would we avoid participation and worry only about its risks, when we need more and more eyes to be wise? Why would we resist the powerful visions and futures that emerge when we come together to co-create the world? ...Here is a very partial list of new metaphors to describe leaders: gardeners, midwives, stewards, servants, missionaries, facilitators, conveners. Although each takes a slightly different approach, they all name a new posture for leaders, a stance that relies on relationships with their networks of employees, stakeholders, and communities. No one can hope to lead any organization by standing outside or ignoring the web of relationships through which all work is accomplished"
(Margaret Wheatley, 1999, p. 72-73; p. 165).

"We must be the change we wish to see"
(Mahatma K. Gandhi, n.d., left sidebar).

OVERVIEW

Tennessee Energy Technologies, Inc.[1] is an entrepreneurial venture founded in 2001. As a co-founder, my purpose in conducting this research project was to explore the role of collaborative learning in our joint experience of starting a technology-based venture. I also sought to improve my professional practice as a facilitator of collaborative learning in organizational settings and, in particular, as a co-leader of our new company. Collaborative learning is a democratic way for people to mindfully engage with each other to create knowledge and meaning in their moment-to-moment social interchange.

[1] Tennessee Energy Technologies, Inc. (Tennentech) is a pseudonym.

Action research is "a practical tool for solving problems experienced by people in their professional, community, or personal lives" (Stinger, 1999, p.11). I used Peters' (1998, 2002) DATA-DATA action research model to guide my research in our entrepreneurial team's development. The DATA-DATA method guides a researcher through eight phases of action and reflection to inform and improve one's practice: **D**escribe, **A**nalyze, **T**heorize, **A**ct followed by **D**esign, **A**nalyze, **T**heorize, and **A**ct (Please see appendix A for a description of each phase). This study is organized according to the stages of DATA-DATA inquiry.

DATA-DATA: **D**escribe

Our Venture

Tennessee Energy Technologies (Tennentech) was founded to discover, develop, and commercialize innovative and efficient renewable power generation technologies. Tennentech's first initiative is to develop a patented improvement for a closed, Brayton cycle, gas microturbine, the **Thermochemical Energy Conversion (TEC) Engine,** which uses a chemically active working fluid to convert heat into power. The TEC concept promises compact, virtually emissions-free, quiet engines that are able to run from a variety of fuel sources with up to 25% increased efficiency, while outperforming conventional energy converters in a comparable output range. Developing and bringing an engine improvement concept to market is a tremendous undertaking, and we anticipate a three- to five-year development timeline that includes both a Cooperative Research and Development Agreement (CRADA) with the Oak Ridge National Laboratory (ORNL) and strategic development and commercialization partnerships.

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Start-up Context

The impetus for our company's formation, the choice to work with the Oak Ridge National Laboratory, and the manner in which relationships were formed between and among team members are defining features of our company.

Tennessee Energy Technologies, Inc. grew out of a leading-edge, collegiate entrepreneurial education program: the Technopreneurial Leadership Class (TLC). TLC was a non-traditional two-year pilot course offered in 2000-2002 by The University of Tennessee in partnership with TennesSeed, an East Tennessee high-technology development corporation. In the Fall of 2000, fifty-six graduate and non-credit students enrolled in the course with the intention of (1) forming a team that would serve as a basis for a company, and (2) selecting a patented technology, preferably a patent held by the Oak Ridge National Laboratory (ORNL), to license, develop, and ultimately commercialize. Participants were given a list of approximately seventy ORNL patents available to consider for technology transfer, and the course facilitators organized get-to-know-you activities and exercises to facilitate the team member self-selection process. Thirty-six students, comprising fifteen different teams, returned for the Spring 2001 semester. Each team was challenged to (1) incorporate and establish company operations, (2) negotiate a license for a technology, and (3) solicit funds.

The TLC promoted a business model of using Small Business Innovation Research Grants[2] to build value in a new company and its technology. The rational for this approach was to preserve and increase the value of the founders' equity until such time as when larger capital infusions, and subsequent dilution of founders' equity, would be needed to finance further product development and/or commercialization activities.

Caroline[3] and Leslie and Simon (who are married to each other), were already partners in a small business and enrolled in the course with the goal of meeting new people with whom they could either expand their existing computer-consulting firm or possibly start a new business. Several years earlier, I had begun exploring small business opportunities and enrolled in the class out of curiosity for what it had to offer and the promise it held for my entrepreneurial aspirations. Caroline, Simon, and Leslie were interested in the energy industry, particularly renewable energy. While I came to the class with an interest in renewable energy as well, especially solar applications, I spent the majority of the first semester exploring possibilities in biotechnology and of working with other classmates.

During a break in a class meeting in the middle of the first semester, Leslie, Simon, and Caroline expressed a desire to work with me. Although we had had few direct interactions up to that point we expressed feeling an affinity and liking for one another in addition to sharing interests in environmental conservation and other areas. In mid November 2000, Leslie, Simon, Caroline, another classmate Ryan, and I committed

[2] Small Business Innovation Research grant solicitations seek innovative high-technology solutions to specific governmental needs and are issued once or twice a year by federal agencies such as the Department of Defense and the Department of Energy.

[3] In order to maintain my agreement for participant confidentiality, I have used fictitious names to identify members of the company who are also participants in this study, and when quoting participants to support the study's findings.

to working as a team, at least throughout the end of the year, to evaluate the "small self-contained utility system" patent as a technology around which to form our company. We moved forward on the premise that we would seek applicable Small Business Innovation Research (SBIR) grant opportunities to fund the company. As a group of five, our skill sets, personal motivations, and commitment to the energy field were complimentary and held potential.

For various reasons, Ryan chose not to return to the class nor to our team at the end of January, which left our team without engineering expertise. We then turned to the two inventors of the technology and asked the primary inventor if he would be interested in working with our small company through ORNL's entrepreneurial leave process, if and when we received SBIR funding. Although the inventors where not interested in taking entrepreneurial leave, they did not want to discourage us. In March 2001, the inventors introduced us to their former boss, Gregg, who had retired from ORNL three months earlier.

At the end of February 2001, Caroline took a step back from the team's day-to-day work with the understanding that she would fulfill bookkeeping needs and would otherwise have limited direct participation in company activities until the resolution of a personal issue, and after we received funding to support salaries. As co-founders we supported Caroline's decision to 'semi-withdraw' from active company involvement. Tennentech incorporated on March 10, 2001. Although Caroline is not an incorporator, she is a subscriber with a founder's equity share. She is included in references made regarding the co-founders.

Gregg agreed to work with Tennentech at the end of March 2001 to seek SBIR funding and serve as the principle investigator on funded proposals. Percentages of equity ownership had been equally divided between each co-founder, and we offered Gregg an equity percentage equal to our own. His interest, at least at that time, was exclusively in developing the TEC technology. At the time data collection ended, Gregg's legal relationship to the company had not been formalized.

My Practice

The initial relationship building and pre-start up phase of Tennentech coincided with my graduate work in The University of Tennessee's Collaborative Learning Program. I entered graduate school with a background primarily focused in the areas of community development and youth development, and I had worked in both direct community outreach and administrative capacities for non-profit organizations. In my work, increasing a non-profit agency's or group's capacity to address its organizational issues was equally as important as helping to improve their methods of addressing social issues, or in the case of a for-profit organization, in developing products and services. I had come to a place in my practice where I wanted to contribute to building a sense of community inside an organization as well as on behalf of an organization. I believed that the way we communicate with each other must be given more than cursory consideration if we are to improve life within organizations as well as within communities – local and global.

During my work in my community and in graduate study, I was seeking approaches for socially and ethically responsible day-to-day management practices. I was looking for practices that value the fundamental interconnectedness we share with each other and the natural world, practices that would be applicable across a variety of organizational settings and levels, most particularly at executive levels, in volunteer agencies, small businesses, and multi-national corporations.

The creative spirit involved in entrepreneurism blended naturally with my desire to seek new approaches for responsible business practices and management. The risk of uncertain personal financial stability involved in committing to Tennentech was, for me, outweighed by the desire to accepting the challenge, appreciation for the need for renewable energy sources, and a high personal comfort level with the benefits and risks the project could entail.

The confluence of events between my entrepreneurial aspirations, organizational and community development interests, the TLC program, and graduate studies presented themselves as an opportunity to incorporate collaborative learning in the process of building a company. During the "courtship" period between Caroline, Leslie, Simon and me, I shared my understanding about the value of collaborative learning to simultaneously support individual and group learning and to enhance communication patterns and company outcomes. I expressed that I was seeking team members who would be interested in trying this approach to leadership and communication. Each person shared feelings about how such an approach might benefit our company.

We concurred that relationship building, collaboration, and interdependence were personally and professionally important to us, and the team agreed to try the approach and to participate as part of my dissertation research. We held the agreement to interact in a collaborative fashion in our awareness as we moved forward. The collaboration occurred in how we shared information, interacted in team meetings and with others outside the company, made decisions, and encouraged each other's personal growth.

Over the course of pre-start-up and start-up activities, Tennentech team members interacted in a variety of contexts. These contexts included meetings in people's homes; meetings before, during breaks of, and after the TLC class; over e-mail; by telephone; at the Oak Ridge National Lab; at Technology 2020's Center for Entrepreneurial Growth; and before and after a variety of special-topic business forums.

DATA-DATA: Analyze

As co-founders in Tennentech's pre-start-up phase, we had choices to make in terms of how to structure the company, how we would relate to one another, and what type of organizational culture we wanted to develop. For example, in terms of organizational structure, our options ranged from a traditional top-down hierarchical structure to a flatter, more egalitarian organizational approach. These choices presented themselves as opportunities for us to create the kind of company environment that were congruent with our values of relationship building and collaboration and governed how we would relate to each other, our community, and other businesses.

We elected to form a flatter, egalitarian, and collaborative organizational structure. With this decision, we were met with the question of how to relate to each other in such a way that would support our desired organizational structure.

Shifting Business Paradigm

Our interest in an egalitarian and collaborative organizational structure gave us the opportunity to launch our venture with the recognition that businesses are not run by departments, units, and divisions; they are run by the relationships of people within these organizational components (Gergen, 2001). In the larger business community, relationship building is receiving more attention as business communication and leadership progress from top-down styles of autocratic, power-obsessed, domineering management to values-centered leadership (Kelloway and Barling, 2000). This shift in valuing people as resources instead of viewing them of commodities is proving to benefit organizations' bottom-line success and serves as a cornerstone for employee satisfaction and corporate social responsibility (Zadek, Pruzan, and Evans, 1995; Baker, 2002).

Responsible management as a part of core business strategy has been shown to have corresponding profitable business outcomes, particularly in terms of cost-saving benefits of improved risk and reputation management, innovation in product marketing and distribution, organizational development, and strategic leadership development (Zadek, 2000; Garone, 1999; Epstein & Birchard, 1999; Baker, 2002). Although companies are capitalistic, businesswomen and men are more willing to take a proactive role in understanding and engaging in socially responsible and respectful behavior in order to survive and prosper (Zadek, Pruzan, and Evens, 1997), and some businesswomen and men are even doing so as a matter of conscience.

Entrepreneurs such as Anita Roddick, founder of The Body Shop (Roddick & Miller, 1992), are successfully taking on the important role of seeking ways to humanize internal and external business practices. Entrepreneurism is revolutionizing the way we think about the world, industry, and team process (Timmons, 1999). While much is known about biographies of individual entrepreneurs, such as Ms. Roddick, and the characteristics of work teams (Sundstrom and Associates, 1999), few studies have looked at the collective entrepreneurial experience at a company's pre-startup and start-up phases (Cooper & Daily, 1997), particularly from a qualitative perspective (Taylor, 1994). Johannisson and Lindmark attest that research on the way entrepreneurs act (together) holds more promise for the field of entrepreneurial studies than a focus on individual entrepreneurs (1996, in Sten, 2001). An understanding of the entrepreneurial team process and how teams collaboratively form, design, and manage a start-up company is important for businesses, academics, and potential new venture leaders who seek to understand how to best integrate a process for communication and leadership that nurtures innovation and teamwork within their practice.

Wheatley (1999) agrees that by paying more careful attention to group process, not just the object or output of the group's work, a group gains a valuable ability to "keep clarifying its intent and strengthening its connections to new people and new information" (p. 155) so that it may thrive and grow. Most groups, teams, and companies experience changes in their group membership by bringing in new individuals and/or through attrition. With such membership change, the group must jointly attend to ways to create a new, healthy relationship between "older" and "newer" team members as well as a new team identity that is inclusive of the new members.

Tennentech faced the question of how to integrate new members into an existing team process from the outset because three of the four Tennentech co-founders had an established working relationship - two of the three co-founders are married to each other. Since the quality of relationships, and especially proximity in this case, plays a critical role in team development, I wanted to know if collaborative learning would lend itself to the issue of how individuals are added to a team, especially when a close relationship is formed between a smaller group(s) within the team. Furthermore, would a collaborative learning environment contribute to beneficial decision-making and company leadership within our team process?

It was also my assumption that the principles of collaborative learning pose an opportunity for business leaders to make the radical paradigm shift in communication, leadership, and governance called for by globalization. The shift needed is for businesses, particularly large corporations, to act responsibly-beyond just in terms of corporate philanthropy - towards an integrated approach for social, environmental, and financial responsibility (Zadek et. al, 1997) within their operations. While many managers recognize a need to go about their work differently-to use dialogue and to be more inclusive, transparent and accountable-they are also saying they do not know how to integrate the process of responsible management with daily practice (World Business Council for Sustainable Development, 1998).

Although I did not intend to determine Tennentech's potential for long-term financial and social responsibility by the end of data collection for this study, I felt that as a pre-start up company we were in a unique position to begin (and hopefully continue) our interactions from a responsible management approach. And, if in time we were successful in the social and financial aspects of our business practices, we might be able offer a path for the larger business community to positively focus a group's collective intelligence and tap unlimited potential for nimbleness in the marketplace. I wondered what we might learn by virtue of our efforts and experiences that could advance the trajectory for relationally responsible practices and contribute to healing the split in consciousness between financial gain and responsible management.

DATA-DATA: Theorize

Theory of Action

Edward Simon, President of Herman Miller, asks "Why can't we do good works at work? Business is the only institution that has a chance, as far as I can see, to fundamentally improve the injustice that exists in the world. But first we will have to move through the barriers that are keeping us from being truly vision-led and capable of learning" (Senge, 1990, p. 5). In his study of learning organizations, organizations that continually expand their capacity to construct synergistic futures, Senge (1990) identified that a group's ability to learn as a team and to jointly create in a productive fashion as the optimal skills needed to build a learning organization. What occurs when a team learns together has been poorly understood, Senge expressed, and "until we have some theory of what happens when teams learn, as opposed to individuals in teams learning, we will be unable to distinguish group intelligence from 'groupthink'" (p. 238).

The model of Three Types of Teaching and Learning (Peters and Armstrong, 1998) presented a theory for understanding the phenomenon of teaching and learning in group settings and the impact communication flow has on individual learning and group learning. Type Three, collaborative learning, supports group meaning-making and learning. Peters and Armstrong (1998) define Type Three as two or more people jointly constructing new knowledge. The nature of member interaction is paramount to Peters and Armstrong's (1998) definition of collaborative learning and the locus of action:

> There are individual contributions, and there is a group contribution. In a collaborative learning experience, individuals bring their knowledge and their actions to the table, and as members of a group, individuals contribute their collective knowledge and actions to the experience. Thus in a collaborative learning experience, individuals learn and the group learns. The group learning experience isn't simply the sum of the individual learning experiences; however, it is both more than and other than the individual experiences...This is done in the context of the *relationship* that is developed between the collaborators...Members don't just talk with one another. They also talk into the group and from the group. That is, as individuals talk to one another, they construct meaning from what is said and how it is said, and the result is meaning that the several people have constructed in the process of talking and interpreting, talking and interpreting, and so forth (1998, p.76).

Peters and Armstrong emphasize equality among group members in collaborative learning. For example, one member does not dictate what must be learned, direct the end result of the learning, or exclusively set the terms for others' contributions. By relating to each other as equal participants, focusing on what is being constructed, valuing each persons' contributions, and engaging in reflection, a group collectively constructs what is learned and the quality of the learning experience by the way members relate and communicate with each other. Although the Teaching-Learning model was conceived for educational settings, I found it applicable in business contexts, particularly to enhance team interactions. This model also responds to Senge's (1990) call for a better theoretical understanding of how groups learn; further Type Three, collaborative learning, offers a path for creating group *and* individual outcomes/knowledge in the optimal fashion sought by Senge. With Tennentech's incorporation, company strategy, and organizational development tasks at hand, I sought to discover what it would be like for my colleagues and myself to bring Type Three, collaborative learning into our company formation.

Three Types of Teaching and Learning

Peters and Armstrong (1998) define three different relational stances between a facilitator, team leader or teacher, and a group, team or class in a given setting and the subsequent focus of communication flow and meaning-making. What accounts for the generative process of group *and* individual learning in a collaborative learning setting is the relational context in which the group interacts with each other and with those who are "in charge" of the group. The following is a review of the relational patterns that distinguish Type Three, Type Two, and Type One group interactions.

Type Three teaching and learning is synonymous with collaborative learning and "doesn't work by the same rules as the other two types, precisely because it is a different way of learning, with different concepts: people laboring together to construct new knowledge, group knowledge, and individual knowledge" (p. 80). In this mode of communication, the facilitator or team leader becomes a member of the group in a way that equalizes the status and hierarchy often ascribed to a "*facilitator*," " *team leader*" or "*teacher*." The facilitator, team leader, or teacher is re-cast as a member of the group, thus creating a new kind of relationship between all group members. Relationships are defined in terms of member to member, member to the group, and the group to the member.

Member to member means that relationships and communications are among team members, and that rapport is felt between members as individuals. Member to group, or team, means that individual behavior influences the team as a whole, and members attend to way in which they are communicating with the team. Optimally, individual members feel a connection with the team as a whole, beyond just an affinity for individual member(s) and communicate freely with the team as a collective. Communication that flows from a member to everyone in the group, as opposed to communication directed toward one or two members when in the group setting, is a characteristic of this process.

The group to member, or team to member, process occurs when members see themselves as a team and feel a connection to the team, and identity as a collective. Individual members act into the team's ways of relating and going about its work, which are co-constructed through members' verbal and non-verbal interactions. Characteristics of group to member communication process are the collective intent and effort to foster and maintain a trusting and safe environment for interaction among members and the joint focus on creating new meaning and knowledge.

Redefining the formerly unidirectional relationships into collaborative relationships creates different responsibilities and possibilities for the (formerly labeled) facilitator, the group members, and the group as a whole. All members of the group share a responsibility for what transpires and how it transpires and give rise to the group's co-creation of knowledge and meaning.

The group's communication takes on a new depth, and so does its learning. What each member contributes to the group intersects with the other individuals' knowledge and becomes part of the group's collective knowledge. Peters and Armstrong use a figurative "X" to describe and illustrate the communication process in Type Three, collaborative learning environments. The "X" resides between group members; it is both the subject of which they are speaking and a connector between those interacting. The "X" is:

> What the group knows...by identifying and locating 'X' between speakers and ultimately in the center of the group, the emphasis on what is going on shifts from a focus on individuals to a focus on the relationship among members of a group...the issue, topic, problem, plan, or whatever the group's focus might be is not in the head of anyone in the group, it is not owned by anyone in the group, but is instead understood in terms of the relationship among members of the group and as the group's own creation. On achieving this focus, the group can build on its own meaning of what it has constructed, as long as the group exists (Peters & Armstrong, 1998, p. 77).

Isaacs (1999) also uses the imagery of "speaking to (and from) the center" (p. 174) of the group, the center of each person, and "the center of meaning emerging in and through everyone" (p.174). Isaacs (1999) elaborates on the tenor of this process: "In dialogues that seem to flow powerfully, people begin to realize that they are speaking to the common pool of meaning being created by all the people together and not to each other as individuals (p. 174). The nature of Type Three collaborative learning environments is to use dialogue to "harness the 'collective intelligence' [quotient] of the people around you; together we are more aware and smarter than we are on our own. And together we can perceive new directions and new opportunities more clearly than we can on our own" (Isaacs, 1999, p. 11).

