# RESEARCH PROJECT REPORT

# Galileo Educational Network Association

## June 2003

**Research Project:** **Developing and Realizing Community within Intelligence Online (io)**

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## Statement of Purpose

This case study is designed to examine how the concept of community is developed, realized and sustained within a virtual in-service teacher-learning environment. The notion of how a virtual community evolves within a formally structured professional development environment for in-service teachers is the focus of this study.

## Research Questions

The study examines two major research questions:

1. How are virtual communities created and sustained to facilitate teacher professional development?

2. What factors influence the phases of virtual community development in online in-service teacher professional development?

## Study Methodology

Because of the exploratory nature of the study, the researcher chose a case study approach. The objective of the case study was to develop an in-depth analysis of the evolution of community within a professional development virtual learning environment. The rationale for using a case study design was on gaining a deeper understanding of virtual community as used in teacher professional development. The nature of the research problem guided the choice of research methodology that would accommodate an in-depth analysis of a 'bounded system' over time and space. The unique character of the case situation was reflected in the physical, virtual, historical, social and academic settings that influenced the development of community.

This research has been carried out in four Alberta school divisions and with Galileo employees. The study was conducted from September 3 to December 23, 2002. Ten teachers from three

school divisions, 10 mentors who were Galileo employees or who worked within the school divisions as mentors using **io** and two **io** developers who were founders of Galileo participated in the study.  Twenty-two people participated in the telephone survey that was conducted at the start of the study.  A purposive sample of teachers (n = 6) and mentors (n = 6) agreed to be interviewed to gain insight into their experiences and perceptions of community development.  Drs. Friesen and Clifford, Galileo developers, participated in an interview designed to gain insight into their experiences and understandings in terms of designing **io** and mentoring in **io**.  Online artifacts (*Private* and *Community Discussions*) have been analyzed as part of the study.  In addition, conceptual framework documents, the **io** pilot study report and articles and presentations based on **io** have all been examined.

## Overall Research Findings

From the findings, it is clear that:

1. Working online and within a virtual community are new phenomena for many educators. Developing routines using computer-mediated communication technology as part of educators' professional practices and routines has had an impact on how the **io** *Community* has evolved. Educators need to have time and need to have made a solid commitment to develop confidence working online, so that virtual community can take hold and become fully realized.

2. Designers have planned and created conditions that can foster and nurture the evolution of *Community*. Users have the flexibility to select online private and public communication tools that are appropriate for their online discussions.  Given that **io** users in the study were able to meet offline (e.g., onsite seminar days) and online, the *Community Discussion* space has extended beyond what was designed as the "community" place in **io**. The diversity of communication channels has accommodated educators at their various levels of comfort with technology.  However, consideration needs to be given to how to bring private and onsite discussions into the online *Community* for the benefit of the larger community.

3. Educators experience a new role when working in the collaborative, collegial space in **io**. As educators share their work and interact within the **io** *Community*, they begin to move their work and their thinking into a public forum. The promotion of a positive and trusting atmosphere that encourages educators to work collaborative is occurring within **io**.

4. The rich and purposeful discussions that are occurring onsite and online are contributing to the evolution of the community. The professional and academic nature and tone of discussions, based on inquiry-based projects,  have established a nurturing climate within the **io** *Community*.

5. The importance of community needs to be made explicit to all **io** users at the beginning of their **io** experience.  Users need to have opportunities to discuss and develop their understanding of the value of community.

6. The initial experiences of educators with **io** need to provide opportunities and strategies for educators to develop acquaintances online. Participants need to get to know other **io** users, not just connect with people they already know. Developing acquaintances online assists educators in making connections and interacting with other educators with whom they share common interests or disciplines. This enables greater interaction leading, hopefully, to richer connections within the community.

7. Intentional strategies and techniques need to continue to be used to foster interdependence and interaction among community members for the purpose of developing social bonds.

8. For community to evolve, there needs to be shared responsibility and leadership among community members. This is important for the continued development of the online social presence of both mentors and teachers, who share mutual responsibility for the evolution of the community.

9. Educators need to understand that their commitment is both to their own personal and professional advancement and to the enhancement of the larger community. Through their commitment, participation and interaction, they will develop an identity as members of a community of practice. For community to be sustained, there must be an enduring commitment to the community.

## **Report Format**

Part I          Overview of the Galileo Education Network

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Part III        Two Concepts - Community and Virtual Community

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## **NOTE:**

**The io case study reported here is one of three case studies which appears in the researcher's doctoral dissertation entitled *Virtual Community Development and Sustainability* from the University of Calgary, Calgary, Alberta.**

**Part I:  Overview Of Galileo Educational Network**

The Galileo Educational Network Association (GENA) is a "professional development and research initiative focused on the fundamental changes to teaching, learning and staff development that information and communications technology both requires and enables" (Galileo Educational Network Association, n.d., p. 1).  This organization is focused on new ways of teaching and learning that deeply engage students in work that is personally relevant and academically rigorous.  GENA supports this work within a cross-curricular environment, within which technology is one of the vital curricular areas.  GENA helps support teachers in creating and designing inquiry-based projects where technology functions as an enabler in fostering engaged student learning.

As a transformational leader in implementing Information and Communication Technology (ICT), GENA strives to achieve its mandate through four target areas: *leading and learning; capacity building; effective integration of technology* and *research and development* (Galileo Educational Network Association, n.d., p. 1).  Galileo is able to provide "systemic, systematic and sustained*"* (Galileo Educational Network Association, n.d., p.1) services designed to meet individual requests and the needs of particular schools and jurisdictions.


**Part II: Overview of Intelligence Online (io)**

Intelligence Online (**io**) is an online professional development and teacher planning service offered by the Galileo Educational Network Association in partnership with Axia NetMedia.  Clifford, Friesen and McNicol (2002) describe it as a "complex learning and planning environment that has no counterpart in applications currently available.  It is neither courseware nor a learning management system" (p. 2).  As a personalized teaching and learning environment for teachers, it has been designed to:

1. Help teachers focus on teaching and learning by designing and implementing inquiry-based learning experiences for students;
2. Improve students' performance and the quality of their learning experiences through more responsive pedagogy;
3. Create a supportive environment for changes in teachers' thinking and practice;
4. Provide teachers with the knowledge, tools and support necessary to integrate teaching, learning and technology;
5. Develop teacher and student fluency with technology through a culture of use rather than through a direct focus on technology;
6. Create a professional learning community (Clifford et al., 2002, pp. 2- 3).

This web-based teaching and learning environment consists of three components.  First, ***Projects*** provides users with access to an inquiry-based project planning process. Users can also access the *Project Tour* that gives an overview of the whole planning process. Projects can be shared with other **io** users and can be archived.  Second, ***Community*** provides users with access to four features: *Private Discussions*, *Community Discussions*, *Participants* (list of all **io** users) and *E-*

*mail an Expert*.  Third, **Resources** consists of four sections: *What's New, Learn More, In*vited *Projects* and *Example Projects*.

*Community* is a structural pillar of **io**.  The purpose of this community-based environment is two-fold:  interaction with experts and provision of a forum for collegial interaction directed to enhancing an inquiry-based, e-learning environment.  In **io**, *Community* gives participants access to both public and private asynchronous online discussions forums.

### Part III:  Two Concepts - Community and Virtual Community

What is a community?  Shaffer and Anundsen (1993) define community as "a dynamic whole that emerges when a group of people:
- participate in common practices;
- depend upon one another;
- make decisions together;
- identify themselves as part of something larger than the sum of their individual relationships; and
- commit themselves for the long term to their own, one another's, and the group's well-being" ( p. 10).

Community is not a product or entity that can be built.  Rather, it a process that is organic in nature.  Kowch and Schwier (1997) state, "Communities are collections of individuals who are bound together by shared ideologies" (p. 1).  A community evolves through cultivating personal interaction and nurturing conditions for growth.  It  "requires a highly interactive, loosely structured organization with tightly knit relations based on personal persuasion and interdependence" (Kowch & Schwier, 1997, p. 2).  It depends on relationships and the building of relationships.  Rovai (2002) found essential elements of community to include: "mutual interdependence among members, sense of belonging, connectedness, spirit, trust, interactivity, common expectations, shared values and goals, and overlapping histories among members" (p. 4).  The growth and longevity of a community are directly related to the community meeting the needs of members.