Elements of Collaborative Learning

To render articulate the nuances, qualities, actions, and potentiality in Type Three collaborative learning, Peters and Armstrong (in press) describe four interdependent elements that constitute a collaborative learning environment:

- **A dialogical space** – establishing an environment that fosters trust, respect, openness, sharing, and support that is developed and maintained by group members;

- **Cycles of action and reflection** – engaging in a reflective practice at the individual and group level to improve the group process by examining assumptions, beliefs, rules, etc.;
- **Focus on construction** – integrating process and content by approaching a task or a topic with intent to create new knowledge and understanding;
- **Multiple ways of knowing** – explicitly recognizing, valuing, and calling upon the various ways of knowing each person brings to a group, such as knowing facts, procedures, self, others, and attending to knowing from within a group's unique context.

The elements of collaborative learning are like four parts to a collective learning harmony and should be understood as functioning interactively within a collaborative learning environment.

In contrast to the focus on the group, Type Two and Type One focus on individual learning. Type Two teaching and learning is defined as teaching by transmission and learning by sharing. As with Type One, Type Two environments are focused on individual learning. The role of a Type Two team leader or facilitator is to transmit information to group members and to support members' transmission of information to each other, and back to the team leader or facilitator. The principal manner of communication is through interactions between the facilitator and the group, and among the members of the group. The relationships established follow the pattern of communication in which the facilitator establishes relationships with the group, and group members establish relationships between themselves, exclusive of the facilitator. The facilitator, or team leader, is the primary source of information; however, in a Type

Two setting, opportunities exist for group members to share personal experiences, understandings, and reflections. A presentation, meeting, and/or activity followed by a group discussion where the group completes a task specified by the facilitator typifies this mode of teaching and learning. The facilitator, or team leader, may be present and participate during the discussion; however, he or she is seeking to foster others' engagement and not to engage fully as a member of the team.

Type One teaching and learning is characterized as teaching by transmission and learning by reception. The role of a Type One facilitator or team leader is to select and disseminate information to group members in a lecture format, typically through presentations and meetings. In this setting, the direction of communication is from the facilitator or leader to the group. Relationships established are between the facilitator and the group members; interactions between group members are limited.

Although there are clear distinctions between the communication flow in each of the Types of Teaching and Learning, there may be occasions where more than one type is used in a group setting. For instance, a group may require direction on the technical aspects of a novel engine design (conveyed by someone in a Type One manner) before proceeding with the development of a proposal or engine application brainstorming in a Type Three collaborative learning manner.

The Types of Teaching and Learning offered a conceptual framework for communication patterns to be cognizant of as I sought to support team learning and, subsequently, organizational learning in our company. Given the nascent stage of Tennentech's team building and since I was not sought out by others in the company to serve as a dialogue or collaborative learning facilitator, I chose to do so from within my role as a co-founder, without the designated role or implicit status of a facilitator or consultant. This approach of facilitating as a member of the group while sharing a responsibility for engaging with others in a way that promotes our joint creation of a collaborative learning experience was consistent with Peters and Armstrong's Type Three teaching-learning model. Examples of my application of my practical theory of facilitating collaborative learning in Tennentech are presented in chapter II.

DATA-DATA: Act

Research Questions

To explore my practical theory of facilitating collaborative learning from within my role as a team member, I conducted this research project to investigate the following questions:

1. What are the participants' experiences of engaging in collaborative learning in forming the company?
2. From the point of view of the participants, what is the effect of my role as facilitator of the collaborative learning experience?
3. From the participants' perspectives, what is the perceived effect of the collaborative learning process on company outcomes such as planning activities, overall communication, and decision-making?

DATA-DATA: Design

Methodology

I selected action research for this study because of its epistemological underpinnings. Action research is a participatory process that unites action, reflection, theory and practice in the search for practical solutions to pressing areas of concern or interest for people and the betterment of individuals and their communities (Reason and Bradbury, 2001, p. 1). Marshall and Reason (1994) write:

> All good research is *for me*, *for us*, and *for them*; It speaks to three audiences...It is *for them* to the extent that it produces some kind of generalizable ideas and outcomes...It is *for us* to the extent that it responds to concerns for our praxis, is relevant and timely...(for) those who are struggling with problems in their field of action. It is *for me* to the extent that the process and outcomes respond directly to the individual researcher's being-in-the-world (112-113, in Peters, 2002, p. 3).

Ideally, action research involves all "stakeholders both in the questioning and sensemaking that informs the research, and in the action which is its focus" (Reason & Bradbury p. 2). I wholeheartedly believe in the importance of doing research "with" rather than "on" others for the mutual benefit of those engaged in the research and for the larger community of which we are all a part. As co-founders we had agreed that we wanted to engage with each other collaboratively. As a researcher, I weighed how I might overcome positioning myself as an expert and participating as a member of the team if I defined myself as a facilitator and asked the team to help me study my role. I perceived that it would have been far easier for me to facilitate collaborative learning if I were ascribed this role by the team and actively coached group members; however, I felt there was something to be learned from exploring the potential for facilitating without such designation or perceived authority. Since our relationships were newly forming, I especially felt that taking the stance of an "expert" might overshadow and negatively impact the equality we were seeking to foster.

Although, team members were not involved in the development of research questions or in formal data analysis for this particular study, I sought to understand their perspectives on the collaborative learning experience and on our joint creation of business outcomes. I perceived that if I were authentic in my actions as a team member without the designation of facilitator, and team members were authentic in return, we might discover, by simply engaging *with* each other, ways to resolve the expert/non-expert contradiction and tension usually felt by those perceived or positioned as "experts" seeking to be an equal and accepted member of a group (Freire, 1996).

Peters' action research model called DATA-DATA (1998, 2002) was used to guide my research, and the previous sections of this chapter have followed the stages of the first 'DATA' in Peters' model:

- Describe - a description of my practice, situation in which it occurs, and the area of practice I want to improve;
- Analyze - identification of the area of interest, reason for the interest, and underlying assumptions which contribute to the present area of concern;
- Theorize - formulation of a practical theory for alternative ways to approach the area of interest and the questions that guide the inquiry; and
- Act – turning informed theory into actions.

The following section represents the 'D' in the second part of DATA-DATA: the design of the study and the procedures employed for collecting data.

Data Collection

I used three qualitative approaches to data collection to answer my research questions: phenomenological interviews, semi-structured interviews, and field notes. I conducted phenomenological interviews of two males and two females, comprising the executive team, in August 2001. These were later followed by semi-structured interviews of the same group of individuals in early 2002. Field notes were recorded throughout the research process.

Phenomenological Interviews

Phenomenological methodology guided the first set of participant interviews, because I wanted to evoke descriptions that would help me understand the everyday life experiences (Polkinghorne, 1989) of my co-founders with respect to the process of forming our company. The goal of this type of interview is "to attain a first-person description of some specified domain of experience…an implicit assumption (with this approach) is that central or personally relevant issues will emerge repeatedly throughout the dialogue (with the interviewer)" (Pollio, Henley and Thompson, 1997, p. 30). A phenomenological interview is initiated with a question, or statement, selected by the researcher in advance; however, the participant determines the nature and flow of the interview through his or her responses. This approach is quite different from a question and answer style interview.

I interviewed participants in a quiet setting of their choice, because Tennentech, Inc. utilizes a virtual office environment the natural office setting for each individual varied. After reviewing the participant consent forms, and gaining participant consent to be audio-recorded. I began the interview by asking, "In thinking about the way we talked and collaborated as a team, what stands out for you in the process of forming Tennentech?" I used probing questions, such as "Will you say more about" and "Tell me more about" any topic related to collaborative learning, action, dialogue, relationship building and/or their role in other aspects of the process the aspect just described, so that participants had an opportunity to elaborate and share their impressions. Since all participants had consented to being audio taped, I transcribed each interview.

Semi-Structured Interviews

Six months after the first interviews and over a two-month period in early 2002, I conducted a second interview using a semi-structured interview format. I selected this modality because I wanted to combine the focus on understanding each person's experience afforded by phenomenology and to inquire about each person's experience in relation to the elements of collaborative learning and our company's development. The same participants were interviewed in their homes, and one interview was conducted via-telephone of a participant who was at home. Although I used an interview guide for this set of interviews, after posing each question I followed the phenomenological interview approach of giving participants space to elaborate on any area related to the research questions as well any areas that were of pressing concern to the participant.

I opened each interview by saying that I wanted to understand the person's experience of the process of forming our company in the context of four elements of collaborative learning. Before I asked the interview questions, I shared a garden metaphor to help define the elements of collaborative learning because I wanted participants to respond to the interview questions with the concept of the elements of collaborative learning in mind (Please see appendix B for a description of the metaphor used). Some participants asked questions about particular aspects of the metaphor and/or definitions; others did not. I answered the participants' questions as best I could without giving potentially leading examples from within our company's context from my perspective. When participants were ready to begin the interview, I used the following interview guide. The phrases in italics refer to the elements of collaborative learning.

1. Tell me about the "garden" or *dialogical space* for Tennentech, the environment where members interact.

2. Tell me about "adjustments in the group's approach to gardening" in the process of forming the company or the *action and reflection* that examined what was and wasn't working in order to make adjustments along the way.

3. Tell me about an experience where the group *focused on construction* or focused on what it was doing and how it was doing it, for example stopping to look at how to plant a garden, communicating patterns, putting together a memo, or evaluating a plan.

4. Tell me about your experience of creating new knowledge with team members and *multiple ways of knowing*. By the term new knowledge, I mean knowledge that didn't exist before coming together with the team and couldn't exist without us working together.

5. Tell me about your perception of my role in the company formation process. **** It should be noted that this question deviates from the phrasing of my second research question**.

6. What stands out for you terms of the role collaborative learning has played in the Tennentech team's engagement in planning activities, making decisions, overall communicating, and any other company outcomes?

7. What stands out for you in terms of the way the Tennentech Team has communicated on-line?

8. What stands out for you in terms of Tennentech's face-to-face team communications?

9. Tell me about a time when collaboration was successful.

   - What was that like for you?

10. Tell me about a time when collaboration was unsuccessful.

    - What was that like for you? What could the group have done or said to change this?

11. What role do you see that collaborative learning could play in Tennentech's future company development?

Probing questions such as "What was that like", "Will you say more about" and "Tell me more about" the aspect just described were utilized as well. The phenomenological and semi-structured interviews lasted approximately one hour and fifteen minutes each.

Field Notes

I kept field notes throughout the project and noted aspects of context and/or content during and after team meetings that stood out for me. In an average week, Tennentech founders had one face-to-face team meeting (typically lasting between one and-four hours, one meeting with ORNL scientists or an outside advisor, typically lasting two and-three hours followed by an hour and a half reflection time among the co-founders, three conference calls between Leslie, Simon and myself, lasting approximately one hour, and an exchange of thirty-five or more e-mail messages. E-mail correspondence played a significant role in communication between team members, and it served not only to augment my field notes but also to archive interactions, communication patters, and our overall activity. During the data collection period, Tennentech team members exchanged over two thousand one hundred e-mail messages. Team members posted important dates to a monthly team calendar, and fourteen final-draft documents were posted on a password-protected Website.

Data Analysis

I began data analysis once all phenomenological interviews were completed and transcribed. I read each interview transcript in its entirety to re-familiarize myself with each participant's responses. On the second and subsequent readings, I performed a thematic analysis by reviewing each transcript, line-by-line, looking for the themes in the text. For each theme I used the participant's original words when generating the name of a code and marked each code in the text. I elected to use the participants' own language when developing the title of the themes, because their language best reflects their views and perspectives of the process of using collaborative learning in forming our venture (LeCompte and Schensul, 1999). Forty-five codes emerged and I grouped related ideas, words and phrases, in quotes, on a continuum from general to more specific themes (LeCompte and Schensul, 1999).

After completing my initial thematic analysis of each interview, I called each participant and shared the themes I found in his or her interview to verify that I had accurately understood the participant's experience. Once all participants had verified the themes of their interviews, I looked at all themes across the phenomenological interview set and separated the data into major themes.

I followed the same initial thematic analysis process with the semi-structured interviews as with the phenomenological interview set. After initially reading each transcript, I reviewed the text line-by-line, and coded information using the participants' own words, and marked the coded passages in the text as I had with the phenomenological interview set. Fifty individual codes emerged, and I also tied these codes to the elements of collaborative learning. As with the phenomenological interview set, I shared the themes derived from each person's interview with the participant in order to confirm that I had understood him or her correctly.

After receiving confirmation from each participant that he or she had been properly understood, I grouped related ideas, words, and phrases together from the fifty codes made by two or more people into themes. I completed the data analysis by reviewing all of the themes from both data sets and distilling these themes into overall themes and, in some cases, sub-themes of the study. I then referred to my field notes to augment the themes and sub-themes.

Organization of the Study

Chapter II presents a description of my approach to facilitating collaborative learning and the nature of Tennentech team members' interaction in our joint interest of incorporating collaborative learning principles within our business and is an extension of "Theorize" in the first 'DATA' of the DATA-DATA model. The remaining chapters of this study follow the sequence of "Analyze, Theorize, and Act" in the second 'DATA' of the DATA-DATA model. Chapter III provides a description the study's thematic findings. Themes and sub-themes are described and illustrated through participant quotes. Chapter IV provides a discussion of the themes in terms of collaborative learning theory and other concepts, theories, and research in related literature. Chapter V summarizes my reflection on the results of this study and the research process.

I also discuss recommendations for others seeking to facilitate collaborative learning from within their practice in a start-up business environment and discuss recommendations for future action research.

CHAPTER II

CONSTRUCTING A COLLABORATIVE CULTURE

DA**T**A-DATA: **T**heorize

This chapter is an overview of what transpired when the Tennentech team interacted in relationally responsible ways of being to create meaning and knowledge through social interchange. To act with relational responsibility is to accept one's role in building a sense of community with others and to engage "in ways that might sustain and support the process of constructing meaning as opposed to terminating it" (McNamee and Gergen (1999) p. xi). I expressed, co-developed, and co-maintained a collaborative way of being by modeling a Type Three teaching-learning approach from within my role as a team member. I related to team members without the explicit designation and power often ascribed to a "facilitator". Throughout this document I refer to myself as a team member, though it should be kept in mind that this means team member-facilitator. I chose to introduce the ideas and nature of communication and meaning-making in collaborative learning, Type Three and its elements – a dialogical space, cycles of action and reflection, focus on construction, and multiple ways of knowing – primarily by employing them in my practice. Secondarily, I subtly intermingled descriptions of these concepts at various times in our communication when doing so seemed appropriate to me.

My rationale for this approach was based on my feeling that, since our relationship was newly forming, our group dynamics would have been negatively affected if, during the first few months of our getting to know each other, I had taken a

Type One facilitation approach to identify team communication patterns, describe the concept of "X" (Peters & Armstrong, 1998), or other formal collaborative learning theory. My assessment was that I would have positioned (Davies & Harré, 1999) myself as an "expert" and that the footing of our emerging relational environment would have been set in communication patterns contrary to the type of environment we were seeking to co-create.

My rationale was also shaped by the fact that initially the group that was to become the co-founders included two people who had no previous experience with each other, and three people who had a long history of working together on a small business. I believed the lack of familiarity between Ryan and me, and between us and the others, had potential to improve our ability to form a group identity – as a group of five. This was based on my perception that during interactions among all five of us, the absence of communication history between Ryan and I would have an altering effect on the taken-for-granted communication patterns between those who already knew each other. This effect would be helpful in fostering a dialogical space because each person would be more sensitive to building relationships among the group and, subsequently, members would more readily consider how the five of us were communicating. Although Ryan and I were "outsiders" to the pre-existing group, his presence made me feel less like an "outsider", and he commented on feeling similarly about my presence.

These early experiences strengthened my belief that for us to have Type Three member to member, member to group (a new group including me and others), and the new group to member interactions, I should not separate myself by taking a Type One facilitation stance at that stage in our relationship development. I felt I would be able to say more about the process of collaborative learning and communication patterns indicative of Type Three, as well as help co-create a new group identity by initially fostering member to member interactions, and co-nurturing member to group and group to member interactions.

Since I was an "outsider" to the existing group, its culture and taken-for-granted communication patterns seemed quite obvious to me. I wondered about our ability to create a new culture including me and other new team members' as the company grew. When Ryan left the group and Caroline semi-withdrew, the team composition and, subsequently, its dynamics shifted. Although I felt warmly welcomed by each person, I still felt a sense of being an "outsider" in a pre-existing network. It seemed to me that occasionally when Leslie, Simon, Caroline and I met face-to-face, they often communicated as a group – a single unit with a spokesperson – to me, whereas I communicated to them as individuals. Part of my strategy as a researcher and group member was to leave myself open to changing my approach based on action and reflection while we proceeded to form the company.

The Three Types of Teaching and Learning (Peters & Armstrong, 1998) are used in examples throughout this chapter to depict the predominant direction of communication flow and the focus of the relationships in our group. The use of "X" refers to what the group was talking about, what the group knew, and "the momentary product of what [we] have worked to construct by verbally and nonverbally interacting with one another" (Peters & Armstrong, 1998, p.77).

Dialogical Space

The first few weeks of relationship building among Caroline, Simon, Leslie, and me were spent sharing personal histories and significant life events. This occurred over the phone, via e-mail messages, at a picnic at Simon and Leslie's home, and at a dinner gathering in Caroline's home. Leslie and Caroline initiated these first social interactions outside of the Technopreneurial Leadership Class (TLC) setting, and we all agreed that they would be "social" and that we would not "talk business", though the conversation did stray to business related topics.

Rapport building was emphasized throughout the data collection period. We shared personally and emotionally significant histories and key life events. This level of sharing was an expression of the depth of relationship and trust we felt and desired to feel with each other. Caroline and Leslie appreciated and valued my openness and articulated their experiences at a similar level of intimacy. Simon did not share his experiences on the same level, but essentially indicated that he valued this type of exchange by listening attentively when someone else was speaking. Over time, sharing of this nature occurred with the group as a whole. In many instances, I initiated this type of response by sharing my personal stories. From the perspective of a team member-facilitator, Palmer (1993) indicates that sharing personal stories increases openness, a collective atmosphere, and positive relationships.

In November 2000, before our first full team business meeting, I shared a copy of the journal article *Dialogical Leadership* by William Isaacs (1999b) and guidelines for *The Dialogue Process* compiled by the Senn-Delaney Leadership Consulting Group, Inc.

(1998) with my co-founders to lay a foundation for dialogue, which is the primary mode of discourse in collaborative learning. Isaacs explains the importance of dialogue and dialogic leadership:

> In the new knowledge-based, networked economy, the ability to talk and think together well is a vital source of competitive advantage and organizational effectiveness...The essence of dialogue is an inquiry that surfaces ideas, perceptions, and understandings that people do not already have. This is not the norm: We typically try to come to important conversations well prepared. A hallmark for many of us is that there are 'no surprises' in our meetings. Yet this is the antithesis of dialogue...Dialogue can be contrasted with 'discussion,' a word whose roots mean 'to break apart.' Discussions are conversations where people hold onto and defend their differences. The hope is that the clash of opinion will illuminate productive pathways for action and insight. Yet in practice, discussion often develops rigid debate, where people view one another as positions to agree with or refute, not as partners in a vital, living relationship...'Dialogic Leadership' is the term I have given to a way of leading...(that has) four distinct qualities to support this process: the abilities (1) to evoke people's genuine voices, (2) to listen deeply, (3) to hold space for and respect as legitimate other people's views, and (4) to broaden awareness and perspective (1999b, p. 2).

After this meeting, as a team member-facilitator, I emphasized the definition of dialogue as:

> A *conversation with a center, not sides...* in which people think together in relationship...(which) implies that you no longer take your own position as final. You relax your grip on certainty and listen to the possibilities that result simply from being in a relationship with others-possibilities that might not otherwise have occurred (Isaacs, 1999a, p. 19, emphasis in original).

I selected times to share the concept of dialogue, collaborative learning, and collaborative ways of being when we met face-to-face, spoke on the phone, or interacted via e-mail. Figure 1 illustrates the relationship between dialogue, collaborative learning, and collaborative ways of being. Engaging in dialogue, as defined by Isaacs 1999a, 1999b), is the primary mode of discourse in collaborative learning and is the heart of both collaborative learning and collaborative ways of being. Collaborative learning is constituted by a group's joint development of a dialogical space, practice of cycles of action and reflection, utilization of multiple ways of knowing, and joint intent to focus on what the group is constructing. Collaborative ways of being represent a culture and its norms, values, customs and traditions for relationally responsible engagement with others. Collaborative ways of being encompasses collaborative learning and dialogical communication.

Our first few face-to-face team business meetings included Ryan and were held in the offices of a business client of Simon, Leslie, and Caroline. I sought to establish a dialogical space for the meeting by bringing food to the meeting and inquiring about the

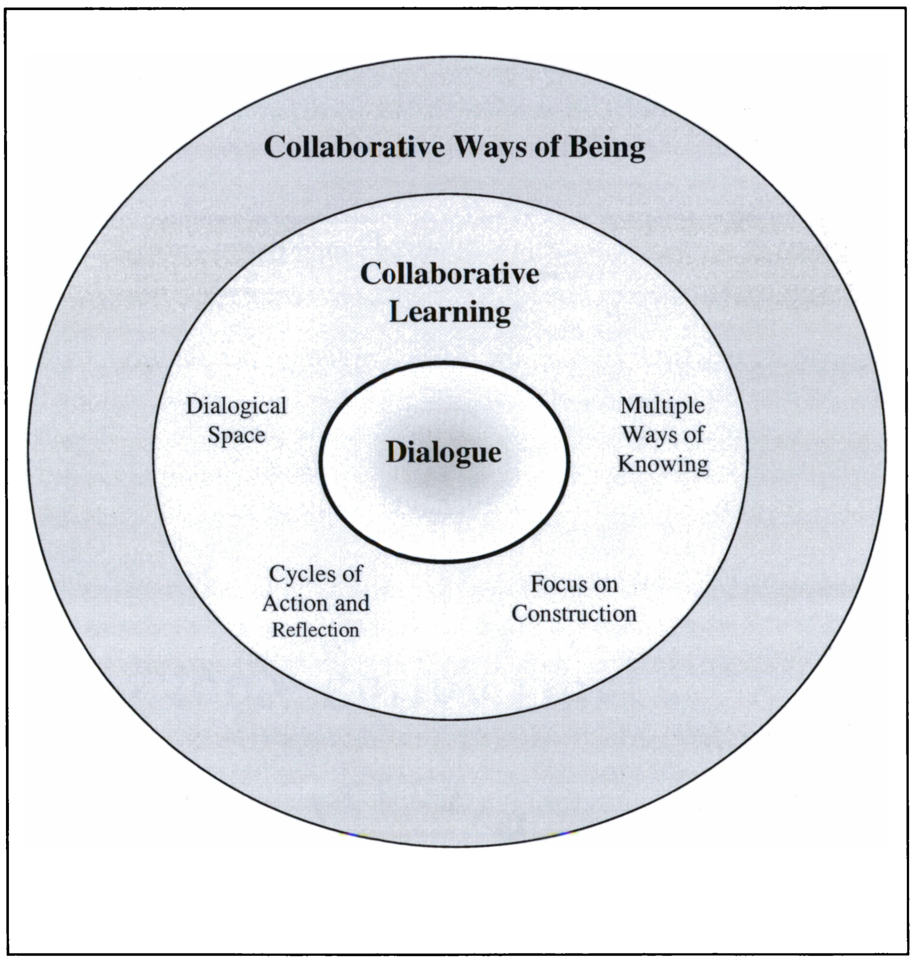

Figure 1. Relationship between collaborative ways of being, collaborative learning, and dialogue

events of everyone's week. Team members answered and in turn asked about the highlights of my week. When laptop computers and a dry erase board had been set up, one team member stood up and took a Type One relational stance with the group. She began the meeting by sharing newspaper articles and industry information she thought we needed to know, and drafted an agenda for the meeting. She asked question and waited for responses. Communication flowed from the facilitator to the group and back to the facilitator; by taking this relational stance she set herself apart from the group.

After forty minutes of this interacting, I attempted to shift the environment to a Type Three experience by asking team members what they thought about the particular topic. I interjected an alternative to a Type One meeting style at that early date to aid the possibilities of our interacting with each other during our meeting then, and in future meetings, in our espoused collaborative ways of being. It was important to shift our group from an exclusively Type One environment where members received information, interacted primarily with the facilitator, and participated according to terms set by the facilitator. As Shotter (July, 2002) writes, the nature of our "*initial stance or initial attitude*…(as we) approach each other in such meetings…'set the scene, so to speak, the 'relational dimensions', the 'style,' the way for going on' for how participants will react to everything occurring within *the event of their meeting*" (p.3).

My persistence in questioning other team members sitting at the meeting table spurred exchanges between team members, and, occasionally, the direction of the conversation went back to the facilitator. The facilitator also interjected points and ideas. After approximately 45 minutes of member to member and member to facilitator communication, the environment shifted into a Type Three teaching and learning situation. The person who had been facilitating in a Type One manner joined the team at the table and participated as a member of the group and not as "the person in charge." Much of the content of that part of our discourse centered on Ryan's desire to understand how each of us felt about a topic and to share his concerns. Communication flowed from member to member and group to member, in a characteristically Type Three manner. The flow of the conversation felt to me much like Physicist David Bohm (1996) describes dialogue: "a stream of meaning flowing among and through us and between us" (p. 6). When Ryan verbally and non-verbally signaled that he felt he had been understood by the group, and was ready for us to leave the topic, the initial facilitator resumed a Type One role. The meeting concluded by setting action items and sharing some jokes.

Although my efforts to shift our communication patterns to Type Three during our first team meeting were successful in terms of laying the foundation for future communication patterns, this intervention alone did not totally allay the sense of participating on someone else's terms or an "insider/outsider" feeling for Ryan or me. In one of two parting e-mails Ryan sent the group, he underscored not feeling member to member and member to group patterns in our nascent dialogical space:

> ***…Understand that I am speaking to Simon and Leslie…You have a well established group dynamic that has brought you success I the past; I don't feel comfortable with how things work. Rather than feeling like part of a team, I feel like the outsider most of the time-the Grinch that hates alternative fuels. Part of this is due to the obvious preexisting relationships between three of the members and part is due to a little snobbery on my side…In short I am to… blend in and take care of my part while the real nuts and bolts of the business side gets handled by a preexisting team …I am not sure how to reconcile the difference in visions, the impact of the preexisting group dynamics, etc…***

After receiving this e-mail, I spoke privately with Ryan about my sense of potential for our group. However, his concerns were compounded by his unease with the commitment required to start a new business, and he chose not to meet with the team again.

After Ryan left the team, most meetings during our pre-start-up phase were held in Leslie and Simon's home, because their home office offered three networked computers with high-speed Internet access. It became a practice for Caroline and me to travel to them. At each of these in-home meetings, the host provided a meal or snacks. On occasion, Caroline or I would bring food to share. I felt that part of my responsibility to act in a relational manner was to accept the generosity.

After Ryan's departure, we shared how we felt about his leaving and considered different options for how we would move forward as a team. We took his leaving as an opportunity to reflect on our goals for the company and refined our vision – creating a shared vision. Sitting around Leslie and Simon's kitchen table, we again explored our feelings about how collaborative ways of being together might benefit us and what this might mean in practice. Leslie expressed, as she had before, that she believed we should interact collaboratively but have a "final" decision-maker in the company. Whoever was in this role, she continued, should be fair, take everyone's ideas into account, and in the best interest of the company and its individuals, versus the best interest of the final decision-maker. Heads nodded; however, we did not explore the concept of a final decision in any more depth. The group agreed that all team members would have input on any decision that would significantly affect the direction of the company and that we would behave ethically in all of our interactions with each other and with others outside of the business. Our agreements and ground rules for communication were otherwise implicit and generated from within our day-to-day interaction with each other. A few times co-founders articulated a desire for changes in some implicit communication ground rules. The team listened to the members' feelings about a desired change agreed to work toward making some ground rules explicit.

In addition to collectively making company decisions, such as naming the company officers' structure, we also elected a formal co-leadership model and divided the position, responsibilities, and authority of President and CEO between two people. One team member who did not hold either position remarked, "*I'm glad it worked out like it did*," further supporting our desired way of being with each other. We treated the signing of our shareholder's agreement and the adoption of our company by-laws as a special event. Standing in a circle in an outdoor setting, I opened the ceremony. We toasted to each person's hopes and goals for our group with champagne Leslie purchased for the occasion. Although this was the only ritual of its kind we held, we recognized each other's birthdays and exchanged Christmas cards. We fostered a sense of community as we continued to get to know each other by forwarding human interest and humorous e-mails. At various times throughout the year I sent electronic greeting cards and messages to the group as a whole and to individuals to express appreciation, congratulations, and condolences. Likewise, Leslie and Simon together, and Caroline sent me well wishes and supported me in other ways, for example, by troubleshooting my computer issues.

In the interest of acting and expressing ourselves in ways that would sustain a dialogical space, we sought to be relationally responsible with each other and with outside business contacts. To build trust, for example, acting with relational responsibility means to be fully present – undistracted and in the moment – (Lao Tzu, 1989), responsive, authentic in actions, and attentive to verbal and non-verbal communication. These are ways of being in the group that I sought to embody, and I felt that team members sought to act in the same manner. Some group members attended to non-verbal communication more than others. We also acted with relational responsibility by showing "the utmost respect for everyone in the group and everything that is said by anyone in the group" (Peters and Armstrong, 1998, p. 83), even if we did not share the same opinions or were frustrated by a situation.

In an effort to nurture Type Three communication, I would frequently ask team members what they were thinking. I asked them to say to "say more about" what they were thinking because of my interest in their perspectives, and as an opportunity to reveal and explore assumptions behind our thoughts. If I was not explicitly asked to share my assumptions with the group, I offered them. Asking others to "say more" was also a way to encourage someone to add his or her ideas to the "X" we were co-creating. This was to firmly connect the "X" between all of us, in the center of the table, instead of its being skewed toward two people, particularly if someone had been silent for a while. I also used gestures, sustained eye contact, a nod, a hand movement, to signal to someone who had been silent or who had been unsuccessfully trying to share something, that I heard. Again, I would use a pause in the conversation to turn to him or her, to invite a response, and ask, "What do you think?" or "What were you about to say?"

In the first eight months, team meetings among Leslie, Simon and me, and with Caroline when she was present, vacillated between Type One and Type Three experiences. I characterized these meetings as inclusive of Type One because one person drove the meeting through a question and answer format of shared monologues and discussion. There were times I was caught up in the question-answering aspect of the meetings and began my own monologue. However, when I caught myself engaging in this way, I would pause and seek an opportunity to ask others what they thought. Some meetings were Type Three, when communication flowed from member to member, and group to member and a rhythm was set by the group and not by an individual.

As our meetings continued, our communication patterns continued to alternate from Type One and Type Three in the same ways. In a Type One fashion, Leslie assumed the role of timekeeper and set meeting agendas that she drafted; however, others, including myself, came with our ideas of what to discuss during the meetings. Simon, Leslie and myself also engaged in a Type One, transmission of information. Information transmitted would be market reports, competitor information, and industry trends. These meetings were distinct from "classic" Type One, because one individual was not proscribing a "lesson" that the group was to have learned to his or her satisfaction by the end of a meeting. Our progression into Type Three usually occurred after an hour of discussion, after which the interaction was among members to learn, share, reflect and establish what the material meant for us in our endeavor. These interactions had more of a member to group and group to member quality.

Many of the pre-start up activities such as selecting the company's name, company's focus, technology to pursue, and preparing incorporation documents occurred before Gregg joined the co-founders; and he was not part of Tennentech's initial meaning-making. Personal rapport building with Gregg, who was not part of the Technopreneurial Leadership Class, had a different quality than with the co-founders.

Sitting around a conference table in the offices of Technology 2020, we inquired into the Gregg's desire and expectations for his experience with the team. He expressed that he was interested in pursuing the development of the technology through SBIR grants and would carry out work accordingly; however, he said he was interested in leaving other tasks associated with starting and managing the company up to Leslie, Simon, Caroline, and me. We shared with Gregg that we had undertaken a collaborative approach to starting the company and that we would like to proceed in that manner. I also voiced that team members had agreed to participate in my dissertation research and that, as a team member, I hoped he would also participate. Gregg nodded and the meeting ended not long afterwards without much discussion. Since Leslie, Simon, and I had been experimenting with collaborative learning, I assumed we would collectively take the approach to model collaborative ways of being with Gregg, much as I had set out to do when I first met the other cofounders.

Although we did not have a ceremony marking Gregg's joining the team, shortly after Gregg agreed to work with us, I sent everyone an electronic greeting card expressing my sentiment of hope for the future much like what we shared on our incorporation day. Gregg did not have the same level of personal investment and fervor for founding a company that we had. He was not, at least at that time, seeking the same depth of relational rapport as the co-founders were with each other. We honored Gregg's company involvement preferences, and, in spite of the fact that we would have valued his input in other brainstorming sessions, our interaction with him for the first ten months occurred mainly in a conference room available for area technology start-up companies and via e-mail.

Early meetings with Gregg were almost exclusively dedicated to discussing specific SBIR-related topics. The meetings occurred once or twice a month, and usually lasted three hours. During the first ten months of getting to know Gregg and vice versa, most meeting communication with him was of a question and answer nature characteristic of a Type One environment. Leslie predominantly asked Gregg questions and he reported on his activities, opinions, assessments, and understandings. In the first few months of this period, Gregg and Leslie spoke directly to each other, more than to the group. They rarely made eye contact with Simon or me. Because of Gregg's extensive training in physics and engineering, knowledge of ORNL, relationships with ORNL scientists, and over thirty years experience in the energy technology field, Simon, Leslie and I related to Gregg as an expert. This was done without articulating to each other that we would do so.

On a couple of occasions after these early meetings with Gregg, I shared my observation with Leslie and Simon about the one-sided question and answer nature of communication during these meetings. I assessed, through conversation with Leslie, that while she was open to engaging in collaborative ways of being with Gregg, she behaved differently in meetings with him than with co-founders out of a desire to make efficient use of his time; these meetings were generally quite long. I also sensed Leslie's reticence to using an alternative meeting approach was due to the fact we had not yet established a stable relationship with Gregg, and she was operating from a relational stance with which she had experience. I also gathered that she did not want to give Gregg the impression that we were less than viable teammates, which, she thought, might be his perception if someone were not driving the meeting or "in charge" in a Type One stance. I related to her feelings because it was similar in nature to the hesitancy I felt in appearing to be "the communication facilitator" during the early co-founders meetings.

We sought to build personal rapport with Gregg by inquiring about his outside interests and aspects of his personal history, and we volunteered information about ourselves in kind. We chose to share anecdotes that conveyed a respect, openness, and trust for his opinion. I interpreted his reactions to this level of sharing as comfortable for him within the new dialogic space we co-created. Over time, as our collective relationship developed, the level of sharing personal histories and areas of interest increased between us as a group of four.

As our relationship developed, our meetings gradually included more Type Three patterns of communication in terms of member to member. With increased frequency Simon and I interjected ideas and questions and Leslie changed her relational stance. Likewise, Gregg became more accustomed to interacting with all of us as we were with him, and we changed our dialogical space. Instances of dialogue in terms of group to member and member to group communication flow in levels that Isaacs (1999a) would characterize as "reflective dialogue inquiry and flowing generative dialogue" seldom occurred and were short in duration.

In December 2001, I utilized a Type One teaching and learning approach in a meeting with the co-founders, Caroline, Simon, and Leslie, to orally define the four elements of collaborative learning. I expressed that collaborative learning is grounded in social constructionism, and shared an overview of the tenets of social constructionism theory: that we are fundamentally co-participants with our social world and it is through this participatory relationship that we continually develop the self and social structures

(Gergen, 1999). Therefore, as a team member I was particularly interested in what we co-created; I referred to the group knowledge created from moment to moment as an "X" (Peters and Armstrong, 1998) constructed by us and existing between us as a result of our dialogue and actions. I asked if what I shared made any sense to the group and if I could answer any questions. I sought to engage the team in dialogue around each person's definition of collaborative learning; however, I was not as successful as I had hoped to be.

In between these meetings we extended our dialogical space by electronic mail (e-mail) communication. The co-founders had established a culture of using the "reply all," e-mail function with most messages as a way to keep everyone informed. By "replying to all" responses built on each other, suspending "X" between us on an almost daily basis, and enhancing the connection, relationship, and communication among group members. During the data collection period, Gregg frequently chose to reply to one person instead of to the group. In these instances the receiver forwarded the message to others in the group unless the content of the message was intended as private.

As a team member-facilitator, I responded promptly and thoroughly to e-mail messages. In my opinion, in a virtual environment, a message left unanswered or unrecognized for an extended period of time could create some instability in our dialogical space. Unless team members knew someone was not responding for a particular reason or the message was an informational forward, they could assume that their ideas or opinions were not attended to or valued. In my messages I sought to draw theme and ideas or people's questions together, when appropriate, and I frequently "asked back" or asked others what they thought about a topic. I found that team members responded with their thoughts, some more frequently than others, and began independently "asking back" as well. I remained cognizant of the fact that Caroline's connection to the team was mainly through e-mail and ensured that she received a copy of messages with key information. Leslie, too, fostered this electronic communication connection with Caroline.

Our e-mail communication, sent "to all" and replied "to all", was more characteristic of Type Three in terms of member to member, member to group, group to member in tone and content of the messages. Many messages from Simon, Leslie, and me were written to generate sharing ideas and dialogue; they were inquiring in nature, posing "what ifs?," and asking people their opinions. Some messages were "left hanging" by the group in that they did not receive a response; however, many others elicited responses which built on what had been written before. Compared to our face-to-face meetings, e-mail messages included more sharing of assumptions and reflections.

Multiple Ways of Knowing

The patterns and content of our e-mails were characteristic of Type Three communication and relationships defined in terms of member to member, member to group, and group to member. The role of e-mail in our group to member relationships can be understood through one of three ways of knowing – knowing from *within* - defined by Shotter (1993a, 1993b, 1994). Shotter describes **knowing from *within*** as "a joint kind of knowledge, a knowledge-held-in-common with others...that cannot be reduced to either of the other two [ways of knowing which are knowing that and knowing how]"(1994, p. 1).

> **Knowing from *within*** is a group's background and sets the stage for a group's foreground: it is "(i) from out of which all our activities emerge, (ii) toward aspects of which (however mistakenly) they are directed; (iii) as well as against which they are all judged as to their fittingness; and (iv) upon which they act back historically [for us] to modify [our understandings of ourselves and the goings-on of the group] (Shotter, 1993a, p. 34).

For Shotter, **knowing *how*** is to posses a "technical skill or a craft" (1994, p.1), such as knowing how to write a business plan, program a computer, design an engine, or repair a light fixture. **Knowing *that*** is "theoretical knowledge" of concepts, theories and terms in disciplines such as biology, chemistry, or nutrition.

E-mail interaction between face-to-face meetings fostered our relationship building and we "experience(d) ourselves as involved 'in' a 'something,', and we [were] affected by, or responsive to, what [went] on within that something'"(Shotter, 1994, p. 1). Although we did not explicitly articulate to each other how we intended to speak with each other when face-to-face and on-line, our utterances, words, gestures, emoticons, actions, and responses continually shaped our dialogical space and informed our way of being. Some gestures were inviting and opened the door for further spontaneous sharing; other gestures pushed the door closed and said, in effect, "I'm not listening to you about such and such anymore." We co-created, moment-by-moment, a shared understanding of our organizational culture and climate. We acted into and out of a living dialogical context.

I was mindful in the way I sought to respond to others verbally and non-verbally in ways that would invite further conversation. Sometimes, however, I was not as successful. When I noticed I had "uninvited" or missed an opportunity for a dialogic exchange by cutting someone off or diverting the discourse when someone had something they wanted to add, I would, for example, seek to return to the person in the conversation and attend to our dialogical space.