Jonassen, Peck and Wilson (1999) acknowledge several variations of the notion of community.  In their examination of community, they identified communities of discourse, communities of practice, knowledge-building communities and learning communities.  Each of these is unique, yet all have common characteristics. According to Jonassen, Peck and Wilson (1998), a learning community, is unified by a  "common cause of mutual support and learning, and by shared values and experiences…Learning communities provide a means for learning within an atmosphere of trust, support, common goals, and respect for diversity" (p. 4).  George Pór (2000), Community Intelligence Labs, describes a community of practice as "more than a 'community of learners,' a community of practice is also a 'community that learns.' Not merely peers exchanging ideas around the water cooler, sharing and benefiting from each other's expertise, but colleagues committed to jointly develop better practices" (p. 2).  Wenger (1998) claims, "Mutual engagement in a shared practice can thus be an intricate process of constant fine tuning between experience and competence.  Because this process goes both ways, communities of practice are

not only a context for the learning of newcomers but also, and for the same reasons, a context for new insights to be transformed into knowledge" (p. 214). With both communities there is an emphasis on cognitive and social attributes associated with a group of learners in supporting and fostering cohesiveness in the community. The community is supportive in drawing and keeping people together in serving common purposes and meeting common goals.

Virtual communities have existed from the inception of the Internet through such things as listservs and newsgroups. The multiple modes of interactive communication technology now available provide diverse online interactions (one-to-one, one-to-many, many-to-many). This diversity allows designers to create learning environments that give users flexibility in the type and nature of online communication tools they can use to meet their needs and to facilitate the evolution of the community. Riel (1996) argues that it is not technical tools that define community; rather, it is the partnerships and interactions among those who come together that define community.

The online gathering place mediated through technology needs to be supportive of the purpose of the community, as well as meeting the needs of users. The technology needs to permit each of the following conditions to exist in a virtual learning community: *negotiation, intimacy, commitment*, and *engagement* (Kowch and Schwier, 1997). What is pivotal in the online community is communication. Schwier (2001) states, "Communication acts as the most important catalyst in virtual learning communities, where it spawns interaction, engagement and alignment among members of the community…When communication ends in a virtual community, that community abruptly ends" (pp. 8 – 9). Appropriate and effective communication within the virtual community is essential if the community is to evolve.

Designing, developing and nurturing virtual community is a matter of laying the groundwork in the creation of a dynamic learning culture. With the expansion of e-learning in a knowledge era, the potential of online learning communities and/or online communities of practice can be realized if embraced by educational stakeholders. As educators embrace a culture shift, the power of community will grow and synergy within community can be realized.


## Part IV:   Research Design

### Introduction

This is a naturalistic exploratory study designed to understand the existence and operation of virtual communities used for teacher professional development. The case study approach is proposed to capture the experiences and perceptions of virtual community participants.

### Purpose of the Study

The study has been designed to examine how the concept of community is developed, realized and sustained within a virtual in-service, teacher-learning environment. The notion of how a virtual community evolves within a formally structured professional development environment for in-service teachers is the focus of this study. The study addresses two major research

questions:

- How are virtual communities created and sustained to facilitate teacher professional development?

- What factors influence the phases of virtual community development in online in-service teacher professional development?

The following, more specific, questions have guided the study:

- How do online participants develop and sustain a sense of community within teacher professional development opportunities?

- How do members of a virtual community recognize and interact with their environment as a community?

- How do online facilitators initiate and sustain a sense of community within an online learning environment?

- How does computer-mediated communication facilitate the creation of a virtual community?

- How does a virtual community shape its own evolution?

## Significance of the Study

As more and more courses and professional development opportunities migrate to online delivery mechanisms, it is important to study the dynamics and the development of virtual learning communities. Appropriate and effective strategies and techniques need to be used to engage participants as members of a community of learners.

## Data Collection

For the study, the researcher gathered data using five data sources: telephone survey, semi-structured, observations (e.g., field notes), documents (e.g., conceptual framework documents, **io** pilot study report, conference presentations and **io** inquiry-based projects); and media materials (e.g., e-mails and asynchronous messages posted in the **io** *Community*). Using multiple sources of information enhances the trustworthiness of the information.

Data collection was from September to December 2002. Data was collected from initial online observations and from a telephone survey of all study participants. In the telephone surveys, all participants were asked to provide general demographic information, a description of their computing skills, computer-mediated communication experiences and reasons for accessing **io**. They were asked to describe their understanding of community, learning communities and virtual communities. A purposive sample of participants was interviewed on two occasions during the study. Questions were designed to investigate each participant's **io** experiences, perception of

community development and sustainability and factors that influenced their membership in the community.  Participants' online artifacts have also been analyzed as part of the study.

**Data Analysis**

Data gathered from the telephone survey and from interviews have been analyzed using the process of coding to find patterns and emphases that existed across the interviews and among the various groups.  The constant comparative method of data analysis was used for the purpose of creating categories.  Data was then broken down into categories and subcategories.  These categories establish the framework for discussion of the findings.

Descriptive and reflective field notes were gathered and examined as part of the study.  Field notes recorded the researcher's online observations. Notes were also taken when the researcher attended Galileo Extended Team – Collegial Support Network meetings and classroom observations.   One teacher, who had created an inquiry-based project using **io**, invited the researcher to observe the learning environment that was an integral part of the work created using **io**.

Artifacts such as conceptual framework documents, **io** pilot study report and conference presentations and articles based on **io** have been examined in the study.  They have been used to develop a foundation of understanding in terms of the philosophical underpinnings of **io** and to cross reference information gathered through the interview process. Information gleaned from the analysis has provided greater insight into GENA and Axia NetMedia's beliefs about professional development and how **io** provides educators with knowledge, tools and support that foster their professional development. In addition, **io** inquiry-based projects created by teachers and shared with the researcher were examined in the data analysis.

Asynchronous communication, including e-mails and **io** *Privat*e and *Community Discussions* were examined. The frequency and the purpose of online participants' interactions were also noted. The participation and interaction section of McKenzie and Murphy's (2000) adaptation of Henri's (1992) model for the evaluation of online discussion groups has been used to analyze the **io** *Community* and e-mail communication.  This model has provided a structure for classifying and measuring online participation and interactions.  Participation has been categorized according to the level of participation (e.g., number of messages), the structure of participation (e.g., time of posting, subject of the posting) and the type of participation (e.g., content, social, administrative or technical). Interactivity has been examined in terms of explicit and implicit interactions and independent responses.

**Participant Profile**

     **Demographics**

A purposive sample of participants was selected from three groups of professionals directly involved in **io**. These were online mentors, in-service teachers and Galileo instructional designers and developers, who also worked as online mentors in **io**.  The study involved eight female and two male teachers (n=10), seven female and three male mentors (n=10) and two female

developers (n = 2). Teachers and school division mentors were members of four Alberta School Divisions (three rural and one urban) who gave permission for their personnel to participate in the study.

Ten teacher participants had between 5 and 30 years of teaching experience. One of 10 teachers taught at the secondary level. Three teachers had participated in the **io** pilot test. Eight of 10 teachers had a previous working relationship with the Galileo organization in a face-to-face mentoring environment. Four teachers had worked with Galileo for two to three years. Four teachers had worked with Galileo for a minimum of one year. Two teachers, were in their first year of working with Galileo.

For the purpose of the study, mentors have been defined as Galileo employees who worked as mentors or school division lead ICT teachers who have accepted responsibility for mentoring using **io**. They are members of the Galileo Extended Team - Collegial Support Network. Mentors have from a few months to four years of experience working within the Galileo organization. Two **io** Galileo developers, Dr. Sharon Friesen and Dr. Pat Clifford, each had over 20 years of teaching experience and were in their fourth year as Galileo educational consultants.

All mentors were aware of or used the beta version of **io**. Four mentors and two Galileo developers participated in pilot testing **io** in Spring 2002. Two school division ICT lead teachers, who began **io** mentoring in the Fall 2002, were not involved in the pilot test but had access to the beta version and a hard copy of the **io** inquiry-based project planning document. Fall 2002 gave them their first experience working in **io**.

Of 12 mentors, six identified themselves as participants and mentors within **io**. Four indicated that they had developed their own inquiry-based projects using the **io** planning process. Two identified themselves as only mentors. The two developers identified themselves as being both developers and mentors.

### Reasons to Use io

The mentors identified several reasons why they were using **io**. Intelligence Online enabled mentors to leverage their time, to be more effective in working with teachers by generating learning opportunities, to facilitate teachers in creating their own inquiry-based projects, to assist teachers in accessing expertise and to help teachers connect with other people. One mentor commented that being employed by the creators was a reason why she had access **io.**

Two mentors referred to **io** as being a "place" to work. One individual described it as follows:

> "I believe my initial idea was to see if it was significantly different or better than other things I have used in the past. Although, I think I have found out it is not a tool in the sense of being an application. It is more of an environment for planning would be the way I would describe it now. I guess the second reason would be to try to create something within that environment and to use in a way that it is hopefully intended to be used."