Focus on Construction

Through our collective attention to our dialogical space, we integrated collaborative ways of being and collaborative decision making into our approach to business. Company decisions, both major and minor, were collectively made. Each occurrence leading up to a decision, utterances, gestures, actions, and reflections, and the decision itself constituted the “X” between us (Peters & Armstrong, 1998). The process of developing “X” and the content of “X” was understood in terms of the relationships between the team and as something that was “ours,” developed by our group. For example, as we worked on a proposal or presentation, the way we engaged in developing the product itself was our “X”, and it was owned by all of us. Face to face meetings after our first grant proposal submission increasingly included more Type Three patterns in our communication and relationships. We were collaboratively learning as we developed our skills and grew as a team. Toward the end of the data collection period, all other team members began asking open-ended questions and inquiring about what others in the group thought more than they had when we first met.

In all communication, I shared my reflections on aspects of our proposal development process and inquired about others’ reflections. Frequently, after the Technopreneurial class and other meetings, I asked Leslie and Simon about their reflections on what had transpired. We shared our reflections of past actions, often considering approaches that might improve our process. We informally shared summaries of these reflections with Gregg in e-mail messages and/or during the course of a following face to face meetings. Likewise, Gregg responded to many of these reflections and shared some of his own. I suggested that we set aside time during a future meeting to collectively share our reflections on the proposal development process and our way of "going on". Although such reflection had not transpired during a meeting to significant extent by the end of data collection, we had incorporated each other's suggestions, informed by reflection, into our process.

Reflective Practice

I engaged in reflective practice throughout the entire project. Peters (1991) states that reflective practice "involves identifying one's assumptions and feelings associated with practice, theorizing about how these assumptions and feelings are functionally or dysfunctionally associated with practice, and action on the basis of the resulting theory of practice" (p.89). The value of reflecting on what one does, Schön (1983) explains, is that it is only through theorizing about one's practice that a practitioner can change or restructure what he or she does for the better. For example, I spent significantly more time interacting with core team members, Leslie and Simon, and my personal interactions with members of other team members were limited by the extent and nature of involvement they chose to have with the company. Through reflective practice, essentially cycling through the first DATA of the DATA-DATA model (Peters 2002) during the study, I asked myself questions such as, "What should I do when members elect to have different levels of participation to facilitate collaborative learning? Should I change my approach of facilitating from within at this stage?"

Team members acknowledged that cycles of action and reflection were a part of the company formation process, and members perceived that we engaged in reflections on our actions in, as Gregg expressed, a "***dynamic***" and "***ad hoc way***". Engagement in reflective practice in a group setting occurred primarily upon my initiation after a meeting or major event when I asked team members about what they thought of the experience. These instances could be characterized as "debriefing" or reflection without inquiry into assumptions. Many of the reflections shared during these times included what stood out from the experience, perceptions of how we (Tennentech and our technology) were received, speculation about future outcomes, and ideas about how to act differently in a subsequent context. These "debriefing" or "reflection without inquiry" sessions often served as a springboard for individuals to inquire into their own practice as a team member.

It is my assessment that some individuals engaged more than others in reflective practice (Peters, 1991) to look at their assumptions and feelings. I became aware of these instances when individuals shared with me that they had been reflecting on how to improve their way of being in the group or when I noticed a difference in a team member's approach to the group and inquired about the difference. Assumptions and feelings associated with each person's individual practices were rarely articulated in the large group setting. Based on my observation and participation in such instances, sharing of this nature usually occurred in various dyad mixes of co-founders.

The examples in this chapter are merely representative of actions and reflections I undertook as a team member-facilitator and by no means are intended as an exhaustive list of my efforts or the team's interactions and collective efforts. Looking back upon our activities, the early "interventions" to move our group into a collaborative meeting style were successful. My persistence in approaching our interactions from this mindset and my partners' receptivity and co-efforts had an effect on our communication patterns. Over the course of the ensuing eighteen months, collaborative learning, Type Three experiences were more commonplace. Type One and Type Two modes of communication were also utilized; we became more adept at moving back and forth between modes, enhancing the group's learning and ability to create new meaning and knowledge.

CHAPTER III

FINDINGS

DATA-D**A**TA: **A**nalyze

This chapter presents the findings of the study in terms of the thematic analysis of data collected from the phenomenological and semi-structured interview data sets and augmented by my field notes. My data analysis revealed four overarching themes: relationship dynamics, knowing, facilitator's role, and business outcomes. Four sub-themes emerged for relationship dynamics: team composition-teams within the team, early loss and change in team member participation, commitment to members, and virtual and face-to-face communication. Two sub-themes emerged for knowing: intuition and experience. I have used participants' quotes taken from the interview sets to illustrate each theme and sub-theme.

Relationship Dynamics

Relationship dynamics refer to factors contributing to interpersonal interactions and feelings among team members. Four sub-themes further define relationship dynamics: (1) team composition, (2) early loss and change in team member participation, (3) commitment to members, and (4) virtual and face-to-face communication.

Team Composition - Teams within the Company

Tennentech's team composition consists of smaller interwoven teams within the company that contributed to the relationship dynamics. Tennentech's pre-start-up and start-up team composition took shape across three team 'landmarks': (1) throughout the Technopreneurial Leadership course up to incorporation, (2) after an early loss of and change in team member participation, and (3) after joining with ORNL-affiliated engineer(s) Gregg, Karl, and Jerry. For example, Tennentech's pre-start up phase fell under the Technopreneurial Leadership Class (the class); the composition of the team, and therefore some relationship dynamics, pre-dated the class and were later brought into the initial Tennentech team structure.

Relationship dynamics played a role in the company formation from the outset. Even though members of the pre-existing team joined the Technoprenurial class to meet new people, they expressed initial doubt about being able to co-found a company with people they did not know. They were cognizant of having a pre-existing team dynamic and were seeking others whom they trusted, respected, and with whom they felt a kinship. Caroline explained:

> ***Well you know it starts out that it was different anyway because me and Leslie and Simon were already together. So we were already a team. And we had a lot of conversation between the three of us...And so it was just a given that we were all together and then us trying to decide who we felt like would fit with us that we liked, that we had respect for. I don't know, just that we felt like we clicked with and that we could work with. And I think that I mentioned that before is that I've always been concerned that this whole thing wouldn't work because it seemed such an unreasonable idea that strangers are going to be able to come together and work together. But, I said this the other night too, I think we, our team, has the most chance of success of any of them (that formed during the Technopreneurial class).***

Leslie expressed her initial reticence about teaming with people she had just met through the Technopreneurial class:

> ***Well I have to qualify my statement by saying that I didn't think it would work to bring together strangers and bond together to form a company. Having said that I've been proved wrong as I am often proved wrong. And I think that it is a function of the individuals involved as to why it is working… Thank goodness I've been proven wrong about that.***

However, another pre-existing team member held a different viewpoint about teaming with strangers. Simon felt this was common occurrence in most existing business situations and explained his view this way:

> ***People just get hired off the street and they are thrown in with other people and they all work together and get a job done. So in a lot of ways it's (Tennentech's process through the class) no different than at a large company that picked a group of four or five individuals who have never worked together before and said, okay, you people are now responsible for whatever the assignment was.***

Caroline and Leslie equated business-owner partnerships with marriage partnerships. From this perspective, they wanted to partner with someone they trusted, respected, felt a bond with, and sensed an emerging friendship. Caroline explained,

> ***And as I think for me everything was just real personal. I keep going back to that, but there isn't anybody else in the whole class that I got that spark from, kinda like a vibe so to speak, that I thought that I would want to pursue any sort of relationship with.***

Leslie concurred:

> ***…And just like a successful marriage if you're gonna have a successful business partnership like that you have to not only anticipate what someone is going to do you have to be proud of them or prove of their action. Or have a good feeling of how they are going to handle things and I've already established that with at least two of our team members and, um, (pause) in Gregg, Karl and Jerry I've had a lot less interaction with them.***

My field notes reflected that in our very early conversations these two team members plus myself felt that, in Leslie's words, "***critical components***" for a successful team were feeling trust and respect for team members, believing that they were sincere and had business competency and sensing an enjoyable personality. Leslie, who had expressed doubt about the potential for success in teaming with strangers, shared the critical components of our team that contributed to her feeling positively about our team building:

> ***The overwhelming factor (for her deciding that teaming with strangers could work) is the personalities of the individuals involved. I think basically I think the factors that contribute to that are, that I'm comfortable that the people I'm working with are competent, sincere, trustworthy, and enjoyable to be with. And so all of those things competency, trustworthiness, enjoyable to be with, I forgot what the other thing I said is. All of those things are so critical to making a good team…A critical component for me is liking and trustworthiness and competency of the people I'm working with. And once I have established that then I can relax. And, be a cog in the wheel and not be concerned about someone else's motives or someone else's abilities I guess. I don't have a lot of concerns about that. I wasn't sure that that would happen and I'm glad that it has.***

Leslie and Caroline initially spoke of Tennentech as an extension of their pre-existing team because, for them, teaming with new people was seen as merely adding others. The pre-existing team dynamic was considered to be beneficial to Tennentech's founding, as expressed by Leslie:

> ***… I hate to keep coming back to it but, you know, the relationship between me and Simon and Caroline, I think makes a strong foundation that building, adding other team members to it strengthens that. I think it could be perceived as a negative by some people, you know thinking that we're some kind of block, you know power (pause) um, power source, no pun intended. But um, and I think earlier on you (Kim) and Ryan both had those kind of feelings. But then again, the very strength of what we are is because we know each other.***

Caroline concurred that the pre-existing team's prior relationship impacted the nature of relationship building.

> ***"I think that a big difference as we go along is you beginning to know and understand about all the different personalities in this (core) group and getting accustomed to how everybody is and how everybody thinks and how everybody presents themselves. Because I was familiar with Leslie and Simon from the beginning, and just you and I as we go on and how we have developed our friendship - and I consider you a friend. I really do ...Again, I think it is as you begin to know the three of us more so than anything else, because, like I said, we had the advantage. We already knew each other."***

The married couple was, in effect, a team by marriage, and added dimension not only to Tennentech's composition but also to the relationship dynamics, most notably in terms of their having taken-for-granted, established communication patterns. These patterns played a part in the pre-existing team's communication. From Caroline's perspective, communication flow in the pre-existing team dynamic before we collectively expressed a desire to incorporate collaborative ways of being in our work, was characterized as primarily Type Two. An individual transmitted goals, some group sharing about how to accomplish tasks occurred, and then tasks were carried out. Caroline described the communication flow in the pre-existing team:

> ***Leslie is the strong personality between me and her and Simon. And Simon and I both tend to sit back and let Leslie lead...She's smart, and she knows how to get things done. And that's a talent that she possesses that I don't think is our strong point.***

Members of the pre-existing team expressed a desire and willingness to build upon their relationships to form a solid (new) Tennentech team with successful relationship dynamics. Leslie explained:

> ***...We know each other and now we know you and you know us and it's not a trio so much as it is a foursome. And as we spend more time with Gregg and he develops (pause) an understanding of who we are and what we're trying to***

accomplish and all that kind of stuff that will strengthen us also. And has strengthen us also to the extent that it's happened...I think the thing that is exciting to me is that I think that we really can be an unbeatable team...That if you take Leslie and Kim and put that dynamic together ... we all have what it takes to make a giant company and do everything that we want to do.

The participants who were part of the class and co-founded Tennentech spent considerable time and effort in building a relationship before Gregg joined the team. Leslie summarized our attention to relationship building in this way:

...What strikes me most about the process is - and I'm not sure if it is because of the individuals or if any group of people within these particular circumstances would do it this way - the extent to which everyone has really bent over backwards it seems to cooperate, to bond, to assist and really work hard at becoming a team. That is the one thing that I really did not think would work and have been proven wrong. But I've been really impressed by the high level of cooperation I guess is maybe the word or effort directed toward interpersonal relationships besides just the technology and this hurdle and that hurdle. And I think that what we were doing to get to know individual team members concerns, issues, strengths, personal items, preferences, all of these kind of things in the circumstances that we're doing it in, where we're not, you know, making life and death decisions and, really put together in a pressure cooker environment, has really contributed. The fact that none of us are making a living out of this company yet and that there is not any pressure really to perform in the sense that oh, my God we have got to make money and that is our only focus at this point. And that has kinda given us a leisurely opportunity to spend our efforts in getting to know each other and getting to understand why people are the way they are. Learning how to work together. Learning what people's strengths are what their weaknesses are. I think that it is a very different process than one that happens normally when people start a company I think that they generally already know the participants.

Interactions with Gregg were not as frequent as among the core team members even after he became part of the group. However, all core team members desired building a stronger relationship with both Gregg and the primary ORNL inventors of the technology, to the extent permissible by ORNL policies. Simon summarized his feelings by saying:

I feel like I still don't know very much about especially Karl and Jerry (at ORNL) and to some extent Gregg. I have a little bit more of an understanding of where they're coming from but, um, it's just been an interesting time.

Leslie also conveyed the aspect of different layers of teams and that although we had not engaged with Gregg, Karl, and Jerry as frequently, they were respected and trusted:

I think, um, Gregg is the part of the equation that gives us credibility even though in some ways he's not really part of the inner team in that we don't have as much interaction with him, he is still a critical part of the team…(with) Gregg, Karl, and Jerry I've had a lot less interaction with them…Though I feel a high degree of that (trust) with Gregg, Karl, and Jerry(that they possess the critical attributes to make a good team)… even though we haven't spent much time together.

In spite of the early developmental stage of team building between Leslie, Simon, Gregg and me, we trusted each other and each person's abilities and commitments to follow through with tasks. Gregg expressed:

In terms of do I think that the other team members are going to get done what they are supposed to there is no doubt that that is going to happen and I'm very comfortable with that and so it's in that sense a good team…But ah, with everyone having other interests which are full-time. And for this not having any material return for anybody it is ah, (pause) it's nice to see that everyone's interest is really, everyone's interest is high and everyone is taking it very seriously. That's…In itself that is a tough momentum to maintain, because after a while if you don't see material things you tend to, to a go off and change your priorities and do other things. And that is so that not happening. So I guess that is professionalism, I guess that's what it is. It is a very professional organization for as small and material poor as it is.

Basic feelings of trust and respect were mutual among team members as expressed by Leslie:

Well, I think that, I think that a lot of the trust and respect in the group that we already had a pretty good amount of that because one we had three group members that were already close … and as we work more together in preparing our proposals and moving forward with the company I think that Gregg has developed respect for us and we have developed respect for him…And I certainly have good reason to trust people's ability and it just continues to grow.

Considerations for the composition of the team were a significant part of the company formation process. Relationship building among the pre-Tennentech team members began during their initial "courtship" period. The team's early loss of Ryan and Caroline's change in team participation stood out for participants in the company formation process.

Early Loss and Change in Team Member Participation

Members felt Ryan's early departure from the co-founding team had an effect on relationship dynamics. Leslie explained:

> ***Well, I think that the whole thing with Ryan was a very negative, negative that happened to us…It was really hard to see it when it was going on because it felt like a failure and a failure to communicate with him or convince him that we were a viable team and really were going to make it happen. In a lot of ways, and we were unable to click with him, although I liked him and felt like we could click... that definitely stands out in our team building.***

Caroline expressed a similar sentiment:

> ***I'm still very disappointed about the Ryan thing, you know, because I felt like he was going to be a good part of our team and I'm disappointed in us, I'm disappointed in him and the fact that he didn't stick around. And I still don't really know and understand why. I just, I've never had anybody walk away from a relationship like that you know and not really understanding why it happened.***

Both of these examples further illuminate the importance members placed on feeling a connection with someone.

Another example of a change in team member composition was when Caroline semi-withdrew. Her absence in meetings changed the dialogical space that had formed, which meant Simon, Leslie, and I had to adjust to the dynamics of working as a threesome. We also had to adjust our team building approach with Caroline. Caroline's semi-withdrawal stood out for Leslie:

> ***The other big thing that happened in our team building was Caroline's circumstance and having to withdraw some…You know, (sigh) as much as I would like for her to participate more fully and I would like to see her come to class, and I would like to see her come to meetings, and I would like to get her input, and all that kind of stuff…So that is something that stands out in the whole teambuilding process is Caroline having to semi-withdraw.***

Caroline also had to adjust to her feelings about her semi-withdrawal and subsequent level of participation:

> ***I feel guilty because I don't feel like I'm doing my part. I tried to gracefully back out earlier… I'll always bend over backward to do more than anybody else in some sort of relationship. Always, I try to do that. And I don't feel like I'm able to do that in this situation… I don't feel like it's a fair situation. I don't feel like I'm doing my part. I mean you sit up all night working. Leslie and Simon sit up all night working. Gregg is over there doing all this stuff that I would never know how to do. And so far I really haven't done anything at all. So I really don't think it is very fair. I did try to gracefully bow out because of that reason. But you all did not want me to leave.***

The team did not want Caroline to be excluded from the opportunity of co-ownership in our venture because particular life circumstances. Our willingness to work around Caroline's personal circumstances was one example of the level of interpersonal commitment members felt toward one and another.

Commitment to Members

Team members were invested in each other's over all well being, and committed to helping improve others' livelihood and enhancing each other's lives. Leslie articulated this feeling:

Maybe because I'm a woman, maybe because we were friends before, maybe because I don't have any children… I'm willing to cut her a tremendous amount of slack because Ben is not going to be seven twice. He's not going to be…She's not going to have a chance to go back and make that up. She is such a good mother for Ben, and I know that this business and this opportunity is very important for her and is very important for Ben also. And I kind of feel like it is a part of the load that we can help carry for her. It's not your load and you don't have to carry it but me and Simon are going to carry it.

The commitment Leslie felt toward Caroline could be seen as a result of their pre-existing friendship and business partnership. While this relationship history undoubtedly affected the feelings Leslie had for Caroline, a high degree of commitment was felt among all co-founders. This included my feelings for Leslie, Simon and Caroline as well as their commitment to me. Caroline points out that as co-founders we felt a responsibility towards each other by recognizing that I, too, wanted to keep her from missing an opportunity to co-found a company, even though we had not known each other for very long, "***So that makes me feel good that you still want me to be a part of it. And your reasoning for that would be completely different than what Simon and Leslie's would be."***

Caroline's semi-withdrawal meant that Simon, Leslie, and I agreed to take on responsibilities that she would have managed. Leslie recognized that without Caroline there would be more work to divide between Simon, herself, and me. I understood this from Leslie's statement, ***It's not your load and you don't have to carry it but me and Simon are going to carry it"*** to mean that she felt a commitment to both Caroline and me. Her commitment to me in this instance was that she did not want me to feel imposed upon as we compensated for Caroline's semi-withdrawal, and that she and Simon were willing to handle the work Caroline would have done if I felt my subsequent workload became unmanageable.

The commitment to team members extended to all members of the team and was felt to some degree by all members of the team including Gregg. Team members also felt a commitment to the primary inventor of the technology, who was considered a part of the team by virtue of his invention and the Cooperative Research and Development Agreement we were establishing with ORNL. All team members wanted to see the inventors of the technology benefit, financially, professionally and emotionally by seeing their idea brought to fruition. Gregg explained that his commitment to Karl, a primary inventor, was a primary reason he joined the Tennentech team:

> ***I don't think I'd change my reasons for being involved than when I did get started. These are that it's a good idea and it would be nice to have it developed and I think it would be great if we could give Karl a big cushion. And that hasn't changed. I still feel that.***

Leslie also captured team members' feelings of commitment to each other by saying:

> ***I think that if something were to happen tomorrow and we were to decide that for whatever reason…we wouldn't do Tennentech, I would still be interested in doing a business relationship with the people on my team. And if everyone on the team wasn't interested in business I still feel like I've developed a strong relationship with people on my team, care about them, and really am a lot more invested in the people then I expected to be at this point.***

The commitment among team members and adjustments to changes in team member composition were influenced by virtual and face-to-face communication.

Virtual and Face-to-Face Communication

Virtual Communication

Our relationship dynamics evolved through a mixture virtual communication using phone, fax, and internet-based interactions and face-to-face communication during meetings. Aside from the weekly class meetings, e-mail was the most frequent form of communication between team members, with the exception of communication between Leslie and Simon, who are married. Ironically, initial interactions between all four members of the core team, Caroline, Simon, Leslie and myself, were indirect through on-line class-required postings to the Technopreneurial Leadership Center's website. Personal goals, past experiences, and answers to business-formation questions posed by the instructors were shared in postings, which contributed to piquing interest in each other as business partners.

Virtual communication extended our level of contact, provided a medium to share thoughts and ideas as we developed our relationship, and provided a mechanism for pursuing start-up activities. E-mail messages also served as a way for Leslie, Simon, Gregg, and I to build a relationship with each other more quickly than if we had relied on face-to-face meetings alone. E-mail communication also gave us the flexibility to bring Gregg up to speed on discussions and events that occurred before he joined the team so that he would have a context for understanding past decisions and reasons for current action. Gregg agreed that e-mail enhanced the team's communication and thus its relationship dynamics. He also spoke to this during the interview:

I don't get e-mails that I don't understand anymore. The team is working better in the sense that the communication is better…People aren't saying things in e-mail and just sort of catching me totally by surprise. So communication is good.

Gregg suggested that it was helpful to have had a couple of face-to-face interactions before relying on e-mail because meeting face-to-face fostered some familiarity with each other. This familiarity helped ease any potential areas of misunderstanding that can arise with e-mail communication. Gregg reasoned:

Written communication is - writing is a tough way to communicate. Because it is very formal, even if you try to make it informal it is still formal because there is no interaction - no nuances, no interaction that takes place. It is just you put something down on a piece of paper and someone reads it. They can't hear your stuttering they can't…the tone of your voice. It's very cold. That's it. I think we all have trouble writing exactly what we mean, exactly the way we want it. That would be a real talent. And so writing can be a difficult way to communicate particularly if you have something really important you want to say unless you have - you're comfortable communicating with one another. I can read what you say and visualize your face, and so your words make sense because I know you... enough that your words in the context that you use them in what we talk about make sense to me. And I can understand why you're saying them. And I think the same is, for me, I can do that for any of the group.

Leslie expressed that team members exhibited sensitivity and took care when writing e-mail messages to be sure that the intent of one's e-mail message was conveyed in the best possible way:

And also, I think that all of us in communicating on-line are sensitive I think to the way that e-mail sometimes - because you don't get the facial expressions and all that I think that people are maybe a little more careful about what they write and how they write it. Because you want to make sure that - you know a lot of times jokes don't come across or when you're kidding or trying to put an emphasis on one word that changes the meaning of the sentence that is very difficult to do with e-mail. So maybe people who are not as skillful in communication as we are would have a problem with that, but I think that we all do very well with it.

Our reliance on virtual communication was almost by necessity since, as Leslie said, "***none of us are devoting full time and attention to it (Tennentech)***" and had other full-time commitments. Tennentech utilized a "virtual office" in the sense that we were not co-located and worked from our homes through the Internet, phone, and fax. We also had a password protected Website to store drafts and final versions of specific documents which served as a "virtual filing system". E-mail continued to function as a way to keep members informed when face-to-face meetings were not possible, or preferred, as a "minutes keeper", and as a way to keep the group knowledge building process going. Caroline remarked:

> ***Well at this point I'm relying on what I read and the things that are flying back and forth between you guys for my knowledge...And my case is unusual. I don't think this is what you normally see and what you expect in a company that is starting up...I'm relying on each of you to keep me informed as sort of like a third party almost because I'm reading your e-mails...I think that it is a real lean, mean kind of way to do our communicating right now since we don't have that space, that joint space where we can all go to right now. It seems to be working...All I know and all I see is what I see on e-mail. So if there are any other forms of communication at all I don't know about it.***

Leslie shared how e-mail also served as a 'minutes keeper': "***Just that I think it is very helpful and useful unlike a telephone conversation or a face meeting you have something to refer back to...***"

Simon explained how e-mail messages served as ways to keep the group knowledge building process going when we were not face-to-face. Additionally, his explanation confirm my field note observations that some team members "replied to all" more frequently than others, and efforts were made to keep everyone involved.

> ***I think there has been good communication, but I think that, especially Gregg, has a tendency to direct his communication specifically to one person and while***

> ***it's probably good a lot of times it leads to some confusion. Or not really confusion, just not knowing, not knowing, and I don't think it's been, if it's been anything specifically group knowledge, but it's kind of like an underlying current of what's going on and what developments are happening… if all it is is forwarding e-mail it can't get really corrupted I guess, but a lot of times if you just summarize something and say Gregg sent this and sent this is where if you don't forward the exact message the information can change a little bit."***

All team members found our attention to team building via e-mail and our ability to rely on e-mail to be unconventional even for a twenty-first century start-up company. Leslie discussed this group feeling:

> ***I think that it is different than the way a lot of other companies start or work together because I think that the tools that we have specifically, probably e-mail most of all and secondly voice telephone calls is probably a pretty unusual way for people to work together and pull off something - the amount of work that we have output only using e-mail, telephone and having very little actual meeting time that we sit down together.***

Gregg reiterated that interpersonal rapport was developed and maintained through e-mail to a degree that enhanced our work and communication:

> ***It's been effective. It works. That stands out…my past experiences has been to communicate face to face, phone to phone, not e-mail to e-mail…A lot of time you get e-mails and an e-mail back is not the way to answer them. And that hasn't come up here with Tennentech, really. That is, I've felt very comfortable answering e-mails with e-mails. So that's working… This activity has been done more through e-mail more than any other kind I've been involved … Somehow or another it's been very appropriate (to use e-mail). I haven't felt the need to call you or Leslie or Simon about something. I can do it with e-mail. And so this is the first time that I've ever relied that heavily on e-mail and having felt it's not a matter of having to rely on it, it's just been a natural way of doing it. I haven't thought about it until now. But I'm more of a telephone person, and I haven't felt that need for it yet.***

When we were not interacting face-to-face our frequent e-mail correspondence extended our interactions and contributed to relationship building among team members.

Face-to-Face Communication

Face-to-face communication refers to interactions in which team members were physically present with each other. Several team members reported that what stood out for them with regard to our face to face interactions is that "***there is not a lot of it.***

Simon reported:

> ***And it seems like we probably ought to have more often face-to-face meetings so we don't' have quite so much buildup of ground to cover…I think it usually works out quite well when we have face-to-face communication it just seems like a lot of times we're trying to cover more ground than we should in an hour or two.***

The overall way in which the extended team communicated in face-to-face meetings was described by Leslie as, "***Good.***" Gregg said, "***It works… I guess what would stand out is if it didn't work.***" Simon agreed by saying, " ***I think communication has been very good.***"

Gregg described aspects that contributed to our good communication:

> ***It's probably that everyone communicates well and there is no sense of information being withheld…Well, I guess that does bring in a third aspect then and that is besides openness, common interests, the third one is, let's see (pause), patience. There is no tendency on anyone's part to cut-off a conversation. So as it evolves things happen. So I think that is the third basic element, not only openness but no one cuts conversation off or effect conversations so they're cut off, and they continue. That's probably being polite. We're all polite.***

All members of the core team noted a distinct difference in relationship dynamics when the core team met as compared to when everyone met together. Simon summarized this difference:

> ***I wish that, well it seems like it varies, the way that you, and I, and Leslie, and Caroline interact is a little different than the way we interact with Gregg. And there is also another level or I guess an environment change when we interact with Karl and Jerry. So it's kind of like, or it seems like there is about three different settings. There is the normal core team. And then there is the extended team with Gregg and then there's the even more structured and less frequent meetings with Karl and Jerry...Again it still seems slow...it just seems like it would be easier to move forward if we could have a little more open and casual structure to our conversation with Gregg and Jerry and Karl mainly, those members of the team.***

Simon attributed frequent interpersonal interactions and the interpersonal relationships that develop through regular interactions as contributing factors to the feelings one has with another:

> ***I think just the frequency and the familiarity that comes with frequency when we work on things and talk about things. That's not quite there yet with Karl and Jerry, and is a little more so with Gregg.***

All core team members expressed the desire to meet more frequently with Gregg, Karl, and Jerry in an effort to nurture interpersonal connections among those working with Tennentech. Leslie reiterated this feeling:

> ***And I think that after reflecting and after experiencing, experimenting, with that method a change that I can think of is that we would incorporate the scientists more into our thinking. And try to meet with them more frequently.***

Two participants reported that that when we failed to communicate during our team collaborations were unsuccessful. Gregg described:

> ***It's not quite collaboration but I guess it was because we had at least one maybe two meetings in which there was some discussion about the agreement with ORNL for Jerry and Karl and then Leslie had the lawyers work something up to make it better, and Karl and Jerry were not involved. So we collaborated but it sort of was a bomb because we didn't talk to the people involved to the extent that they felt they should be involved. In other words, we didn't really, probably***

> ***stop and really think hard about what involvement should they have or do we think they'd want. That was not communicating well with them so that was a failed collaboration.***

Simon shared a similar feeling:

> ***I can't really think of anything where we have had an unsuccessful collaboration on a project. Um, although I guess to some extent, Karl, what he mentioned at our dinner I guess bears out that we were unsuccessful in communicating with him.***

Since we were in the process of establishing a Cooperative Research Development Agreement with ORNL, the topics and extent of business related communication with Karl and Jerry were limited to that which was permissible their organization until the agreement was signed.

Knowing

In our work with Karl, Jerry and others, team members referred to the use of knowing. Knowing refers to sentient and specialized understanding and skills. This theme is further divided into two sub-themes: intuition and experience.

Intuition

Intuition refers to an inner knowing from feelings and perceptions one has about a person, place, thing, or event. Team members reported using intuition to determine initially if a foundation for feelings of trust and respect could be established, and later intuition informed predictions and anticipations about others' actions. Team members expressed that they relied on their intuition when initially assessing someone's character and the potentiality for a relationship with trust and rapport. Caroline summarized how she depends on immediate intuitive impressions to make decisions:

> ***And I think, I think that I am more of an emotional person and I base more of my decisions on the emotional part of me…A lot of that sort of feeling for me is an immediate thin …I meet somebody and I decide right then whether I think they're a good person. If I think that they're a good person then I decide at that moment that I'm gonna trust them…But it (pause) it is the immediate thing. I just immediately know whether I like somebody and trust somebody. And sometimes I'll change my mind, but most of the time it doesn't happen like that. But after I've already decided that I like them and I think that they are good people, trust worthy, and worthy of being friends with then it is just a natural progression. You know, it just gets, my bond, is just stronger and stronger…I just can't say enough about how important I think it is that people who are going to be able to work together be able to trust each other and have a vibe between them. Do you understand what I mean by that? It is, um, that we really like each other and really enjoy each other, but in different ways. And I think we've got that. I think that is a real strong ingredient in our team. And when I say that I mean the four of us because I don't know Gregg."***

Leslie shared how she based some of her feelings and opinions of others on intuition:

> ***… All of those things are so critical to making a good team, and, um, I don't know I guess maybe because we're women we bonded. Though I feel a high degree of that with Gregg and Karl and Jerry even though we haven't spend that much time together. And I think a lot of that really I probably am basing on intuition and gut feeling, I guess, more than anything…"***

Leslie described what contributes to her having an inner knowing based on feelings and perceptions of people:

> ***I think that a lot of intuition is, or at least intuition about people, is based on things like body language. Things like being around people and seeing how they react in certain situations. Reading things that people have written and then just general interaction- your interaction with the individual and watching them interact with other people. And, um, (pause) in all of those things I've been very pleased with our team."***

My field observations illuminated the use of intuition in determining the potential for our technology, someone's approachability, and whether or not a strong "connection" was felt with a business contact that might prove beneficial for the company. Leslie, Caroline, Simon and I shared our "***intuitive feelings***" when we were trying to gauge other team members' and outside business mentors' attitudes. These feelings, along with other information available on a given topic, were taken into account when we made decisions as a group. Team members commented on relying on their intuition to sense when it was appropriate to raise a concern or make a specific point.

My field notes further reflected that all team members shared with each other perceptions that were attributed to gut-level feelings and perceptions of another person based on an intuitive knowing. For instance, Gregg shared his "***hunches***" and "***gut-level feelings***" about what a particular scientist was thinking and feeling and what was motivating his choices. Leslie, Simon and I often shared our "***hunches***" about what would be expected of us in a meeting, and, afterward, assessed how we felt we were received by someone throughout the process of the meeting. For example, when undertaking license negotiations, we performed due diligence investigations of the merits of our technology as well as best practices for negotiation techniques, and then during the meeting relied on our intuition as to how to proceed with the technology transfer agent.

Experience

In addition to intuition, members brought together skills acquired over time through engagement in various training and educational programs, fulfilling former job responsibilities, and pursing hobbies. By way of sharing these skills, team members served as resources for each other. Throughout the company formation process, team members thoughtfully solicited, shared, and considered each other's perspectives and drew upon each other's skills and talents to complete business activities.

Shotter's (1993a, 1993b, 1994) theory of knowing *how* and knowing *that* described in chapter II is useful in understanding the features of this sub-theme. Proposal development was cited as the most obvious example of each person's bringing his or her skills in knowing *how* to write and format a grant proposal. Knowing about the thermochemical energy converter and power generation trends was shared and became part of what the group knew, which is an example of Shotter's knowing *that*. For instance, several group members reviewed the topics within a given solicitation and shared possible topics under which we might submit a grant proposal for the group to consider and select the most promising options. Different perspectives where shared and considered, because as Gregg pointed out: ***"Different people see different things in a write-up about a (solicitation) topic..."***

We shared our knowledge about energy technologies, steps in developing a bench-top prototype and skills in editing, formatting, designing computer graphics, and budgeting to prepare our proposals. Leslie shared her feeling that combining each member's individual proficiencies in knowing how and knowing that improved the group's output: "...***The proposals- I have no doubt in my mind - would have been anywhere near as good without the participation of every member and everyone contributed something specific that was unique to them."***

Team members reiterated that as a company we were establishing a company baseline of experience in how to best combine our skills in knowing how to write proposals and knowing that about energy technologies.

> ***...I think that maybe at first you have to do a few to kind of get a baseline of where you're at and what you're doing. And then, probably, after you feel like you've done the same thing a few times it's probably a good time to step back***

> ***and say, which of these processes (works best)...We've done it multiple times and is there one (way) that is better than another and is there some way that we can improve it?***

Another example of how differences of opinions and perspectives based on past experiences with a topic were shared, considered, and integrated into our dealings. For example, in approaching a win-win scenario to license negotiating, Leslie expressed:

> ***If one person had been responsible for getting our license there are a lot of things that person might not have thought of. Because of incorporating different viewpoints, the interaction between team members was helpful and resulted in a better outcome than if a single person had been trying to do it.***

Each person's strengths and talents in knowing how to do something or knowing about a concept or theory come from their experiences. Gregg gave an example that being open and willing to draw on everyone's skills in knowing how and knowing that is also something that also comes from experience:

> ***Yeah, but see that comes to experience too, because...almost everyone's reaction is to assume responsibility, to assume it all, if it's leadership, to control. And they find out very quickly that you can't lead without listening, changing, compromising, and you can't control because you stifle. It's experience; you just learn it as (inaudible) if you don't learn it you fail.***

For Tennentech, through proposal development and business activities team members brought to bear their past experiences and gained new experiences through blending everyone's specialized skills to complete projects.

Facilitator's Role

The theme of facilitator's role refers to team members' perceptions of my actions. Although different team members took the lead on completing particular projects or aspects of projects, the co-founders particularly were involved with every project in the company's development. At no point in the company formation or interview process did I refer to myself as a facilitator or as serving the role of a facilitator. Significantly, all team members reported that I played an important role in enhancing communication as the team developed.

Caroline described my approach to communication, leadership, and effect on the team in this way:

> ***I think you are good for the mix…it just seems like overall you kind of soften the whole atmosphere of all of our relationships…I like your style. I really do. Instead of just being that forge-ahead kind of person, you know - deciding that this is what needs to be done, and how it needs to be done and this is what we're going to be doing - I like your style in that you really examine everything, evaluate, and you consider everybody's thoughts.***

Gregg described my role in the company formation process in the following manner:

> ***You've been very effective at maintaining that dialogical environment. I'm using your words. That is communicating lots of ideas and finding things and putting them in front of the group and quickly reacting to anything that you're asked to react to, those are the kinds of you seem to be doing… Not to be a personal, you throw out a new idea to everybody and ask for a response and that sort of forces people to respond. That's not a negative thing, I mean that's not in a necessarily aggressive force.***

Leslie laughingly described me as a ***"Co-conspirator"*** and went on to say that my interaction with her and the team had an effect on raising her awareness of collaborative ways of being:

> ***I think I am more aware of that (the elements of collaborative learning) and more conscious of the need to get other opinions and take advantage of other people's skills…I think that I probably, in my personal dealings and relationships or in my activities for activities in Tennentech in terms of forming the company or pursuing the actives of Tennentech I am more sensitive to the need to try to discuss and inform and include the group as opposed to striking off in a direction and doing things that I would normally do for say my other company.***

Simon described me serving a facilitative role in the company formation process:

> ***I think that you have been very instrumental in creating and maintaining lines of communication between all members of the team. And I think that you have been, (pause) I don't know how to put it but I guess a facilitator, filling the role of facilitator in getting everybody on the same page and making people aware of a little more of the details and depth of subjects that we may be - a dispersor (sic) of information I think is a good...You're a good disperser (sic) of information, and in such a way that it's not just putting the information out there but also putting it in a way that everybody can get their hands around or understand...***

Caroline shared her perspective that my way of being in the group helped raise people's awareness of being more inclusive of others in meetings, ***"In a gentle sort of way, I think that you have and will tone that down...(the actions of those who) don't really always consider what somebody else might think or want."***

My field notes indicated that throughout the course of the project, I used the practice of "asking back" or asking "What do you think?" in meetings and e-mail correspondence to further discussion and move the group to dialogue on a given topic. With increased frequency, others also "asked back". As a team member-facilitator, I was mindful of principles of collaborative learning and my intent to act into the group in ways that might support and sustain collaboration. At times I felt uncomfortable with the process of introducing the idea of reflective practice by way of being the first in the group to openly share her reflections on pressing areas of concern. A field note entry I made in early August 2001 spoke to this:

> ***The overall feeling I'm having now is about how challenging it is to always check assumptions, particularly with people you don't know very well yet (and want to get to know) in a setting that is filled with a lot of hope and promise to fulfill personal and professional goals. On one hand I'm having feelings of not wanting to jinx the (still somewhat nascent) environment by repeatedly checking my assumptions with the group. This is because I feel like I'm being***

> ***a 'downner' by bringing up potentially unpleasant topics or feeling, but I also assume that the environment – or the development of a healthy relationship - won't survive unless I do.***

Although Argyris (1990) says, "feeling vulnerable while encouraging inquiry is a sign of strength" (p. 107), I found myself wishing others would also initiate such self-refection and inquiry within the group. While modeling reflective practice had benefits, such as encouraging discussion of feelings and thoughts that might have otherwise remained undiscussable, I found it challenging at time to suggest self-reflection by example.

To the extent that we shared our reflections and checked our assumptions, our communicative environment and relationship dynamics were enhanced. A field note entry in November 2001 reflects an example where I checked an assumption with a group member that resulted in increasing our focus on what we were constructing:

> ***...A team member had been consistently looking ahead – not making eye contact - while I talked. After a while I took this to mean that she wasn't interested in what I had to say. At one point I said, " I have the urge to 'stop the music' so to speak and see what is going on in our interaction.". I asked her what her reflections were on what just transpired between us in terms of what we were saying and doing. She said she really didn't know what I was asking, and named the topics of our conversation. I spoke about the concept of "X" and said that I believed that all meaning occurred within relationships - so words, thoughts, and feelings were a part of what we created between us. I said that I feel that I make eye contact with her when she spoke, and that by her not making eye contact with me when I spoke gave me the impression that she wasn't interested in what I had to say. I asked what could we do to create a different environment. She explained that she didn't know why I would think that she was uninterested and that she had been looking through our list of target items to cover while I was talking and she was thinking about how to move us along faster. We spoke about this further and after clearing the air about our different perceptions of this interchange, we had a great deal of synergy between all of us. And a very productive meeting. The tone of our group meeting had changed for the better. Everyone seemed more in the moment, and truly focused on what we were doing. I know I was acting in more positive ways and felt more in the moment with everyone.***

A facilitative action to encourage a collective culture that was more readily incorporated into others' practices was distinguishing a difference in the meaning-made when one uses "I" language versus "we" language. Since our early team building, I thought of Tennentech and referred to actions and decisions made by our group in terms of "we" language when I was speaking with team members or with others about the team. At the beginning of our relationship a few team members predominantly used "I" language when, for example, presenting a group made decision to a non-team member, such as by saying "I can offer you..." or by saying "my company" instead of "our company". However, over time I noted a progression of the integration of inclusive "we" language being used by all members. This usage paralleled a progression of our having feelings that we had established a community between us as we worked on business outcomes.