Ten teachers identified four reasons why they had decided to use **io**.  First, using **io** gave them an opportunity to work with and integrate technology into their teaching environments.  Second, previous positive experiences working with Galileo on other projects had influenced them to use **io**. Three teachers described their work with Galileo as having a positive impact on their teaching practice and indicated that using **io** would benefit their teaching and their students learning. Third, three teachers were approached by their school administration or by a Galileo person to use **io**.  Fourth, two of three participants involved in the pilot test had proceeded with their own projects. One teacher gave this explanation for why she chose to use **io**:

> "Three years ago I got involved in Galileo working with Pat Clifford and Sharon Friesen in my classroom. Totally, totally into what they were doing and how they were thinking, how what we could do to get to a level of understanding rather than just teaching them the basics.  **io** just seemed to be the next step in that journey of learning."

### Computing Experience

In the study, 16 of 22 participants had more than five years computing experience. Six had more than one year, but less than five years of computing experience.  All participants indicated that they had used software applications, such as word processing, databases, spreadsheets, graphic organizers, multimedia applications, HTML editors, e-mail, listservs, and computer-mediated communication applications such as Community Zero, NetMeeting, Manhattan Virtual School and WebCT.

At the start of the study, 5 of 10 teachers rated their competency in using e-mail, online discussion forums, listservs and chat features as being of a high level. One person rated herself as being very experienced using these items. Two teachers rated their competency as being of a moderate level.  Two teachers indicated that they had limited experience and one teacher noted that she had either no or very limited experience with such computer-mediated communication. This person commented that it was only in the month prior to the telephone survey that she had learned how to do e-mail and e-mail attachments.  In contrast, five mentors rated their competency using those applications as being very experienced.  Three mentors rated their competency as being of a high level and four rated their competency at a moderate level.  One Galileo mentor rated her competency as being at a high level, but with limited experience.  This person explained that she would rate herself as high with some applications, but since communicating in an online community environment was new to her, she rated herself as having limited experience.

As with competency, there was an array of responses in how teachers described their level of comfort in an online environment.  Four teachers rated their experience as very comfortable, three claimed a high level of comfort, three rated it as at a moderate and two rated their comfort level as being somewhat uneasy.  When asked to explain why they selected a particular descriptor, a number of responses were given. Some teachers indicated that they were still learning to use computers and the Internet in their personal and professional practices. For other teachers, technology was becoming an integrated component in their daily activities.  The following teacher quotes capture their thinking around their use of technology:

"Through experience, through daily learning. The more I learn, the more I realize I can do, the more I realize I can do the more I do."

" I think because of the willingness to make mistakes and because of the success I have had in the past with anything with technology."

" It is something that is integrated into our everyday activities with our staff, our colleagues, with our students and at home. It is just an everyday thing."

"It is coming second nature now. It's what I do. I check my e-mail everyday."

In comparison, 8 of 12 mentors rated their comfort level as very comfortable. Two rated their comfort as being high and two rated their comfort level as moderate. One mentor rated her comfort level as uncomfortable. She noted that she felt comfortable using Internet and e-mail, but the fact that she had not used the online chat feature left her feeling uncomfortable. Mentors stated that they have used online environments for such professional and personal reasons as publishing, communicating and for business purposes. They also showed an appreciation of working in an asynchronous, online environment, because it gave them time to reflect and to compose more thoughtful messages. Four Galileo mentors described their comfort level using an online environment as:

"It is where I live. I use it personally so much it is part of my personal life and then it is part of professional life."

" It is like a method, my communication method of choice… Totally comfortable."

"…to me it is like talking to the person face-to-face."

"Just because of familiarity of use. I like the extended time to contemplate and dialogue. To do what I need to do – it can be a fast dialogue. It just puts me in control when I respond and the extent of the type of contemplation that I want to put into the response. It is for me more learner driven."

### Access to io

All participants in the study received access to **io** through an **io** license. By September 30, 2002, 176 out of 202 **io** licensing orders were activated **io** accounts. A licensing order was defined as a license purchased, for which users had not self-registered to activate the account. By December 31, 2002, there were 257 activated accounts out of a total of 312 licenses. Of the four school divisions participating in the **io** case research, there were 177 activated accounts from a total of 288 orders (R. Feighan, personal communication, February 6, 2003).

Each school division had a different start date for their teachers to be able to access **io**. Three of four school divisions hosted an onsite meeting with Galileo mentors and teachers, who were interested or who had been selected to use **io**. The fourth school division did not have an onsite **io** launch event. At the onsite launch of **io**, mentors provided an overview of **io,** gave teachers

opportunities to begin working in **io,** and encouraged the use of the *Community* feature of **io**. The initial onsite meeting provided a forum for teachers and mentors to meet and to get to know each other in a face-to-face situation, prior to moving into an online communication environment. The researcher attended the onsite **io** launch event in three of four school divisions.

## Part V:   Research Findings

Information gathered from the telephone survey, interviews and the examination of archived online work from mentors, developers and teachers has been classified into seven categories:

- Design and implementation of **io**.
- Perceptions of community.
- Participants' initial **io** experiences.
- Follow-up on participants' **io** experiences.
- Online interaction and participation.
- Community building.
- Insights and understandings of a virtual community.

### Design and Implementation of io

#### Goals and Objectives

Drs. Friesen and Clifford, the Galileo **io** developers, identified three majors goals to be pursued by **io**. First, they wanted to "influence thinking about inquiry that would shift people's awareness and their practice in directions that we think are better for kids." Drawing from research literature, they found evidence supporting inquiry-based thinking and learning using digital technologies as critical factors in education for a knowledge era, rather than for an industrial era. Second, from their own classroom experiences, validated by research literature, they identified attributes supporting high quality professional development. They determined which elements could be put online to extend their Galileo onsite work. Third, Dr. Friesen noted that they wanted to "make the work of Galileo sustainable and also scaleable." Their work became an ecological approach, where they sought to increase the capacity of individual educators in school divisions, without Galileo having to build a larger human resource base. They wanted to keep themselves "small and flexible," to remain on the cutting edge, without getting caught in a replication scenario. They began exploring online options, working from the foundation of their "development work." Both developers believed that their goals and objectives were being realized.

#### The io Development Process

In 1999, GENA "sought a corporate partner with high quality technology expertise to explore innovative design and create a rich, inquiry-based professional learning community" (Friesen, Clifford, Saar  & Gladstone, 2002, p. 1).  GENA and Axia NetMedia share a "commitment to finding innovative ways to foster an inquiry stance in integrating digital technologies into

classroom teaching, student learning and in professional development" (Friesen et al., 2002, p. 1). In May 2000, Galileo Network began to work with Axia NetMedia. In February 2001, GENA and Axia NetMedia formed a partnership for the creation of an online Center for Excellence in Technology Implementation called Intelligence Online (**io**).

Axia NetMedia's KEDG (Knowledge Expert Development Guide) process was used in the initial phase of development. The KEDG process "provides a means of focusing the efforts of diverse (and usually large) teams on establishing and accomplishing common goal" (C. McNicol, personal communication, April 4, 2003). The process has been an efficient and effective way to "harvest the knowledge" of the Galileo subject matter experts. Galileo developers have worked through a series of questions designed to flesh out their "tacit knowledge and make it explicit." The harvesting process occurred through successive iterations over eight months. The questioning process cored down into "what the *right* things were to do in supporting teachers as they learned how to use technology effectively in classrooms" (Friesen et al., 2002, p. 17).

It was through the KEDG process that the two partner organizations began to identify and determine how to transfer this knowledge and to develop ways of working with educators in an online environment. Friesen et al. (2002) indicated that Axia NetMedia translated "what was right in face to face to what was possible in an online environment" (p. 1). They also stated that the "established purpose of **io** was to provide teachers with the knowledge, tools and support necessary to integrate teaching, learning and technology" (p.2). It took 22 months to design and build **io.**

According to Friesen et al. (2002), **io** is a personalized environment, where

> …teacher knowledge is not delivered; it grows in unpredictable ways because teacher-learners move through this e-learning space according to their needs, intentionally connected to others. Participation in the space makes it grow for participants, over time and through their use and interaction. For each learner, the space becomes what it is because each learner uses it in the ways that make most sense to them (p. 4).

One developer stated that they wanted an "instructional design that was deeply interactive, so in the way that as we worked with teachers, that was really personal. We wanted something that got at helping teachers to create tasks." They did not want to duplicate an online environment that modelled an instructional-design course environment. They dismissed this type of thinking as they worked from a studio metaphor. The developers "wanted an instructional design process that was a studio design process." The inquiry-based design approach used in **io** is to model what the developers want teachers to do as they work with students through inquiry-based learning.