Effect On Business Outcomes

The following theme, effect on business outcomes, refers to the participants' assessment that our joint effort to undertake collaborative ways of being was successful. Participants indicated that our way of interacting with each other was specifically helpful in maintaining momentum, enhancing proposal development and increasing communication. Gregg expressed that, in his opinion without utilizing a collaborative learning approach within our experience we might not have stayed together as a company.

> ***Okay, we probably would have written one proposal and quit or written two proposals and quit or gotten downcast. And I think that it's, I don't (know) if I'd say remarkable, (pause) it's important I think. It's important, I think, that we not loose the faith that at some point we might be successful. (Tape***

> ***switches) What you need in these situations is for people to get their reinforcement from each other because you're not getting it from the outside because from the outside you're getting negative reinforcement. You're getting rejection.***

The results of our team's efforts to approach proposal development from a collaborative learning perspective were consistent with the effects previously described in earlier themes. The elements of collaborative learning were entwined with proposal development and the overall communicative environment. In response to looking at the four elements of collaborative learning and as they had effect on our planning, decision-making, or overall communication, Simon replied: "...***Yes, it impacts and has an effect on everything. I mean, if you're going to include all of those - the environment, that's the space if you will, that the learning takes place in - so everything has an effect.***"

Tennentech team members reported that the process of writing and submitting proposals was the most vivid example of our team focusing its collective intent to complete a task in a collaborative manner. Members of the team participated in preparing a proposal for submission: there was also tightly focused collaboration between a smaller group of people on certain technical aspects and between a different smaller group on aspects of the proposal's structure and budgets. As one might expect given the earlier themes, some proposal development meetings were face-to-face, but the vast majority of our collaboration to learn and come to a decision occurred virtually. Caroline's observations succinctly characterize the collaborative writing and collaborative decision making that occurred as we wrote proposals:

> ***I think it's really neat how you all start out with like say a paragraph and then that paragraph goes out to everybody and this person adds to it and this person adds to it and then comes back. And then you add to it again. And then it just kind of flies all over the place. I think how you all are doing this with the e-mail***

thing is working great. I think that it is the quickest, easiest way without having a company, an office, a space that you go to every day to work together. I don't know how you all feel about it, I mean sometimes it is much easier to be face to face and talk, and other times I think that e-mail is just absolutely the quickest most direct way to communicate.

Gregg described our work as a team in general, and in particular proposal development as being a joint-effort:

...This isn't my piece and that is someone else's piece. I've got the lead on some things and everyone else is contributing to it, and I hope that that's mutual and that's probably what a team is supposed to do. So it's a good team...

Leslie concurred that proposal development best characterizes collaborative learning in our activities, ***"Well, I think that collaboration was very successful on our proposals, though we haven't had a successful proposal yet. I think that the proposals are the best example of collaboration that we have so far."***

For Simon, collaborative learning effected our work as a team, ***"The process of doing these proposals...is the most apparent example that comes to my mind immediately...I think that in putting together our proposals all of us have learned a little bit from each other...And that it is better because of our group efforts."***

Leslie stated that, prior to this experience, she had not been as attentive to relational responsibility or the potential for collaborative learning as she is now, and that as a team we have made a sincere effort to engage in collaborative ways of being.

I think I am more aware of that (elements of collaborative learning) and more conscious of the need to get other opinions and take advantage of other people's skills. I think that were we not doing this whole collaborative process thing that it, I'm sure that we probably, I don't know, I think that we are probably the only group in our (Technopreneurial Leadership) class that is approaching it that way to the extent that we are really trying to do that. And I think it is something that has been very beneficial.

Caroline felt a gradual difference in the dialogic environment after we collectively sought to engage in collaborative learning as a company:

> ***I don't have to worry (now) about being, let's see if I can come up with the word, overshadowed in my thinking or my thoughts, not having what I think taken into consideration… And I feel a lot more comfortable just saying what I think and feel and knowing it will be accepted whether anybody agrees with me or not - that you guys accept whatever opinion I might have, whether you agree with me or not, and that you allow me the courtesy to say what I think.***

Gregg said that his experience with Tennentech "***reinforced***" the principles of collaboration for him.

> ***This is an example of a process that can be successful. And people have to bring valuable experiences to a group, have to bring a willingness to listen, to cooperate, to compromise, and if you have a good topic you have a good chance of success if they perform well, subjectively…You have to understand the other person's perspective as opposed to simply just saying, "ah, all right, I have to give in to them…And I guess you could put it in quotes because understanding -- so listening implies taking the time to hear a person out and try to understand what it is you're saying and assimilate it with your understanding. And going through all those things mentally and individually because you have to assimilate that information and react to it yourself. And everyone has to do that and you go from there… You have to keep the dialogue. You have to have a good environment for dialogue. "***

In addition to our preparation and submission of grant proposals, other outcomes are examples of our collective focus on "X" (Peters & Armstrong, 1998) and creating new knowledge and understanding, as well as engaging in collaborative decision making. Pre-start up and start up activities were undertaken with attention to a collaborative learning approach. The core team increasingly utilized Type Three communication and relationship patterns as it selected the company's name, prepared the incorporation documents and shareholder's agreement, determined company officer roles; completed a due diligence evaluation of the strengths and weaknesses of potential technologies prior to selecting TEC, prepared for and executed our license agreement, selected and worked with legal and accounting counsel, designed the company logo and business card layout; and prepared and delivered a number of oral and written presentations for the Technopreneural Leadership Class.

During the data collection period, the extended team, with some interaction from the extended scientific team, worked collaboratively on a number of other business activities. For example, we arranged, prepared, and delivered a presentation to an engineer's group; wrote and submitted a technical white paper for funding consideration; designed the layout and content of our Website; strategized our initial approach to a potential strategic partner; and reviewed alternative funding strategy approaches. All of the core team and extended team business outcomes attest to team members' jointly creating meaning and knowledge in our social interchange.

Team members perceived that the elements of collaborative learning would have a role in our future company development. Leslie felt that collaboration among team members benefited our company:

> Well I think that my experiences with the proposal writing has proven to me that collaborative learning has a great deal of value for our company and it is certainly something that I would want our company's culture to encourage. I think that there are probably specific activities that would benefit from collaboration - proposal writing, the Website, things like that.

Leslie also felt that as we grow we will need to determine what kinds of decisions should be made collaboratively and what kinds of decisions should be handled independently to maintain the company's forward momentum.

Caroline speculated that she saw team members having the lead in specific areas of responsibility. With agreed upon major decisions, members will come together to share their work and findings with the team, the team will talk about the findings, and as a group decide how to proceed in a given area.

> ***I think that there is going to be different things that are important to each one of us. I think that they'll all be important but we'll all pick our own specific area that we care the most about. For instance, I know that you're very serious about our social responsibility statement, is that what you call that?...We'll consciously choose a certain area and we'll become experts in those areas...What I picture is like we each become our experts in our areas and we share...That we will learn on our own and then come together and share...(We will learn) just by listening to each other... I mean that's what the collaborative thing means to me.***

Gregg sees that, while our current level of team collaboration is meeting our company's needs, as the company grows we will differentiate responsibilities and use collaboration to share information so that we can make effective group decisions:

> ***When we start being successful various people's roles are going to have be better defined and they'll be different. Collaboration is going to take a slightly different form because not everyone is going to have the same level of understanding of everything so the collaboration is going to have to become more of information exchange and division of responsibilities and an effective way of making group decisions.***

Simon expressed that he felt the company would benefit if team members continued to incorporate a collaborative learning approach to tasks through, "***Strengthening our understanding of not only specifically what it is we're working on, but the company as a whole will be stronger in that everyone will be more aware in exactly what is on the page that we're working from.***"

These speculations address a desire to continue fostering a collaborative learning culture in some capacity. Working through issues that will arise as we cross into new phases of development, such as a division of responsibilities and a process for making group decisions once we have more formally divided responsibilities and related business challenges we have not yet had to face, will provide new challenges for a collaborative work place.

CHAPTER IV

THEORETICAL DISCUSSION OF FINDINGS

DATA-DA**T**A: **T**heorize

This chapter explores the themes of relationship dynamics, knowing, facilitator's role, and business outcomes in terms of collaborative learning theory and related concepts, theories, and research.

Relationship Dynamics

"Man is but a network of relationships, and these alone matter to him"
(de Saint-Exupéry, A. quoted in Merleau-Ponty, 1962, p. 456).

Aspects of interpersonal relationships – their pre-existence, development, continuance, and enhancement – were critically important to Tennentech team members as we journeyed together to form our company. According to Buber (1970), "In the beginning is the relation(ship)" (p. 69), and so to it was for Tennentech. The female co-founders who came to the company with a prior relationship initially placed particular importance on teaming with new persons who complemented their existing relationship dynamic. All co-founders likened our new business partnership to a marriage. Snider (2001) also uses the metaphor of a business partnership as a marriage and suggests that "Entry into an active partnership should be approached with the same attention (to relationship building) one gives to entering a marriage" (p.22), because healthy relationships are critical for a successful venture partnership.

Tennentech co-founders desired to share mutual positive feelings of a social connection and respect for each other, because we believed that the potential of our entrepreneurial venture rested in the quality of team member relationships. Through our relationships we developed a shared meaning of Tennentech's corporate identity and its collaborative organizational culture meaning became the background for all of our activities.

Drawing on the work of Bakhtin (1986), Wittgenstein (1978), and Bohm (1996), Gergen (1999) concluded, "There is no meaning that is not derived from relationship itself" (p.131). Krishnamurti (1997) further explains that "The mind is to be understood only through relationship-relationship with nature, with people, with our own projection, with everything. In fact, life is nothing but relationship" (p. 143). According to Gergen (1999), social constructionism holds that we are fundamentally co-participants with our social world, and it is through this participatory relationship that we continually develop the self and social structures. Collaborative learning is embedded in social constructionism theory.

Team members co-created Tennentech's organizational culture through a relational process. We desired our company to have a comfortable organizational culture. Members characterized a comfortable culture in terms of interpersonal feelings of trust, respect, friendship, a connection, and camaraderie; the presence of these feelings were reported as critical components to forming a strong team and to maintaining a successful collaborative environment. Our desired organizational culture reflected that team members held basic positive assumptions about human nature, the value of relationships, and a desire to see others succeed. The concept of developing enriching relationships and fostering trust and social intimacy in the workplace is characteristic of Theory Z management and motivation described by Ouchi (1981).

The principles of improving organizational life and effectiveness by developing respectful relationships that include a holistic view of the lives of co-workers are advocated by many others including Argyris (1964,1992), Greenleaf (1977), Boje & Dennehy (1993), Bohm (1996), Srivastva & Associates (1988), Srivastva, Cooperrider & Associates (1990), Boje, Gephart & Thatchenkery (1996), Senge (1990), Isaacs (1999), Gergen (1999, 2001), McNamee & Gergen (1999), Daft & Lengel (1998), Wheatley (1999), Weick & Sutcliffe (2001), and Reason & Bradbury (2001). Daft & Lengel use the term "fusion leadership" to describe an approach that focuses on creating relationships and connections with others. A fusion leader, according to Daft & Lengel (1998) is interested in fostering these areas in his or her company:

- Joining, coming together, connection, relationship, community;
- Control 'with' others;
- Absence of boundaries, sharing of information and responsibility, unity, wholeness;
- Common ground of shared vision, values, norms, and outcomes; and
- Body, mind, heart, and spirit as instruments of change (p.22).

Peters and Armstrong (1998) explain that a trusting and supporting relationship between group members is "vital to the process of collaborative learning" (p. 83). Armstrong (1999) found that in collaborative learning groups individuals initially felt a relationship with other individuals. As they began to know each other in the context of the group they expressed a feeling of a relationship with the group as a whole. My observations and experience were consistent with these findings.

Co-founders made efforts to attend to each other's feelings and engaged in activities that would develop interpersonal relationships, such as sharing and listening to accounts of personal events in each other's lives, remembering special occasions, and supporting each other's personal growth. Team members saw these activities as conducive to fostering our desired culture. Schein (1992) emphasizes that a group culture develops from a shared history and collective taken-for-granted assumptions group members develop as they learn to work together and solve internal and external problems. The feelings shared and conveyed during interactions with team members and with outsiders are integral parts of organizational culture, which Schein (1992) labels as the climate of an organizational culture. Weick and Sutcliffe (2001) emphasize that feelings among group members are the "engine of culture" and should not be ignored (p. 141). Daft and Lengle (1998) agree that it is "emotional attachments that lead people to care about one another and jointly pursue their shared vision with creativity and enthusiasm" (p.113).

Tennentech's organizational culture and climate developed through invisible, though profoundly important, emotionally energetic connections co-created in dialogic interactivity. Team members' desire to build healthy team relationships speaks to their having a tacit sense that something more than just 'work output' happens in relationships and because of relationships. Discursive psychologist and existential phenomenologist Martin Buber (1965) describes the "something more" of interaction as *das Zwischenmenchliche*, the "sphere of the between." Buber explains that in the sentient point of interaction "when two individuals 'happen' to each other, then there is an essential remainder which is common to them, but which reaches out beyond the special sphere of each" (1965, p. 17, 25).

Shotter (1993, 1994, 2000, 2002 June) says that a depth of participatory understandings is co-created in these happenings to form the unique kind of knowing,

knowing from *within,* which structures the possibilities and potentialities for future action. Shotter (1994) explains that these understandings only appear "between us, in the process of our talk" (p.2, emphasis in original), and Shotter goes on to clarify that

> Those involved in joint action create unique, novel circumstantially appropriate 'situations' between themselves, which, although they contain no independent, material objects as such at all, it is just as if they did...the 'situation' itself constitutes something to which we can both contribute: it is 'ours' (1997, p.5). Attending to what is created from *within* is at the heart of relationship building.

Daft and Lengel (1998) speak of an invisible point where this knowing is the "subtle white space between people" (p.113), a space containing the relationship, emotional energy and spiritual values that bind people together and keep the organization flowing. Because of this energy, attending to relationships proved to be rewarding not only for the group as a whole, in terms of drawing upon multiple talents to strengthen and achieving company outcomes, but also for individuals, in terms of enhancing their personal and emotional being.

When speaking of aspects of organizational culture during the interview process, only two team members mentioned our intent to work collaboratively. These members referenced our collaborative approach in a parenthetical, matter-of-fact manner while making other points. I interpreted the limited references to our having a collaborative culture to be implicit and an indication of the embedded nature of our collaborative approach in all activities to date that had become part of our taken-for-granted background. Since I am a team member-researcher, other team members may have not pointed out this underlying feature during the interview process because of their assumption of my knowledge of its practice within the company.

Although all members participated in business activities in a collaborative fashion, Gregg did not emphasis a desire to build strong interpersonal relationships as much as the co-founders did. This difference could be attributed to the fact that the co-founders were part of the Technopreneurial Leadership Class and had explicit intentions of becoming entrepreneurs. The co-founders envisioned our joining as a team as an investment in a long-term partnership through which to fulfill personal and professional goals. The other team members were, at least at the time of data collection, more invested in the idea of developing a specific technology than the idea of forming a company. Differences in personal style could also account for the variance in expressions of forming partnership-friendships. For example, some team members may desire to have partnership-friendships and yet are not as verbally expressive in their desires. Another explanation could be that some members had a threshold of comfort and trust they wanted to feel with others, and, once that was minimally met, they were not as interested in maintaining the relationship beyond a certain emotional investment. Friendship is not a requirement of experiencing collaborative learning, though friendships often develop among individuals who engaging with each other in collaborative learning.

The differences of investment in relationship building expressed by team members may have also been a function of the composition of the team at the time of the interviews. Prior to the first interview, the co-founders had spent ten months of engaging in relationship building activities that co-mingled with business topic activities. On the other hand, Gregg had only been involved with the team for five months at the time of the first interview. In those five months, the team's interactions were primarily focused on meeting SBIR grant deadlines. However, co-founders initiated interpersonal sharing during the course of these meetings.

As the team composition changed, the dialogical space or the "sphere of the between," to use Buber's (1965) term, of the team also changed. Likewise, the frequency of team member interaction affected the dialogical space. Three team members who had the most consistent and frequent exposure to each other reported feeling this distinct difference in the "sphere of the between". The amount of time together was reported to affect participants' feelings of rapport with one another, and subsequently with ease in face-to-face communication among participants. The importance of time spent with team members to build relationships and create a collaborative learning environment was reported by other researchers in the field of collaborative learning (Tisue, 1999; Armstrong, 1999; Cross, 2000; and Alderton 2000). The extensive use of electronic communication served to counterbalance the infrequency of face-to-face interactions. E-mail communication, in effect, extended the group's dialogical space, increasing sharing and listening among members and positively affecting face-to-face communication.

E-mail communication provides a vivid example of the group's engagement; communication followed the concepts of member to member, member to group, and group to member patterns. Group to member communication occurred by virtue of our focus on "X" and what we were co-creating with each e-mail exchange. Both the abstract and concrete qualities of "X" can most easily be conceptualized when thinking about the abstract and concrete qualities of the Internet. For example, someone would send an e-mail to the group about an upcoming funding opportunity in the field of combined heat and power. Another person would "reply all" with news about recently funded combined heat and power proposals and ask a team member a question about how this related to our technology. Someone would respond and e-mails would continue about ways to pursue the funding opportunity; plans would be made to meet face-to-face to further strategize. In this example "X" was both developing the combined heat and power funding proposal and the way we were engaging with each other. Member to member communications were the direct expressions made from one individual to another in a message. Member to group patterns were illustrated by comments made by an individual to everyone in the group essentially talking to the "X" virtually centered among us as we collectively focused on making meaning of the combined heat and power solicitation for us and our company. Group to member communication was the shared intent by the group and way the group fostered the communication exchange, kept it alive and between us, by the way we responded.

The Internet, most specifically e-mail, functioned as a unique container to support the process of our dialogue in ways consistent with Isaacs' (1993, 1999a) four-stage theory of dialogue evolution. Isaacs (1993) found that dialogue requires four enfolding fields of genuine conversational inquiry, holding the "sum of the collective assumptions, shared intentions, and beliefs of a group"(p. 34). Isaacs (1999) uses the term "container" to describe the "more elusive notion of the 'field of conversation'" necessary for experiencing dialogue (p. 257). The characteristics of Isaacs' (1999a) four fields are summarizes below:

- *Field I: Instability of the Field/Politeness in the Container* – (Shared) polite monologues without expressions of disagreement.

- *Field II: Instability in the Field/Breakdown in the Container* – Controlled discussions or skillful conversations where people begin to feel a 'container" assumptions and thoughts are openly shared without collective reflection on disagreements and a crisis occurs if people become unwilling to suspend their assumptions to hear other points of view.

- *Field III: Inquiry in the Field and the Flowering of Reflective Dialogue* – People begin to notice their assumptions and are willing to explore the rules that have governed these assumptions, deep shifts in understandings and felt connections with others take place.

- *Field IV: Creativity in the Field: Generative Dialogue* – Formerly imposed limits and structures on assumptions and positions are lifted and the group creates a 'collective flow' where awareness is heightened and synchronicities often arise during meaning making with and among others.

Team members reported that our face-to-face interactions, even though limited in comparison to the extent of our on-line interaction, fostered an important basic social connection. My field notes indicated that instances of all four fields of dialogue occurred, albeit varying in duration, among members after a comfortable level of rapport had been achieved. Movement though the fields of conversation throughout the company formation proceeded in a non-linear fashion as Isaacs (1993, 1999a) suggests is often the case. Team members were consistently polite with each other, and explorations of assumptions in a group setting occurred more frequently among co-founders when face-to-face than with the group as a whole when either face-to-face or on-line.