### Community

From the developers' data, two critical issues were identified as having influenced the **io** learning community philosophy. First, the developers did not want **io** to replicate an online course delivery model where people come together for a specific purpose for a set period of time. Dr. Clifford remarked, it "is absolutely crucial that in e-learning environments, we begin to explore how people can come together in community." She argues that the isolated classroom of the industrial

model needs to be broken down. With digital technologies, people are able to collaborate across time and geographic locations around complex problems. According to Dr. Clifford, the developers were more interested in the question of how to introduce teachers to "the very notion that they can work with one another" and move to a learning situation where colleagues work face-to-face or online sharing their work, brainstorming together and sharing resources. Friesen remarked that it is "the tone, the ability to share and collaborate" that is needed to foster a learning community. Second, shifting teachers' work into a public and collegial work paradigm requires teachers to value their purpose and to be committed to working within the new paradigm. One of the challenges faced by the developers has been that "having a community discussion place doesn't mean that people are going to use it and to know why they should use it or to see any benefit from it." For people to be committed members of a community of practice requires "people to see this as part of their work life."

Friesen had been observing the evolution of community in **io** and was pleased with the "quality of conversations." She stated that the design nurtured the "truly professional conversations with people who are trying to work things out." She has found that initially people asked questions such as "'I'm teaching this project and I need some help, or has anybody got some ideas, or what matters about this?'" Now she finds people posting messages that say, "'Here's what I've done with this and here's how this works.'" She has noticed the transition from people reaching out for help to people coming together in community.

Friesen acknowledges that the developers purposely designed the *Community Discussions* interface so that users could enter into a discussion on topic (e.g., in *What Matters* a person may decide to enter the topic of *Identify a Topic*). The developers did not want the discussions in *Community* to degenerate "to personal-type things or just school...things like supervision." Both developers also wanted to quickly establish their presence in the *Community* to effectively set the tone. Friesen is pleased to see that the tone of discussions remained as they had established it. She noted: "Both at a personal, but at a very professional level people saying, 'You come here because you want to learn how to teach better and you want to feed your own inquiry.'"

### Implementation of io

At the time of the developers' interviews, **io** had been in operation for three months. The developers, also acting as mentors, had begun working with Axia NetMedia to plan **io** upgrades. The developers identified three issues that needed to be addressed in the upgrade. First, the current version involves a step-by-step process, which does not allow users to advance to the next planning step until they have worked through the preceding step. Developers have noted that **io** users, who have worked through the process, are asking for an unguided version of **io**. One of the reasons why the developers did not include an unguided format in the original version was that it would be easy for people to assume that they actually understood the thinking behind the inquiry-based project planning process. The developers wanted to ensure that the **io** planning process would "in fact cultivate the mindset that they wanted to have in teachers working in this manner."

Second, both developers noted a concern that **io** is "text-intensive." They appreciated suggestions that they incorporate a more "media-rich environment." As a result, the inclusion of video and providing visual examples as ways of augmenting the materials was currently being examined.

Third, **io** users have requested a space where they can reflect on their projects, consider what is going on in their work and record their personal reflections.  Teachers have asked for this space because "the environment envelops you as a teacher," it moves along as the teachers develop their ideas, and there needs to be somewhere in the process for them to record their thoughts. One developer was surprised by the request. She assumed teachers would use a word processor to record their reflections and keep them on their own computers, rather than wanting to have their reflections as part of the planning process recorded in their **io** *Project* space.

### Disengagement

The developers have not created a process for members to disengage from the **io** community.  As founders and developers, they have been more conscious of marketing **io** both to school divisions and to individuals. Their preferred thinking is around "'what are the conditions that make continued engagement inevitable?'"  At present, there is neither a formal nor an informal disengagement process in place.  If **io** users decide to terminate their work in **io**, their projects are archived.  Their information may also be placed on a CD-ROM, in which case, if the person returns to **io,** his/her information and personal profile can be uploaded to the **io** server.

### Challenges

The developers acknowledged four challenges they have confronted in the implementation of **io**. First, users of **io** need to be committed to being members of a community of inquiry.  Friesen observed that she was beginning to see educators taking up "each other's questions and issues and start to build on it." As people used **io**, they saw the community coming together.  The other developer noted that she would like to see people "talking directly with one another and not through" the mentors.  She would like to see people finding ways of using the community that the developers had not imagined and that, as a result, the developers could assume a lesser role.

Second, Galileo mentors play a crucial role in **io**.  As mentors, they too are learning and finding their way.  Dr. Clifford stated that, as developers and mentors, they need to encourage people to "pick up the discussion on their own and yet we're also recognizing that's not going to happen without our feeding the conversation." However, she was conscious that feeding the conversation should not result in musings for Galileo staff and not for all **io** users.   Striking a balance between participation, prompting the conversation and encouraging teachers to have their voice heard in directing the online conversation is an important factor.

Third, the shift from onsite support to online inquiry-based planning support has had an impact on some teachers.  Prior to the implementation of **io**, Galileo mentors worked onsite to provide coaching and mentorship to classroom teachers.  Online support was available and used, but not to the degree that it is used with **io**.  One developer noted that there was resistance to using **io** by some teachers, because they wanted a mentor working onsite.  What she has found was that mentors were instrumental in helping teachers plan the *What Matters* part of the process.  What she observed was that **io** users who did not have a prior face-to-face teacher-to-mentor relationship find **io** to be an "incredible environment."  She had expected to spend more time with new people in **io,** showing them and justifying the process. In fact, the reverse occurred. She

observed that there needs to be in place a process for the transition from onsite support to online support.

Fourth, along with this transition to working online, with teachers having greater ownership of projects, teachers raised an issue relating to the project web site. When working onsite in the past, Galileo mentors were influential in creating "pretty jazzy looking" web sites for projects. However, the default **io** publishing project web site is plain. Although they are informed that they can be creative with their own sites and cut and paste **io** information into it, teachers are disappointed. Since the implementation of **io**, the expectations of **io** users have changed in comparison to what occurred with onsite coaching. The nature of interaction between teacher-mentor and teacher-teacher has changed and these changes have met with some resistance.

### Perceptions of Community

In their definition of community, 22 participants used descriptors such as: people working together for a common purpose or goal, people using their strengths to assist in developing something better than what can be done individually, interdependence, an environment that is supportive, non-threatening and allows the exchange, negotiation and testing of ideas, and listening and working together for the good of the individuals and the whole group within the community. Two participants have described community in the following manner:

> "I would see community as really a collaborative work space...that is non-threatening. It is a place where you can discuss issues and get feedback from individuals that you respect... A place where you can test your own ideas. A supportive environment. It is a place where everybody comes together and has a responsibility to contribute."

> "A group of people who are interdependent. They need one and other in order to accomplish something what they could not do at the same depth or by themselves. People who care for one another and care about what happens to another. Not just rubbing opinions back and forth. But it matters to them and this person. To be heard in the community. "

The 22 participants were asked to define a learning community. In their responses, they saw a learning community as a community focused on investigating problems and issues that are of mutual concern. They saw a sharing of information, an exchanging of ideas and an engaging in dialogue. What occurs within the community is the "building upon shared knowledge," contributing to that knowledge and developing new understandings. Building relationships is important for this learning to occur. For one participant, a learning community involves "like minded people working toward a common goal." One mentor described a learning community as a "place where you come to interrogate ideas and ask questions, problem solve together." A teacher noted:

> "… one of the purposes would be the whole realm of learning. People helping each other to be the best they can be and helping them sometimes with positive talk and showing them other ways, in mentoring in all facets with respect and trust being paramount."

Twenty-one participants perceived a virtual community in terms of technology-mediated communication and the connectedness and the purposefulness of the community. Technology allows people to get to know one another. Both synchronous and asynchronous digital communication media are used to facilitate the existence and the continuous development of the community anywhere and anytime. They described it in such terms as not being bounded by physical space or geographic location. One participant explained it as, "…we connect at different times and live in different places but we are united in community because of the connectivity that the digital world gives us." In contrast, another participant did not differentiate virtual community as being something new or different. She compared it to what occurs when a group of people meet to have a book talk. As a group, they talk about their virtual experiences through the medium of the book. For her, virtual community "is just another conversation group, another learning group and it happens to be online."