The majority of e-mail communication was representative of Isaacs' first two fields of communication; however, there were e-mail exchanges between two specific team members that moved into the third and fourth field. After moving through all of the fields of communication, these two particular team members expressed a heightened awareness of the willingness to suspend judgements and respectfully listen to each other, while reflecting on their actions and working at building a trusting environment.

Alderton (2000) found that group members who moved through the first two fields reported an increased sensitivity in the need to establish and maintain a dialogical space to fully explore assumptions or ideas expressed by members.

In a study of virtual teaming in a corporation, Nandhankumar (1999) found that trust relationships among team members were critical for sustained virtual team success, and that some degree of face-to-face interactions were needed for establishing and sustaining trust. In each of the virtual team case studies presented by Jackson (1999), relationship building and emotional bonds among members were essential to virtual teaming success. Duarte and Snyder (1999) determined that, while it is both possible for virtual teams to be productive without a sense of trust and unity and for a team to have a sense of trust and unity without being productive, virtual teams that attend to social relationships will have more trust and unity among members and be more effective.

Knowing

Tennentech team members reported employing various ways of knowing as we engaged in the company formation process, in particular they expressed using intuition and experience. Intuition served as an internal gauge for members informing their decision making and choices of how to act in the group and on behalf of the group.

Team members reported intuiting the potential for building trusting, respectful relationships with other team members and the caliber of his or her professional capabilities. Team members also intuited market opportunities, and relied on their intuition when assessing the timbre of team meetings and meetings with outsiders. Likewise, team members reported using intuition to interpret specific behaviors, desires, and needs of team members and outsiders. When conflicts arose during the initial forming of the team's dialogical space, team members reported that they were motivated to work through the "instability of the container" (Isaacs 1993, 1999) because of intuitive feelings for achieving a positive outcome both in terms of strengthened relationships and improvement of specific company projects.

Parks (2001) suggests that team members' intuitive feeling from interpersonal encounters is a form of relational knowing: Parks (2001) explains:

> If we get to know our conversation partners in the process of talking that impels us to connect, this knowing is inherently not just an intellectual exercise, but an affect-laden action...When we know relationally we mobilize our feelings and our minds...(This form of knowing) resides in the act of relating and shows itself in words, expressions, actions, and other forms of doing relationship. In relationship, we know with feeling, and the knowing is the feeling...In general, knowing through senses comes before knowing through thinking...the *raison d'être* for relational knowledge is not putting that knowledge to use; rather it is an end in itself...In knowing relationally, knowledge becomes part of us, in the same way that food nourishes us. It enriches us and we become more whole because of it. Love, which is the prototype of relational knowledge, epitomizes these qualities...(It) comes from connecting and leads to further connecting...relational knowledge endures and grows through a commitment on the part of the parties involved to persevere through good times and bad...(Relational knowing) makes it possible to create and sustain a community (p.85-86).

Heron and Reason (2001) define a similar knowing as experiential knowing. Experiential knowing is an in-depth knowing from direct, personal encounters with people, places, and things, a knowing that stirs a resonance with others that sometimes cannot be put into words. Such resonance evokes one's intuition, feelings, about the meaning of an action or situation. Central to both Parks' (2001) and Heron and Reason's 2001) definition is the role of intuitive feelings of rapport and respect as the bedrock for relationship building and fostering a sense of community building among group members.

Candid sharing of intuitive feelings occurred more frequently among co-founders than among the entire team, and co-founders accepted these feelings as valuable and legitimate ways of knowing. The act of sharing one's intuition was a form of self-disclosure that contributed to building trusting interpersonal relationships among members. My field notes indicate that team members made a distinction between what they characterized as an opinion and as intuition. Intuitions were feeling-based and where as opinions represented a blend of one's own thoughts and feelings as informed by others' thoughts and feelings. Although co-founders shared intuitive feelings throughout all stages of the relationship building process, as rapport increased members began identifying expressions of intuition to each other. Similarly, the sharing of intuitive feelings among the co-founders and Gregg proportionally increased with rapport development.

Senge (1990) reports that "intuition in management has recently received increasing attention and acceptance, after many decades of being ignored" (p. 168). Srivastva and Associates (1988) align intuition with integrity gained through experience and as a combined characteristic is "the highest form of intelligence...a sophisticated state of processing experience in the world that encompasses moral judgement, creativity, and intuitive capability, as well as rational-analytical" abilities (p.27). Dreyfus and Dreyfus (1986) agree in their research that "analysis and intuition work together...Although intuition is the final fruit of skill acquisition" (p. xiv). This intuitive fruit, born through social interchange as Parks, Heron and Reason, and Shotter have aptly described, is consistent with the co-creative, social nature of knowledge and meaning-making in collaborative learning theory.

In addition to intuition, members reported calling upon skills, talents, and perspectives of group members during the company formation process. For example, team members utilized each other's knowledge about the energy field, engineering theories, and accounting practices to accomplish such things as writing and submitting proposals, designing a website, and meeting mentoring agency requirements. As previously mentioned, Shotter (1993a, 1993b, 1994) defines these ways of knowing as know *that* and knowing *how*. Knowing *that* refers to theoretical knowledge *about* such thing as precepts of engineering, physics, information technology, and management science. Knowing *how* refers to the ability to apply a skill, craft, or trade.

Several typologies of knowing exist (see for example Habermas, 1971; Schön, 1983; Belenky, Clincky, Goldberger, & Tarule, 1986; Mezirow, 1990, Parks, 2001). Heron and Reason (2001) and Shotter (1993a, 1993b, 1994, 2002) succinctly articulate what Peters and Armstrong (in press) mean by the element of collaborative learning termed multiple ways of knowing. Shotter's knowing *that* parallels what Heron and Reason (2001) mean by *propositional knowing*. For Heron and Reason, p*ropositional knowing* is a knowing of facts, concepts, and theories that are expressed as "informative statements" (2001, p. 183). Shotter's knowing *how* is akin to Heron and Reason's (2001) *practical knowing*, which is "knowing 'how to' do something and is expressed as a skill, knack, or competence" (p.183). Team members honored and utilized multiple ways of knowing, and, while they did not use the term "*knowing from within*" it is clear to me that they functioned from *within* even when they were unaware of its underlying significance to our way of being together.

Business Outcomes

For Tennentech, engaging in collaborative learning during the company's pre-start up and start-up phases fostered trusting interpersonal relationships, sustained team motivation in spite of funding or other setbacks, and enhanced the overall quality of the team's work. Research on entrepreneurial teams is limited, and biographies and autobiographies account for most of the current analysis of a new venture team's interpersonal meaning-making process in the pre-start-up and start-up phases. Ponthieu, and Critelli (1995) found scant empirical research with venture team members as participants in Bettenhausen's (1991) review of over one-thousand articles on team and group work.

Although research in the field of entrepreneurial teams is limited, Watson, Ponthieu, and Critelli (1995) found interpersonal relationships were important to venture outcomes. They surveyed one hundred-ninety venture dyads that had been in business for an average of 7.78 years, and described characteristics of effective interpersonal process. They found that dyads that agreed on interpersonal process issues perceived their ventures to be successful in terms of profit and growth. The dimensions of interpersonal process reported in their study were (1) shared leadership in decision-making, setting goals and quality standards, and continually improving, their process; (2) interpersonal flexibility in sharing, problem solving, and overall style; (3) commitment to the team shown by coordinating effort among members, enthusiasm for team performance and common goals; and (4) friendliness and general helpfulness to team members beyond what might be expected.

Watson, Stewart, and BarNir (2001) studied the role of cohesion in seventy new venture management teams and found it to be an important aspect of successful entrepreneurial management teams. Based on their research, Watson, Stewart, & BarNir (2001) propose that "Cohesion, when combined with efforts to promote free and open interaction, will lead to more effective and better performing ventures" (p.1). This study did not, however, investigate the interpersonal process through which the teams developed cohesion and business outcomes. The authors conclude that "Interpersonal process in the venture performance equation is a very important area to develop and should become a part of the human capital core assets" (Watson, Stewart & BarNir, 2001, p. 18).

Dialogue, which is the primary mode of discourse in collaborative learning, was not examined as a part of either of the aforementioned studies. Dialogue has received attention from a growing number of established businesses as a way to understand the dynamics of their practices and co-create innovative solutions to problems (Senge, 1990; Zadek, Pruzan & Evens, 1997; Isaacs, 1999; Daft & Lengel, 1998; Freydmen, Wilson, and Wyer, 2000; Wheatley, 1999). Many established businesses engaging in dialogue are also seeking to stimulate company performance by emulating an entrepreneurial culture (Timmons, 1990). With this in mind, it could be inferred that entrepreneurial teams themselves would further enhance their synergistic performance by engaging in the process of dialogue.

Tennentech's increasing engagement in collaborative learning and its effort to dialogue contributed to team members' abilities to create new knowledge and meaning. Constructions of "X" (Peters & Armstrong, 1998) were illustrated not only by the development of interpersonal relationships but also by the completion of our business tasks and activities. Table 1 provides an overview of the process and product outcomes Tennentech achieved. The columns contain examples of process and product outcomes achieved during the pre-and start-up phases of our company development. The pre-start-phase refers to the period in which co-founders considered working together through filing the company's charter with Tennessee's Secretary of State and officially incorporating, and the start-up phase refers to the point in time after incorporation to present. Process outcomes are the factors supporting and governing our interpersonal relationships and ways of working together, such as building trust, to achieve product outcomes, which were tangible results of our work to form and run the business.

The dialogical space itself was a co-created process "X," and it intertwined the co-creation of all other team product "X's" such as our incorporation documents, grant proposals, and company business plan. One team member reported that our attention to interpersonal relationships helped us maintain forward momentum in spite of unsuccessful proposal bids and generated a sense of support and positive morale within the company.

Facilitator's Role

As a Tennentech team member, I chose to facilitate the co-creation of a collaborative learning environment through a member-to-member relational stance. Subsequently, I did not cultivate group expectations or perceptions of my serving an explicit role of leading the group through a dialogue process and into collaborative learning. Nor did I establish expectations that I had more responsibility for creating a safe, respectful, trusting environment, the dialogical space, than did other members.

Table 1. Pre-Start-Up and Start-Up Outcomes Achieved

Company Phases	Process Outcomes	Product Outcomes
Pre-Start-Up Phase	Agreed to work as a team	Selected company name; registered domain names
	Built initial sense of trust	Registered company charter with the Tennessee Secretary of State
	Developed personal rapport	Elected company officers
	Began to establish ways of communicating	Authored and adopted company by-laws
	Learned each other's strengths and challenges	Authored and adopted shareholder's agreement
	Determine desired organizational culture as egalitarian/flat	Opened bank account
	Agreed on company focus, vision, and values	Selected technology to pursue
Start-Up Phase	Sought engineering expertise to balance team skills	Engaged a legal firm and accounting firm
	Continued to build trust and respect among members	Drafted initial business plan
	Continued nurturing other aspects of relationship building	Negotiated exclusive license in all fields of use for chosen technology
	Continued exploring mutually beneficial teaming with ORNL scientists	Joined a technology start-up business mentoring program
		Received two sub-grants from a private foundation for $8,360 to support selected start-up expenses
		Designed company logo, Website, and password protected Website
		Submitted three SBIR proposals to the Department of Defense and three SBIR proposals to NASA
		Submitted one proposal to a federal Broad Agency Announcement
		Issued first press release in partnership with ORNL
		Delivered first company presentation
		Provided technology white paper to the Department of Energy
		Established relationships with potential strategic partners at a conference in Nevada
		Conducted first presentation to a potential strategic partner
		Received first inquiry to purchase a TEC engine component

Nonetheless, team members reported that I facilitated and encouraged communication among members. Some of these characteristics of facilitating were asking people for their opinion, disseminating information and sharing information with depth and clarity, responding quickly to inquiries and providing feedback, encouraging on reflection one's actions, and softening the atmosphere of the group's communicative environment.

These results indicate to me that facilitating collaborative learning from within my role was beneficial to our interpersonal process and subsequent company development. It says to me that in my relational stance I was able to shift between my roles as a team member, as a facilitator, and as a researcher in ways that are characteristic of a reflective practioner (Peters, 1991). This meant taking a mindful relational stance within any given situation and doing my job while taking a closer look at verbal and non-verbal cues to detect tones, feelings, and ways to inquire.

Few business studies have looked at the approach of facilitating a collaborative way of being and communicating. Tisue (1999), who studied facilitation of dialogue in a family business setting and the effect of dialogue on decision making, found that modeling behavior of a collaborative learning, Type Three environment and asking open-ended questions were important activities for a collaborative learning facilitator, even one who is explicitly serving such a role.

From a social constructionist perspective, the language an individual uses and the language the other person uses in discourse during social interactions plays a fundamental role on the construction of self-identity, thought, culture, and science (Harré, 2000). The nature of our utterances and gestures are critically important for either enriching a sense of connection in relationships or creating a distance between them. Buber (1970) referred to all living as meeting, and as such one should seek to "make the secular sacred" (p.23). Weick (1995) proposed that all sensemaking of an organization's identity occurs when people meet (p. 143). Therefore each action a person makes in social interchange, an utterance, word, gesture, silence, generates a meaning that is interpreted by others; and each occurrence, each point of action, is inherently a meaning and knowledge building process and product which directly influences relationships.

In facilitating Type Three collaborative learning, one must be aware of the generative, co-constructive nature of discourse. With this awareness "of the negotiated and constructed nature not only of identities but also relationships and systems of relations," Deetz and White (1999) posit that we "need to implement interaction processes that do not privilege particular ways of understanding and of being-to adopt an ethics of mutual decision making that requires us to engage in the negotiation of identities and forms of relatedness" (p. 115). Peters (1991), Peters & Armstrong (1998; in press) and Shotter (2002, August) remind practitioners to make sense of the background of our lives in a way that supports co-creating positive relationships.

In this chapter I summarized the thematic findings of this study: relationship dynamics, knowing, business outcomes, and facilitator's role. In chapter V, I share my reflections on these themes and how I understand them in terms of my research goals.

CHAPTER V

REFLECTIONS AND RECOMMENDATIONS

DATA-DATA: Theorize & Act

This chapter summarizes the study's findings, my reflections on the findings in terms of my practice, and the study's contributions to my practical theory of facilitating collaborative learning in a start-up business. I also provide recommendations for others desiring to facilitate collaborative learning from within their practices, and make recommendations for further action research.

My purpose in conducting this research project was twofold. I wanted to explore the role of collaborative learning in co-founding Tennessee Energy Technologies (Tennentech), and I wanted to improve my professional practice as a facilitator of collaborative learning in organizational settings from within my role as a team member, without the designation or status of a facilitator. My research questions were:

1. What are the participants' experiences of engaging in collaborative learning in forming the company?
2. From the point of view of the participants, what is the effect of my role as facilitator of the collaborative learning experience?
3. From the participants' perspectives, what is the perceived effect of the collaborative learning process on company outcomes such as planning activities, overall communication, and decision-making?

This study, spanning eighteen months, occurred during the company's pre start-up and start-up activities. From data collected through phenomenological and semi-structured interviews and field notes, I found four overarching themes: relationship dynamics, knowing, facilitator's role, and business outcomes. Relationship dynamics were defined as factors contributing to interaction among team members and is further defined by four sub-themes: (1) team composition, (2) early loss and change in team member participation, (3) commitment to members, and (4) virtual and face-to-face communication. Knowing was referred to as sentient and specialized understanding, and was further divided into two sub-themes: (1) intuition, and (2) experience. The theme of facilitator's role referred to team members' perceptions of my actions. Business outcomes (as a theme) was defined by team members' perceptions of the effect of collaborative learning on our company formation process and business products.

The themes describe the participants' perspectives of their experience with collaborative learning as we jointly formed our company. Team members perceived the process as one in which we were involved in strong interpersonal relationships among team members. These relationships developed through interpersonal connections made while we communicated virtually and face-to-face. I was perceived as having facilitated and supported communication among team members, as having helped establish and maintain our dialogical space, and as having encouraged individual's reflections on their actions. Participants perceived that engaging in collaborative learning strengthened our interpersonal relationships, team communication, company outcomes and products, and that behaving collaboratively was particularly helpful in maintaining company momentum. The essence of the findings is that the business cannot be described without referring to relationships among team members.

The relationships among members define the system in which all of our organizational activity took place. Our relationship dynamics, ways of knowing, and my role as a facilitator effected our business outcomes. Business outcomes refer to both the process and the product of "X" to use Peters and Armstrong's (1998) term. The themes can be understood in terms of how they interact and Figure 2 illustrates the interaction among them.

Group members' ways of knowing were impacted and enhanced by our relationship dynamics and vice versa. My efforts to facilitate our development and maintenance of a collaborative learning environment as we co-constructed business outcomes were influenced and informed by our relationship dynamics and ways of knowing. Likewise, my ways of knowing and relationships with team members were affected by our relationship dynamics and they influenced how I acted as we jointly constructed company outcomes. The themes in Figure 2 are encompassed by a triangle, which further illustrates the communication and relationship flow in a Type Three collaborative learning environment as defined by Peters and Armstrong (1998).

The participation of team members and the interrelationship among the themes exemplifies Wheatley's (1999) description of how "in living systems theory, quantum physics, chaos and complexity theory, we observe life's dependence on participation…nothing exists independent of relationships whether looking at subatomic particles or human affairs" (p. 163-164).

Reflections on my Practice

Oftentimes, groups interested in and willing to engage in collaborative ways of being call upon an outside facilitator to guide and coach their process. In such traditional facilitator-group relationships, the facilitator is perceived to have primary responsibility for creating and maintaining a safe communicative environment for all participants.

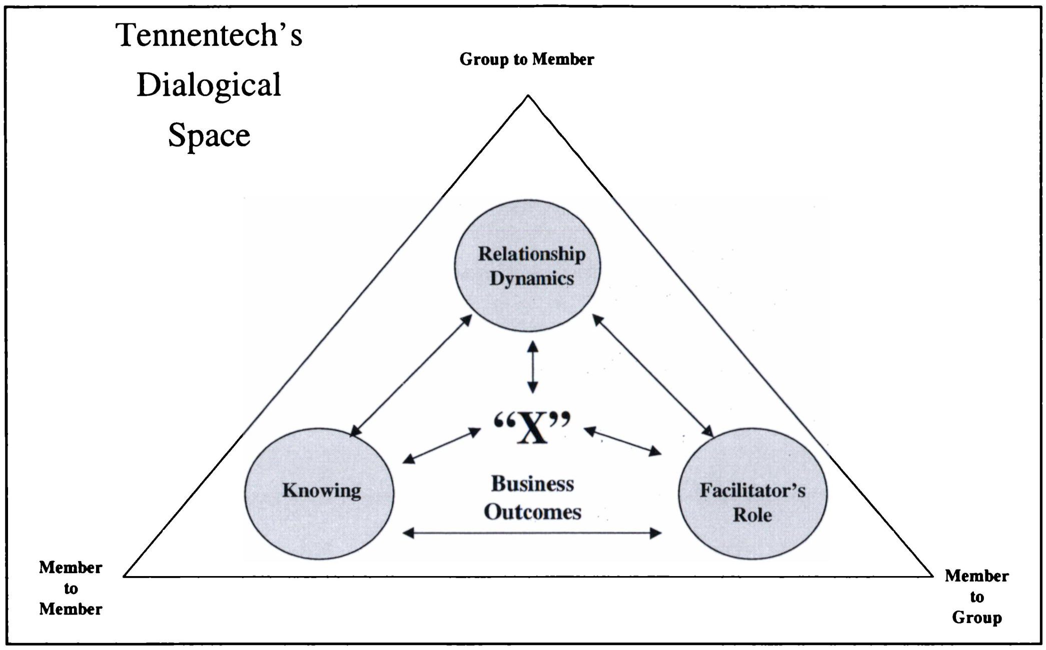

Figure 2. Interaction among the themes: relationship dynamics, knowing, business outcomes and facilitator's role

The group openly relies on the facilitator for direction and coaching concerning ways to improve their communication and group decision-making, but the facilitator is not necessarily expected to join the group and its members to co-construct knowledge. Recent research in the field of collaborative learning has shown that even when a facilitator seeks to divest his or her power as the primary caretaker of the process, group members frequently turn to the facilitator for clues on how to go forward (Alderton, 2000; Brickey 2001; Tisue, 1999). Undoubtedly there are merits and benefits of the traditional facilitator-group relationship for the facilitator and the group, and certain group circumstances may benefit most from this approach. However, findings of my study indicate that it is possible to facilitate collaborative learning from within one's role as a member of a group in a start-up business context. I found benefits and challenges to my approach to facilitating collaborative learning as I sought to increase individual and team skills in collaborative learning.

Unlike a consulting facilitator whose responsibilities to a company end with the completion of an assignment, my responsibilities were ongoing. I was invested in the idea of establishing a team to form a company, whose members likewise shared the same investment of hope, vision, and anticipation for an entrepreneurial team effort. Once Tennentech incorporated, I had an official responsibility as a co-founder and officer of the company. With this investment, I felt more was at stake in my role as a team member-facilitator than I had felt when I previously worked as a facilitator in a consulting capacity. I had to navigate through my own feelings and periods of doubt and uncertainty about our team composition in order to help establish a trusting dialogical space at a far more personal level than when I had been a consulting facilitator. A benefit to my approach was that I was a team member first and a facilitator second; once our team had established rapport among us I operated as an insider. By facilitating from within I did not have to negotiate ways to integrate and reintegrate myself as a group member, as would have been the case if I moved back and forth between formal facilitator and team member roles.

This study affirmed the critical role of relationships and communication flow in a Type Three collaborative learning environment as defined by Peters and Armstrong (1998). I experienced how fostering and maintaining of member-to-member, member-to-group, and group-to-member communication was critical our group's interpersonal relationship development, and company process and product development. An example of this was Ryan and I felt like outsiders on the team that included a pre-existing group. Even though we had begun to work together, the absence of all three types of communication process affected our interpersonal relationships and group development. Ryan's feelings and my experience indicated the particular importance that relational knowing plays in building rapport with all team members if one is working with others with the intent to co-found and co-manage a company.

Engaging in reflective practice to clarify my own assumptions and feelings contributed to my facilitator role. During the time our team relationships were stabilizing, I was able to see a progression in how I facilitated from within my role as my relationship with team members changed, as I revised my practical approaches, and as I put more trust in myself and in the group process. I found facilitation worked best through relational stances that gave legitimacy to each person's feelings and invited inquiry into others thinking. These stances included hand gestures, nods, and other supportive gestures as Bakhtin (1981, 1986) has described. Another included verbally inviting someone to say more about what he or she was saying during group meetings. However, there were instances in which I found myself at a crossroads in terms of how far to assert myself as a facilitator. As educator/activist/facilitator Myles Horton once said, "this is a problem that has always bothered me, exactly how far can you go in stretching people's experience without breaking the thread" (Horton & Friere, 1990, p. 154). I was concerned about the thread of our group process, the thread of my relationships with members, and their relationships with me.

This concern surfaced for me when Caroline semi-withdrew and many team meetings involved only Leslie, Simon, and me. Leslie and Simon made great effort not to let their affinity for one another overshadow our joint affinity as a threesome, and, in many ways this was very successful. The background of their relationship was a part of their joint identity and personal histories, and it was important to respect their bond. We had great rapport and accomplished a significant amount of work together as a threesome. Although, there were times during our interactions when I wanted to suggest alternative communication pattern, I was hesitant to "stop the music" on too many occasions. I felt reluctance because I was unsure of how my action would be received and how cooperative they would be in exploring our communication process. However, when I took into consideration the fact that they are married, I was mindful of not wanting to be perceived as trying to pseudo-counsel. I kept in mind that as a threesome our "within" was different than the "within" between them as a couple. The occasions that I asked to "stop the music" in order to look at the way in which we were communicating proved to be extremely productive and moved us into Isaacs' (1999b) third and fourth fields of conversation. I attribute our successes to the willingness of my team members to collectively explore and reflect on our communication patterns and for having invited such an inquiry in a non-threatening manner.

At that stage in our team's development and skill in collaborative learning, the most challenging aspects of facilitating from within occurred when I raised a personal issue or concern that I wanted to explore during group dialogue and reflection. It was difficult for me to balance staying in touch with my feelings and reflections and continue coaching the process. My intention in these interactions was to explore my personal concerns with the group, to have them help me understand the assumptions and feelings guiding their actions and to help me understand mine. When I was focusing on my own concerns, our communication flow seemed more like a monologue exchange than during our other discourse. I felt that team members perceived me to be sharing my concerns in order that they could make corresponding corrections, instead of perceiving my real desire that we engage in free-flow idea sharing and reflection. Team members listened with care and sincerity, though I did not feel that I was effectively able to model open-end inquiry. I also over compensated for the lack of reflective questions posed to me by further continuing my monologue of concerns.

From my perspective, Isaacs' concept of the third and fourth fields of dialogue and ways to reach those fields had not, at that point in our collective experience, become familiar in some group members' experience. This suggested that a group's ability to engage in collaborative ways of being and to foster a collaborative learning environment takes time, practice, and skill – individual skill and a group skill – to move from expressions of politeness to generative dialogue.

While I think Tennentech would continue to benefit from my team member-facilitator stance, a few months after the data collection period ended I felt we had reached a point in our group development where we could benefit from my "stopping the music" to share formal collaborative learning theory. My assessment is that although we have established a collaborative culture, our ability to learn as a group could be enhanced if I sought additional opportunities to share collaborative learning theory during interactions and engaged the group in reflection on more occasions.

Considerations for New Business Practitioners

This study contributed to my practical theory of how to facilitate collaborative learning from within my role as a new business co-founder and ways to balance the "expert/non-expert" tension as a facilitator and team member. Although it is impractical to distill the process of collaborative learning into a quick recipe for facilitation, I offer a few recommendations as a result of my practical theory for consideration to others seeking to facilitate collaborative learning in pre-and start-up business contexts.

These recommendations are equally applicable for those facilitating from within their practice as well as those serving in a traditional facilitator's role. However, from the perspective that the full potential for developing a collaborative learning culture in one's organization can only be truly understood by those within the organization (P. Jarvis, personal communication, October 26, 2001), suggests that internal collaborative learning facilitators might have an advantage over consulting facilitators. The following considerations may inspire approaches and a range of possibilities specific to one's context for facilitating collaborative learning.

My foremost consideration for others seeking to facilitate collaborative learning from within their practice, or as a consultant, is to be mindful of the communication patterns in the teaching and learning types described by Peters and Armstrong (1998). The synergy attributed to the practice of dialogue in collaborative learning rests on the felt resonance among member-to-member, member-to-group, and group-to-member relationships and communication.

All of the Type Three relationships and communication are essential to achieving collaborative learning. As such, it is insufficient to attend only to member-to-member relationships. It is important to nurture group members' collective awareness and relational responsibility by reflecting on one's own actions and making any necessary changes to improve one's verbal and non-verbal contributions to the group's co-creations as well. Shotter writes:

> Because everything of importance to us in our social lives together occurs in *meetings* of one kind or another…(it is important to) understand how many of the features of our sense of our own identities, and of the kind of world in which we sense ourselves as living, are <u>constructed</u>, <u>maintained in existence</u>, and <u>changed</u> in our conversational dealings with each other (2002, August, objectives section, emphasis in original).

I contend that awareness and relational sensibilities – consciousness of the feeling, tone, and energy of a group through the gestures and words used - are the most powerful abilities and skills for the collaborative learner. Increasing one's awareness and relational sensibilities are essential for acting in terms of a Type Three relational stance in order to co-create a dialogical space, reflect on individual and group action, focus on construction, and engage in multiple ways of knowing. To assist in these efforts, I have adapted some recommendations by John Shotter:

- ♦ Pay attention to one's initial attitudes or "inclinations" during interactions;
- ♦ <u>Notice</u> the thousand and one small details of our conversational activities that usually remain in the taken-for-granted background of our lives, and to raise questions about why they are important;
- ♦ Bring out the dialogically-structured or the living nature of these taken-for-granted backgrounds created in our different meetings with each other and point out some of the "hidden" social and political "interests" at work in the interactions within which such "constructions" are produced;
- ♦ Bring out the very different kinds of methods of inquiry (compared to the methods of the natural sciences, such as action research, participatory action research, and reflective practice) appropriate to the development, elaboration, and refinement of resourceful background contexts (2002, objectives section).

I recommend utilizing the concept of "X" – focusing on construction. Peters and Armstrong (1998) say that a group focuses its attention on "X", it more quickly moves to the group learning stage than by reinforcing the Type One belief about learning occurring only in the heads of individuals. Even though speaking in terms of "X" means using an abstraction to describe an abstraction, I contend that the concept of "X" is easily comprehendible much like Isaacs' (1999b) "container," and it illuminates the sphere of activity between people. Attending to what goes on in that sphere is essential to in engaging in collaborative learning. If one wishes to continue facilitating in an informal capacity, such as I did in this study, my strongest recommendation is to pay attention to one's relational stance and see what happens as one attends to the culture of the group. I caution practitioners to be mindful that the process takes time and the incorporation of collaborative learning or Type Three communication in one's organization will likely be gradual. It is also reasonable to expect that relationships will strengthen and that team members' skills increase over time. In Tennentech's case, it took nearly a year to establish trusting interpersonal relationships through which we could more easily move back and forth between types of learning. Naturally, team members' willingness to engage in dialogue is a contributing factor to a group's ability to learn together in a Type Three fashion.

It is my assertion that even if one finds his or her co-workers to be unwilling to engage in collaborative learning, the approach is worth exploring as a way of being for one's self in the world. Isaacs concluded that collaborative-based, "dialogic leadership can appear anywhere at any level of an organization. As people apply the principles they are learning to think together, and so greatly increase the odds they will build the expansive relationships required to build success in the new economy" (1999b p. 5).

Reflections on Methodology

In reflecting on the methodology of my project, I found action research to have informed and improved my practice. The phenomenological interviews were successful in generating rich descriptions of my team members' life-world experiences; however, I found that the semi-structured interview questions did not reveal the level of detailed descriptions as I had hoped. I account for this difference by my having framed the semi-structured interview questions in language with which team members were not as familiar. Specifically, I asked them to respond in terms of the elements of collaborative learning, and our company formation process. I felt that significant data pertaining to each element could have been revealed if the questions had been phrased in terms that were more organic to our group.

I did not to share my research questions with group members in advance, as I wanted to avoid biasing their actions and influence how they cast my role as a team member-facilitator of collaborative learning. Although I explained that I was studying my role and our group process, on one occasion a team member mentioned that she felt uneasy sometimes knowing that our process was part of my dissertation research. Perhaps if I had shared examples of other action research studies, I might have helped team members better understand the action research aim of studying one's practice.

Although I shared with each person the themes I found in his or her interview, during the research process I had desired to share the overall thematic analysis of the phenomenological interviews with the group midway through the data collection period. It was my desire that sharing the themes would serve as a catalyst for group reflection on our process, and for us to jointly consider ways that we might change or improve our practice. However, the urgency to complete business matters during the time immediately after I had completed the thematic analysis overshadowed my intentions of convening such a meeting.

All team members will receive a copy of my dissertation, and I will convene a meeting in which we dialogue about their reflections on my findings as well as reflecting on their understanding of collaborative learning and the meaning we have constructed during the company formation process. In subsequent action research with Tennentech, I would like to more formally engage with team members as co-researchers and jointly determine the areas we would like to improve or explore in our practice.

Recommendations for Future Research

I did not find any research in entrepreneurial literature on facilitating collaborative learning or dialogue from within one's role without the designation or status of "facilitator". Additional descriptive and systematic research into this generative way of facilitating is needed to further understand the nuances and complexities of such undertaking in order to improve upon the effort. Aspects of this approach needing further development are how a team member facilitator attends to the changing composition of a group, groups with members who elect differing levels of company involvement, and with members who do not desire to engage collaboratively with the rest of a team. Additional research is needed on the approach and perceived effect of a team member-facilitator in pre-and start-up business phases within a team where all company co-founders have prior relationship history.

Other issues to be explored are whether or not the member-facilitator feels group learning-skill development plateaus. If and when such a plateau is felt, areas to explore include the approach undertaken to increase team learning skills, the perceived effects on team learning, individual learning, business outcomes, and interpersonal relationships. Further study is needed in the process of team member facilitators who elect to shift back and forth between facilitating from within to serving an expressed role as a group collaborative learning facilitator. Issues to consider with this approach include any perceived expert/non-expert tension felt by group members and the facilitator and efforts undertaken to ease any felt tension. Likewise, an approach with two team member-facilitators should be studied to explore the process of their undertaking, the group's perception of their efforts and any effect on the group's relationship dynamics and company outcomes.

Few studies have examined the role of collaborative learning in virtual environments. Further research on facilitating from within one's practice through exclusive use of virtual communication as well when combined with face-to-face meetings would contribute to understanding the nuances, subtitles, and approaches required to co-develop and maintain the elements of collaborative learning through virtual interactions. Although this study has focused on facilitating from within a small, start-up business, additional research is needed to explore such an approach in larger organizations, as well as the role of collaborative learning facilitated internally, and through consulting facilitators, on group learning, problem solving, and decision making.

If employees and co-workers are undervalued, mistreated, or objectified within company headquarters, chances are high that supplies, out-sourced labor, customers, and other stakeholders will receive equal treatment. As a relationally responsible approach to engaging with others, research on the role of collaborative learning on business ethics and in day-to-day business activity may offer promising ways to improve corporate social responsibly and stakeholder engagement in a variety of organizational contexts.

Closing Reflection

Referring to the aims and audiences of action research described by Marshall and Reason (1994), this study proved to be *for me, for us,* and *for them.* It was *for them* in that the study contributes to the emerging field of entrepreneurial team research and provides a rare examination of a team's interpersonal process during the pre-and start-up stages of company formation. The study signifies the importance of interpersonal relationships and relational knowing within entrepreneurial teams, indicates that collaborative learning contributes to enhanced interpersonal processes and group learning, and offers an idea of how to facilitate collaborative learning from within one's own practice without formally being expressly designated as facilitator.

It was *for us* in that it responded to Tennentech's co-founder's desire to integrate collaborative ways of being in our business – to try the approach and see what would happen. It assisted in our creation of healthy interpersonal relationships and improved our collective efforts to start and manage a new venture. Since data collection formally ended, I have noticed that we continue to improve our individual collaborative learning and group learning skills. Subsequently, our relational knowing has increased, our interpersonal process has evolved and the boundaries between the core and extended team, as described during the data collection timeframe, are becoming hazy.

It was *for me* because it enhanced my practical understanding of relational ways of being and improved my professional practice as a collaborative learning facilitator and entrepreneur. Correspondingly, I feel I am more relationally responsible as a friend, community member, daughter, sister, and in a host of other roles. I am hopeful about the role collaborative learning will continue to play in increasing my self-knowledge and providing a path for co-creative, engagement with others that will enrich us all. As Bohm

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APPENDICES

APPENDIX A

DATA-DATA PHASE	GUIDANCE	QUESTIONS
DATA-DATA: **D**escribe	Describe the area of practice that the practitioner wants to improve and the situation in which the practice occurs, without attempts at judgements or reasoning.	**What** is occurring in my practice? What is the situation I would like to explore?
D**A**TA-DATA: **A**nalyze	Identify the underlying assumptions that have contributed to the present area of concern or interest and the reason for the concern or interest.	**What** is going on in my practice and **why**?
DA**T**A-DATA: **T**heorize	Formulate a practical theory for alternate ways to approach the area of interest or concern and the questions that will guide inquiry.	**What** are possible solutions to address my area of concern or problem in my practice and **why** am I selecting a particular approach(s)?
DAT**A**-DATA: **A**ct	Act on the basis of this practical theory.	**What** do I wish to find out? What are my research objectives?
DATA-**D**ATA: **D**esign	Design or identify the method and procedures for collecting data.	**How** can I find out the answers to my research objectives?
DATA-D**A**TA: **A**nalyze	Analyze and reflect on the data collected.	**What** did the data reveal about my practice?
DATA-DA**T**A: **T**heorize	Refine the practical theory.	**What** do the findings mean in terms of my practice?
DATA-DAT**A**: **A**ct	Reviewing what was learned, modify one's practice or disregard the findings; determine if a the cycle of DATA-DATA should be implemented.	Upon reflection of the findings and their implications what have I learned? **Will** I take action to cycle through DATA-DATA again?

(Peters, 2002)

APPENDIX B

Semi-Structured Interview Guide Garden Metaphor

Metaphorically, if you think of collaborative learning as gardening you would think of four interactive elements:

- Establishing and maintaining an ideal space, plot of land, and environment for the garden to grow;
- Engaging in actions to water, feed, and prune the garden;
- Considering the context of the garden such as the unique conditions of companion planting and what occurs between the two plants. Also considering that gardening actions and skills are influenced by past experiences with gardening, growing plants in general, lessons learned from others, and that there is more than one way to prepare for, grow, and harvest a garden; and
- Focusing your intent to integrate what you know about gardening from your past experiences with the growing process you're nurturing right now to understand gardening differently or in a new way.

In terms of our business:

- Establishing and maintaining the space or plot of land is like establishing and maintaining a **dialogical space**. A dialogical space is an environment that fosters trust, respect, and openness that is developed and maintained by team members.

- Actions to care for the garden are like **cycles of action and reflection** where individuals and the group looks at what we are communicating, learning, and deciding and how we are doing these things. We intentionally examine our assumptions (beliefs, rules, etc.) as we go along and change our assumptions if they are shown to be wrong or ineffective or dysfunction in the appropriateness of our actions. Through examination and reflection on our assumptions and what is and isn't working we make adjustments along the way to improve the process.

- Gardening experience and knowledge are like **multiple ways of knowing.** This is ways of knowing ourselves, others, specific data, procedures, and from within a group's unique context. It includes the idea that there is more than one way to garden, do a task, or lead a group Being open to these various ways and being willing to try things differently promises that individual's unique talents, skills, ways of learning, deciding, and leading are more likely to become a part of the group effort and that different ways of deciding, leading and so forth can be called upon as the company (or garden) situations change. It also means recognizing the uniqueness of our particular garden based on what we contribute by tending to the garden.

- Approaching gardening with the intent to do certain things in the process of gardening to create the garden and learn from the process of gardening is like a **focus on construction.** In terms of our business, this is the team's attention to what we are co-creating, such as a garden, or a business plan, a company culture, a way of working together, how to evaluate a plan, design a product etc.

VITA

Kimberly J. Naujock lives in Knoxville, Tennessee and spends her time enjoying outdoor activities, participating in the arts, working with community-building projects, and learning with others. She graduated *Summa Cum Laude* with a BS in Human Services from The University of Tennessee at Knoxville (UTK) in 1995. During her undergraduate career, she was a founding member and president of UTK's Habitat for Humanity and worked for a summer in Stein am Rhein, Switzerland. In 1993 she received the General Motors Volunteer Spirit Award and in 1995 the Chancellor's Citation for Extraordinary Professional Promise.

Following graduation, she interned at the Highlander Research and Education Center in New Market, Tennessee. Since 1932, the Highlander Center has been on the leading edge of work for peace and justice. From 1995 to1999 Kimberly worked for the East Tennessee Foundation, a non-profit, regional community foundation. Her duties included managing a grant-making portfolio comprised of undergraduate scholarship programs, a youth endowment, an arts fund, and the Arts Build Communities Program.

In 1998 she entered the Collaborative Learning Program at UTK. During the course of her graduate studies Kimberly participated in a Basic Popular Education Institute in Guanajuato, Mexico; traveled to Germany in 1999 with a fellowship to the University of Bonn's Transatlantic Summer Academy: Exploring the Evolution of NATO and the Future of Europe; and visited India (to study Eastern philosophy, architecture, and healing traditions). In addition, she co-founded and continues to work with the company described in this dissertation. Kimberly received the College of Education's Outstanding Achievement Award in Collaborative Learning in 2002.