Eleven of 14 participants indicated that their perceptions of virtual community had changed from the start of their using **io**. They explained that their experiences before **io** were based on online course environments, e-mail, discussion forums, text-based chats and listservs. One participant was concerned that the **io** *Community* would "turn into a diluted spaghetti string kind of stuff that's indicative of most educational discussion groups." From their **io** experiences, participants found that their perceptions of virtual community had changed in terms of understanding that it can be a resource package, it can provide access to experts and it can be an avenue for their "own personal and professional development." One participant noted that **io** was a "professional development environment and that's a significantly different thing than a discussion or a chat room." A second participant remarked:

> "It is a place of teaching and learning, an environment where there are like-minded people that are thinking similar things to what I'm wondering about…it's allowed me to really explore some of those things that I maybe don't have the opportunity to do within a school of only 30 teachers because now my environment for that has really grown."

Two people indicated that their perceptions had not changed and one person was undecided. One participant noted that the critical feature of a virtual community is interactivity. People need to be asking questions and not be simply online observers. This individual perceived **io** as a "hustling and bustling little community." The participant who was undecided commented that one factor that needed to change was to "de-privatize the community more." From this person's experience with other online applications that foster a community of learners, he felt that people need to enter the virtual community with a new mindset, one that is not trapped by antiquated regulations and copyright issues. Rather, the virtual community needs to be "public and visible."

**Participants' Initial io Experiences**

### Strategies for Becoming a Community Member

At the start of the study, participants were asked how they would become community members. The teachers noted that it was a matter of interacting and observing the online discussions with mentors and other teachers around topics or questions of interest. One teacher noted that observing what others are doing, thinking about and discussing issues, provided insight into how she could incorporate those elements into her own practice. In **io**, they had the ability to invite people to view their projects, to participate in private and public asynchronous online discussions and to communicate using e-mail. Being able to talk with other people about their projects was one vital strategy in becoming a community member. The collaborative aspect of **io** was an appealing feature.

Mentors planning to become community members needed to have a virtual presence in *Community* and to be able to assist teachers in becoming familiar with and comfortable with **io**. Mentors needed to "enter into conversation with the people who are in there and keep the conversation going" in *Community*. One mentor described how he has been involved in *Community Discussions* and has participated in *Private Discussions* both as a host and as an invitee. Another mentor noted that she logged into **io** "everyday and sees if anybody else added anything to the discussions."

Drs. Clifford and Friesen were participating in and monitoring the discussion. Their work in community was now based on coaching and mentoring both mentors and teachers. They were at the stage where they were "cheerleading some of the process." They had set up discussion groups, participated in and monitored discussions. They were making sure that things were moving along and that people were receiving meaningful responses to their questions.

### Mentors' Initial io Experiences

In interviews at the end of October and early November, six mentors indicated that they had been involved in face-to-face and onsite large group meetings with teachers at the launch of **io** in various school divisions. Two mentors noted that, on three occasions in onsite meetings, they had worked with a group of teachers from one school division, where teachers were working on their projects.

At this time, mentors noted their being invited by teachers to view projects designed in **io.** Projects ranged from developing beginning ideas, to working through *Learning Matters* to the development of rubrics. One mentor had been invited to view six projects. A second mentor had been invited to view 45 teacher projects, of which 75% were at the elementary or junior high school levels. Of these projects, 80% were in the *What Matters* stage of the planning process. A third mentor noted that she had been invited to view 59 projects. Being invited to view projects enabled mentors to monitor the ongoing development of the projects.

The mentors indicated that some teachers had developed and implemented projects using the **io** planning process. One mentor was aware of three projects that had been implemented. One reality in **io** is that teachers are able to create projects without anyone knowing of their project work, unless that individual is prepared to share the project with teachers and mentors.  Mentors could encourage teachers to invite them to view their projects, but ultimately teachers decide what they would share with mentors.

At this stage of implementation, the major goals and objectives of mentors were to introduce teachers to various **io** features and "to begin to support them as they first venture into **io**."  One mentor's goal was to have teachers begin  implementing projects they had designed.  A second mentor commented that her goal was for teachers "to transform their teaching" as a result of their **io** work.

The researcher found that having access to **io** did not necessarily translate into people using **io** to design projects.  She noted that mentors needed to motivate teachers, without turning them off their work.  One mentor stated that, during the piloting of **io,** she discovered what she called "positive pressure."  She found that leaving people on their own to use **io** led to them drifting along in their work.  Yet, giving teachers due dates and defined timelines, without considering their personal and professional commitments, might have a negative impact on their motivation and on their completion of **io** work.  She noted, "You've got to put yourself in those teachers' shoes and you've got to think what's going to work for the majority of them."  The mentor decided to use an approach of suggesting that, when they complete **io** projects, teachers might take time to look at their projects at the next onsite meeting of teachers and mentors.  This, she felt, would encourage other teachers to complete their projects.   Although teachers within her school division are to create two projects during the year, they do not have defined due dates for the completion of their work.

#### Mentors' Online Communication

In addition to viewing projects, mentors continued talking with teachers face-to-face in the schools and online through e-mail or **io** *Community*.  One mentor commented that at the beginning, a lot of work occurred within the projects and then, for the past few weeks, she found that "nothing really happened."   She found that it was a matter of waiting to be invited to view teachers' projects.  A second mentor noted that it is difficult to stand back and wait for teachers to come to their mentor, either seeking information or sharing their projects.  A novice mentor noted that it was "quite a learning curve" to mentor in **io**. This mentor found that you mentor in two contexts.  First, teachers invite mentors into a discussion about their ideas.  Second, teachers share their projects with mentors.  As a mentor viewing their work and discussing their ideas, it took time to formulate appropriate responses. The element of ownership and the teacher's vested interest in the work were at stake. Mentors found that they had to think carefully about the wording of their responses in order to honour the work and move the work and related ideas to the next level without discouraging teachers.  It was important to keep the lines of communication open.

At the first interview, it was found that the working relationship between mentors and teachers emphasized face-to-face interaction and private online communication.  Mentors noted that their

regular visits to schools and large group meetings or seminar days with teachers provided face-to-face opportunities for mentors and teachers to work together.  One mentor explained that she communicated online with people she had met at the school division launch of **io** or with people who knew her.  She has not mentored someone that she did not know.  She believed that the "face-to-face is what leads to **io** being successful, so you have a really exciting conversation and then everyone has time to go off on their own and think about it and then input their information into **io**."   A second mentor commented that the reason she had been invited into a large number of projects was that she began working with teachers in face-to-face situations.  In these situations, both mentors and teachers have been able to establish relationships through physical presence and verbal communications that could be continued and extended online.

Mentors followed up face-to-face meetings with e-mail or private, asynchronous online discussions.  Four mentors discussed how private, online communication, either through e-mail or through **io** *Private Discussions,* at this time, were more prevalent than public *Community Discussions*.  One mentor noted that teachers she worked with had all shared their projects with her and that she had been in contact with them. She observed that half of those teachers had been involved in *Private Discussions*.  Fewer than half of that group had engaged in *Community Discussions*.  For teachers, the ability to control whom they invite into *Private Discussions* is a positive attribute.  A second mentor observed that teachers needed to have reasons for using the **io** *Community Discussions*.  At this time, teachers were more focused on designing and developing inquiry-based projects that they would use with their students.  She believed that as teachers "become more conversant creating projects or designing learning this way, that they'll tend to explore and move out in to the *Community* section more."  She commented that, at this stage, teachers might perceive *Community* "as more of a place to philosophize."

One mentor raised the issue of teachers' technological skill levels and their attitudes toward technology and the effects on their communicating online.  One mentor found that teachers using **io** in her school division ranged from people who, at the launch of **io,** had not logged on to their own school division's e-mail account to people who were regular online communicators. The mentor then worked with all teachers to get them using e-mail and regularly checking their e-mail messages. At this stage of implementation, mentors found that e-mail and private discussions were shaping the development of community.  They felt it important that teachers develop a routine of checking their e-mail and **io** *Private Discussions,* so that they could receive information and have opportunities to participate in online discussions.

E-mail was a predominant form of online communication between mentors and teachers.  One mentor commented that online communication is new to many teachers and is met with "some suspicion and curiosity…A lot of them are just barely opening up."  A second mentor found that with e-mail there is a "sense of 'I have to respond to this right now,'" compared to an item posted in *Community*.  With messages posted in *Community*, there tended to be less commitment or motivation to interact.

Mentors acknowledged that they felt comfortable mentoring teachers within the online environment.  Two mentors remarked that they were enjoying it.  Another mentor explained that she had paid attention to keeping the tone of the messages upbeat and to not giving people too much information in any particular message.  When invited to view a project, this mentor used

the following response, "'Thanks for inviting me into your project. Was there something specific that you wanted me to comment on?'" In fostering online communication, mentors appreciated the need to respond to messages as quickly as possible. Yet, the asynchronous environment afforded them time to clarify their thoughts and to do some reading or research before responding to messages. A mentor commented that "it's a much more thoughtful environment."

One mentor noted the dominance of mentor messages compared to teacher messages in *Community Discussions*. The mentor described how a teacher would post a message in *Community Discussions* and mentors, being eager to foster discussion, would generate the "next five posts." From this person's perspective, *Community Discussions* were changing to mentor-driven discussions.

### Integration of io in Mentor Routines

At the time of the first interview, mentors acknowledged that they were trying to integrate **io** into their daily routines. It was a matter of how to manage time to allow for online work. They noted that their onsite work did not necessarily provide them with the opportunity to work online, responding to teachers and participating in *Private* and *Community Discussions*. One mentor described it as finding a balance between the onsite and the online work. This mentor estimated working two to three hours per evening online. The focus of the mentor's work was in responding to projects through e-mail or *Private Discussions*. One mentor commented that she did not feel compelled to participate in the *Community Discussions*, because Drs. Friesen and Clifford were maintaining a continuous presence in that forum. Mentors were searching for ways to manage the projects efficiently and to integrate their **io** work within their daily routines.

### Teachers' Initial io Experiences

Two of six teachers participating in the first interview had worked with student teachers during the Fall semester and two other teachers had worked in partnership with other teachers in their school on **io** project development. All six teachers had either begun to develop a project or were in the final stage of implementing projects with students. One high school teacher who had used **io** to plan a project, found that **io** provided opportunities for teachers to connect with and talk with other educators about what they doing without attending professional development workshops or being restricted in communicating only with local colleagues.

A second teacher described her **io** experience as "an absolutely incredible journey." She was involved in the pilot test of **io** and started to plan her inquiry project over the summer. She used the summer to read and reflect on various articles and resources posted in **io**. The readings allowed her to "rethink and refocus and reframe, some of the ideas" and helped her to make new connections. When she had a question, she would send an e-mail to the **io** mentors and appreciated the immediacy of their responses. She valued the flexibility of the online environment that allowed her to work anytime that was convenient for her.

### Teachers' Online Communication

The six teachers felt comfortable working within **io**. They were more comfortable working in the *Projects* component, than in the *Community* component of **io**. One teacher rated her comfort level in **io** at a three, based on a scale from 1 to 10, with one being terrified. Although she was anxious and uncertain using **io**, she was building confidence by making efforts to log in and read the topics. She felt that she was getting used to the system. Nevertheless, she still felt hesitant about ploughing into the work, because she wanted a "chunk of time to do it." Another teacher commented that she was comfortable using **io,** except for the *Community* component. She noted that she focused more on the *Project* section, because she needed to develop a project by the end of the year. *Community* was less important to her, because she felt it was something that she was not going to be using with students.

From the data, teachers preferred face-to-face support of mentors and private online communication through e-mail or *Private Discussions*. There was an appreciation of the immediacy of e-mail responses from their mentors. One teacher described how she preferred *Private Discussions* in **io,** because "there's more of a sense of security." Another teacher, who had been invited to view projects, stated that she would use *Private Discussions* when she planned her next inquiry-based project. A third teacher noted that she did check in to see what was going on in *Community*, but most of her time was spent in the *Private Discussions* section and with things that personally related to what she was doing. She remarked, for example, that she did not take time to read what her friend was writing in another discussion thread. A fourth teacher, active in *Private Discussions*, found that, when school began, she became involved in day-to-day issues and was doing more face-to-face communication than online communication with her mentor. Consequently, she contributed less to the online discussion groups. Face-to-face discussion, e-mail and/or *Private Discussions* that were specific teacher' needs and their projects took priority over reading and interacting in the *Community Discussions*.

One teacher, who was comfortable communicating online, took a lead role in helping her colleagues with the inquiry planning process and had a strong commitment to the idea that there needs to be a face-to-face component to **io**. She said, "I think we need, as humans, we still need that connection of who we are individually." She suggested that "teachers need to have an initial getting together, sitting around, having coffee and doughnuts or whatever, to see who everybody is that's going to be part of this environment." Another remarked: "'Would I feel comfortable talking to someone who I don't know, and how can I establish that rapport with them over the Internet?'" For this teacher, a physical presence and personal image were necessary for connecting with others in the online environment.

### Evolution of Community

Four of six mentors and four of six teachers believed that a sense of community was evolving in **io**. A sense of trust was developing and people were sharing their private thoughts and their work with others. The contextual conversations in *Community* in both project topics and discussions were becoming richer. Mentors were working with teachers to connect with others having similar

interests and topics of discussion and to connect teachers with experts in their fields. These are a few ways they were using to foster the evolution of community. As one mentor stated: "I love the discussion topics because of the context of thought that's involved and the fact that I think one begins to see the human being behind the words...you begin to feel comfortable with them."

One of two mentors, unsure if community was evolving, qualified her response by stating that a sense of community was evolving and there was a community of learners. However, she was unsure if the *Community* was evolving. She found some discussions to be "too theoretical." At times she found postings that could have been placed in an e-mail rather than in the public discussion forum. She found it "fantastic that they [teachers] can find colleagues online that they want to discuss issues with." The mentor appreciated the value of the **io** *Community* and appreciated people having a voice online.

For the second mentor, it was a matter of not enough time to determine if community was evolving. The teachers he worked with only had access to **io** for three or four weeks. He reported that teachers were still learning to use **io** features and were not focused on participating in online discussions. The mentor found that onsite seminar days in the school division brought **io** teachers together for face-to-face conversations, which could be extended online. However, these conversations did not necessarily extend beyond those within their own school division.

Two teachers, who did not know if a sense of community was evolving, were not yet using **io** *Community*. One teacher noted that she felt "a little intimated by it." When she went into *Community*, she looked for the names of people she knew and thought this would be a starting point for her to connect with other people. The other teacher stated that she "was a little afraid to share with anybody because you feel like you're on the Internet and so you're pretty much holding hands with the world out there." She expressed the fear that, after all the work she had done with her project, if she shared it, other people would take it for their own use.

### Establishment of the Importance of Community

Mentors and teachers differed in their views on how the importance of community was established and reinforced. Mentors reported that the importance of community was not explicitly articulated for **io** users. Rather, the importance of community was part of mentors' work with teachers, as teachers made the transition from working in isolation to working within a collaborative online space. Mentors invoked a number of strategies for modeling and showing the value of community. Mentors had also initiated and participated in *Community Discussions*. One mentor thought that more deliberate actions by mentors to create assigned discussion groups for teachers would provide opportunities for interaction and would raise teachers' awareness of the importance of community. Mentors noted that creating inquiry projects within **io** is a "very personalized space for these teachers. And it isn't until later on that they begin to feel comfortable in sharing their work or inviting other people into this personalized space." For teachers to open themselves up to others requires trust and a level of comfort that is not necessarily present when teachers begin working in **io**. Mentors remarked that educators' purposes in using *Community* influenced the importance they attached to community. Consequently, the commitment a person brings to a community was a critical factor, not explicitly addressed with **io** users.

In contrast, four teachers acknowledged that the importance of community was established with users when they first began working in **io**. There was however, no consistency in how that was established. One teacher recalled being told to create a discussion topic. This resulted in her receiving a large number of responses that kept her involved in the discussion forum. Another teacher felt that the importance of community was established by the "sense of the possibilities of the community" and the "connectedness" of community. She appreciated the idea that if a question or topic was shared in *Community*, there was "bound to be someone that has some experience" around the topic. Another teacher corroborated this by saying that educators can engage in ongoing discussions around discipline and pedagogy and by sharing practices and personal experiences with others. One teacher felt that her personal interests reinforced the importance of community. She did not see this as part of the **io** design. As she worked within **io,** it was "becoming more of a congenial collaborative relationship where people are opening up." It was, she believed, individual contributions that fostered the importance of community.

One teacher, who had been involved in *Community*, described her behaviour as not unlike how she would behave at a cocktail party. Within *Community* or when invited into a private online discussion, she would have an opportunity to observe the online discussion, just as she would stand and listen to some group at cocktail party. If people were talking about something she was not familiar with, she would listen, but not necessarily engage in the conversation. She did not want to "seem like you're a fool". If the topic were of no interest, she would walk away from the group. In *Community*, if the topic was of no interest, a person might not open and/or read that particular discussion thread. If the topic was of interest, she might choose to participate in the online conversation.

### Pedagogical Approach

Mentors and teachers noted that the generative, constructivist approach to learning fosters responsiveness by users in terms of their work and discussions. For teachers to share their work, a sense of trust and a high level of mutual respect were part of the norms being fostered in **io**. One mentor remarked: "Everyone feels a responsibility to improve everybody else" in **io**. This mentor went on to state: "I feel obliged to respond in a way that is also thoughtful and respectful and helpful…It's quite purposeful." The mentors were pursuing the same types of questions with teachers, as teachers had used with students around their projects. These questions helped teachers to think more deeply about their work and how they might nurture connections and conversations within the **io** *Community*.

### Shaping the Community

Teachers acknowledged that mentors and teachers were shaping the evolution of *Community* in three ways. First, receiving feedback and opportunities for discussion with mentors and other teachers were influencing the development of *Community*. At this time, there was a tendency for teachers to invite people they knew into *Private Discussions*, rather than inviting people from the larger **io** population.

Second, role modeling by mentors was a key factor in the evolution of *Community*. One teacher reported her admiration for mentoring and work done by one particular mentor in encouraging people to engage in *Community*. She stated:

> "….. is just an inspiring role model in terms of being a mentor and just that quick response - 'Have you tried this? Did you think of this? And did you know that if you click in the bottom right-had corner it's going to make it easier for you?… things like 'thank you.' You know, were really thoughtful."

Third, their use of **io** has influenced some people's understanding and perception of computer technology. One teacher reported that she no longer looked at the computer as a word processor. Rather, she saw "it as a tool of learning and that tool of learning is incredible." As part of this evolution, a change in thinking about technology and how it impacts teaching and learning was emerging.

Mentors commented that it was too early to see any particular shaping of community. The focus of questions in *Community Discussions* was on *What Matters* topics and the fact that people had not branched into conversations around *Teaching Matters* or engaged in discussion around finished projects. Mentors expressed the view that greater shaping of *Community* would occur as the year went on and people developed a greater comfort level working within **io**. With the implementation of projects, a level of excitement among teachers communicating with others about their work will have an impact on how the community grows. This quote captures one mentor's thoughts on the potential for *Community*:

> "I don't think the potential of the community has been tapped anywhere near where it could be. But I think that whole space is going to open up as one – teachers becomes more comfortable in designing work this way and start to recognize that they're no longer isolated in their own little classroom boxes, that they have a whole big world of experts that they can tap into."

Another mentor speculated that teachers were very busy and "summer might be a really nice time for the **io** *Community*." During the summer, without day-to-day classroom pressures, teachers would have time to engage in meaningful discussions and take greater control in shaping community. This opportunity would allow them to refine their understanding of community.

### Future Direction of the Evolution of Community

Participants identified seven ways in which they wanted to see their online community evolve. First, there needs to be greater interaction among teachers and less reliance on mentors to carry online discussions. According to one mentor, at times mentors were pulling the online discussion along. Part of this evolution requires mentors to wait for others to contribute before entering the discussion, thereby giving participants an opportunity to take control of the discussion. Educators need to be willing to participate in online discussions. Second, the community needs to become a "place where teachers are talking very seriously about their pedagogy, about the things that they hold near and dear to their hearts." Third, there is a need for more opportunities for sharing and collaborating among people who share common interests and for the facilitation of team planning

using **io**. Fourth, the *Community* needs to be opened up further to having more educators participate. Moreover, having more topics of discussion (e.g., topics associated with curriculum) available will lead to people finding online discussions, which are of interest to them. Fifth, more detailed participant profiles are needed to facilitate interaction and to promote online discussion and the sharing of projects. Additional information shared in the profile might help educators to connect online with others with whom they had no prior acquaintance. Sixth, the nature and the tone of 'voice' online have a significant bearing on the development of community. One mentor described the 'voice' of another mentor as "succinct, up-beat, positive, encouraging, kind and honest in her postings." Seventh, the very fact that **io** licenses are to be renewed annually might be a serious impediment to community development.

### Challenges in Using io

Four challenges or issues emerged from the mentors and teachers data in using **io**.

- Time
- Online planning and communication
- Transition from onsite to online support
- Interface concerns

First, time has been an issue. The issue was not related to time to access computers, rather it was related to scheduling time in educators' daily lives to work with **io**. Teachers reported that there was no time during the school day to work within **io**. One teacher reported that she could use the computer in her classroom at noon to work, however the distraction of students in the room made it difficult to concentrate. She went on to state, that although she had tried to use the computer after school, there were other factors that affected her time. A second teacher remarked, "we're piggy-backing this on top of a full load." There was a perception that **io** was an "add on" to their workload. However, teachers did acknowledge the value of the work. The following quotes capture teachers' thinking about time and **io**:

> "…where are teachers finding the time to invest in this. But you know, in the second breath, you're designing curriculum which you have to do anyway and it's such an easy tool to use, why, so its not a huge time commitment…if there was anything that is difficult for me to get used to it's putting aside the time to sit in front of the computer screen and actually go through the process."

> "…it takes time to think. It takes time to congeal your ideas into a way that you're doing justice to what you are doing…what you're doing is you're congealing your ideas, you're thinking about it, you're wondering about it, you're doing a good design..."

Second, online planning and communication is a new world for teachers. Teachers may not feel confident working online. For educators with limited experience with online environments, they may feel threatened, nervous and intimidated working and communicating online. One teacher explained that she was nervous with the *Invite Me Into a Discussion* option, because she was not sure what she getting herself into by inviting people into a discussion. Although she was aware of the potential of the larger community, she was not sure how to take the next step into the

community.  A second teacher revealed that she still felt "a little frightening to put down" her ideas and that "just anybody else can look at it and question."  She commented, that someone might think "my goodness what a stupid way of going about it."  A third teacher noted that sharing work with colleagues is "a bit intimidating."  This teacher noted that through *Sharing My Project* or *Copy My Project* a teacher is able to share projects with mentors and other teachers. Sharing a project and receiving feedback in an electronic environment has liberated time for the teacher by not having to meet face-to-face with a mentor.  However, the development of a comfort level in sharing work and ideas with others online needs to be nurtured. Learning to communicate and developing a level of comfort working in a text-based environment has been a challenge for some educators.

Third, with the implementation of **io,** the nature of the relationship of Galileo service to schools had changed from earlier years.  The transition from onsite coaching to online support in the development of inquiry-based projects has had an impact on some teachers.  One mentor stated that she had received concerns from teachers who felt that the level of service had declined with the implementation of **io**. Teachers still wanted the mentor sitting beside them to create projects. What this mentor found was that when teachers create projects in **io**, they own them and they are proud of their accomplishments.

Fourth, three teachers and one mentor on behalf of teachers acknowledged a few structural concerns with the **io** interface. The lock-step nature of the planning process constrained their use of **io**.  Two teachers noted their style of planning tended to involve the use of webs, branching and moving around the planning process.  That approach is not an option with the current version of **io**.  Second, in *Community*, a person is not able to view all topics in *Community* to see where people had posted, how many people had posted and the frequency of their postings.  Third, reading the amount of text on screen was a concern.  One mentor reported that people have created hard copies of the **io** materials to read offline and at a time that was convenient for them.

**Follow-up on Participants' io Experiences**

Six mentors, two developers and six teachers were interviewed at the end of November and early December 2002.  This was the first interview with developers and the second interview with mentors and teachers.  At the time of these interviews, mentors had from 13 to 15 weeks of access to **io** and teachers had from 8 to 12 weeks of access to **io** within the academic year.

**Mentors' io Experiences**

The six mentors continued mentoring both online and onsite. In two school divisions, mentors reported the implementation of projects. One mentor commented that more than half of the teachers in her school division had completed designing their inquiry-based projects.  Two mentors had begun to visit classrooms to observe the implementation of projects.  They reported that the next onsite seminar day in one school division would be used to celebrate the work of teachers and to give mentors and teachers an opportunity to examine projects posted to the **io** web site. The large group activity and related discussion would be used as a "positive pressure" strategy to encourage other teachers to complete their projects.

Mentors found that onsite seminar days were valuable because teachers and mentors could work together without the distraction of day-to-day activities. Three mentors reported that between onsite seminar days, a number of teachers did not work on their **io** projects.  They reported that the seminar days provided a "good mental space" where teachers worked on their projects.

Mentors noted a perception that **io** was an "add-on" and that the strength and benefit of **io** had not inspired "some transformational thinking." Mentors noted also that, with some teachers, there was a lack of commitment to inquiry-based project learning and to using the **io** application. This lack of commitment and buy-in to the **io** learning environment was having an impact on how teachers used or did not use **io.**

Mentors had observed a shift toward greater use of *Private and Community Discussions*.  They noted also that mentors and teachers had both created *Private Discussions* and had invited others into these discussions.  However, teachers tended to invite only people they knew into their discussions rather than inviting educators with whom they might share common interests or disciplines.  There was some reluctance by teachers to initiate online discussions with people whom they did not know.

Mentors noted that if teachers had not been working on their projects, they tended not to enter *Community,* because they could not share their work or their experiences using the prescribed topic headings in the discussion forum. Mentors reported that some teachers had not yet discovered *Community*. They observed that when teachers begin to see the value of *Community* and appreciate the opportunity to connect with other educators, they are more likely to participate and to interact within *Community*.

Mentors did not in all cases initiate specific strategies to assist teachers in making substantial contributions to *Community*.  For example, at the launch of **io** with teachers, no information was shared in terms of netiquette, guidelines for asynchronous communication or expectations in using *Community*.  However, as they worked online, mentors developed strategies, which they used to nurture community development.  For example, a mentor who worked in one school division and a Galileo employee who mentored in several school divisions would copy e-mail messages to and from teachers and to mentors who were working with particular teachers.  In this way, mentors, who were directly involved with teachers, gained information on how other mentors had responded to teacher's e-mail. A second strategy was to have people participate in *Private* or *Community Discussions* rather than use e-mail, so that everyone involved would be able to read what was posted and build on that information.  When she received e-mail from a teacher that she thought would be of interest to other teachers, one mentor asked the teacher to open a *Private* or *Community Discussion* on the particular topic.  Moving the online discussion from a one-to-one medium to a one-to-many medium helped to shift the work of teachers from being private and isolated into a more collaborative, public forum.

One mentor commented that she felt that the "Grade 3 Rocks and Minerals" *Community Discussion* was an example of teachers and mentors engaging in online discussion around a particular topic. She noted that this was an example of a "real conversation." The discussion consisted of 44 messages posted over four months and contained dialogue among five mentors and three teachers. The expertise of one Galileo mentor proved to be invaluable as people

engaged in sharing ideas, mapping ideas to curriculum and sharing resources.  Participants in the discussion noted how they appreciated the one mentor's knowledge, her willingness to share resources and her facilitation of the inquiry. Within the discussion topic, there was openness among those engaged in discussing the inquiry into rocks and minerals.

Three issues emerged from mentors' data in terms of how people interacted in the private and public asynchronous online discussions.  First, they found that teachers were encouraged to start discussions.  They invited people whom they knew into their discussions rather than initiating new relationships with other educators.

Second, they found that some teachers, who did initiate discussions, did not return to the discussions. Their initial ideas never became online discussions between the initiator and other educators.  In one *Focus* the *Topic* discussion, a teacher started a discussion that was taken up by two mentors and another **io** user.  After 10 messages, one mentor posted a message asking the initiator of the discussion, "Are you still out there?"  No one responded. Mentors identified three possible reasons for the behaviour.  The termination of temporary **io** licenses to teachers would result in teachers not having access to respond to the discussion.  Teachers might have been encouraged to initiate a discussion at an onsite meeting, but after the onsite meeting teachers might not have logged into **io.** Or if they did log in, they might have worked only on their project and not opted to go into *Community*.  Teachers might have been reading what their colleagues posted, but their presence would not have been observed by colleagues, if they had not posted any messages.  Mentors noted that some **io** users did not feel a sense of obligation to respond to what people had been contributing online.  On the other hand, in a face-to-face situation, they would have had a sense of obligation to respond and to continue the discussion.  From the mentors' perspective, the educators' lack of understanding of communication using a text-based medium that provides no visual and/or auditory cues has had an impact on community development.

Third, the nature of online communication among educators influenced the development of a sense of community.  One mentor reported that she regularly read *Community Discussions* but did not feel an obligation to post, unless she had "something intelligent to say."  Rather, the mentor chose to focus on providing feedback and support through personal communication such as e-mail and face-to-face communication.  The private and personal communication had helped to foster a sense of connection and affiliation among the teachers and with the mentor.

Another mentor suggested that there is a need to give people opportunities to participate in online conversations that are social in nature to facilitate common bonds.  The mentor commented that, if teachers were not comfortable using asynchronous discussion forums and are now expected to engage in academic discussions online, they might feel inhibited in voicing their thoughts or ideas in *Community*.  The mentor suggested having a "chat line in **io**" or some forum that allows social interaction to help teachers to establish their comfort zone and to get to know each other, before they begin to invite people to engage in academic discussions.  The mentor did not want the social interaction to result in a chat group that does not further the work of teachers or foster a reflective pedagogical environment.   Rather, a balance would need to be established.  Another suggestion was to provide opportunities for bringing people together in a conference or seminar format.  These three suggestions were possible ways in which participants could develop bonds in fostering the interdependence needed within the community.

**Teachers' io Experiences**

The six teachers acknowledged that their experience using **io** was having an impact on their thinking and teaching. It altered their classroom practices. It re-focused their thinking about teaching and learning and it fostered an appreciation of students' individual learning.

During the first and second interviews, time constraint was raised as an ongoing issue for teachers. The teachers realized that planning inquiry-based projects using **io** was time consuming and that **io** was not a quick planning tool. They also realized that time was needed to plan such projects. One teacher remarked that there was a need "to devote the energy to it," if it was to have an impact.

Three of six teachers had been involved in onsite seminar days within their school divisions. Two teachers had been involved in face-to-face meetings at their school with their mentor with no onsite school division seminar days. The sixth teacher noted that she had attended one onsite seminar day, but was not aware of any regular onsite **io** seminar days in her school division.

The six teachers were asked about the importance of scheduled onsite seminar meetings with mentors and other **io** users. The teachers stated that the need for onsite seminar days or meetings depended on the group of **io** users. When doing a project, just-in-time support was important. One teacher found that onsite seminar days gave teachers time to work on their projects and to be very productive in their **io** work. In contrast, another teacher found that she was not able to work in a large group setting and preferred to work on her project at home. A third teacher noted that onsite seminar time provided a structure that would help teachers initially to "buy into" **io**. Teachers noted that scheduling regular onsite large group meetings ought to be governed by the needs of **io** users.

The six teachers' experiences using **io** *Community* were diverse. One teacher had been invited to view colleagues' **io** projects, and she had electronically responded to her colleagues. She had created and participated in *Private Discussions* and had been an observer of *Community Discussions*. A second teacher had created a peer list. She had been invited to join and had participated in a *Private Discussion* with her mentor and her school colleagues, but had not participated in *Community Discussions*. This teacher was concerned about how would she respond, if she posted a message in *Community* and there were a large number of responses. A third teacher had been invited to view four projects and had sent e-mail responses to the project authors. A fourth teacher had been invited to view one project created by a teacher within her own school. She had mainly communicated with **io** users in her school through face-to-face communication. She felt there was a need to have a blend of face-to-face and online interactions to meet her personal learning style. She had started a *Private Discussion* and checked it a few times a week. She saw *Private Discussions* as an area where she and her colleagues could share ideas about their projects and things they were doing in their classrooms. Although she was apprehensive about posting in *Community*, she did post one message on a topic related to her project and hosted a discussion in the *Community Discussions* forum. The fifth teacher had participated in *Private Discussions* and felt comfortable participating in *Community Discussions*.

The sixth teacher reported that she had not been invited to participate in *Private Discussions* and had not entered the *Community* component of **io**.

Teachers acknowledged that personal contacts through face-to-face meetings and e-mail communication were having the greatest influence on community development.  Three teachers preferred a mix of online and face-to-face communication. For these six teachers, the use of e-mail for online communication was important.   Two teachers preferred face-to-face communication. One teacher had no preferred form of communication.

Two teachers noted that they had received no guidance in how to make substantial contributions to *Community*.  A third teacher stated that, although she did not receive structured guidance, the encouragement of colleagues and feedback from her mentor persuaded her to post substantial contributions to *Community*.  Another teacher stated "it pushes me to have the responsibility to do it." Two other teachers acknowledged that encouragement was a significant factor in making *Community* contributions.   Another teacher commented that knowing Galileo people and others of like mind were online made her feel more comfort.

### Community within io

Six mentors and six teachers saw themselves as members of a learning community in **io**. Mentors noted that, from philosophical and pedagogical perspectives, both the level of discussion and the substantive ideas being discussed were reflective of a learning community.  People were serious about what they posted, and were "looking for connection…communality and they're looking for purpose."  It was an "academic place where teachers can go and just share a variety of information with one another."

One teacher, who was not aware of *Community* in **io**, felt she was part of a learning community. She noted that she was "still an island" not connected to other **io** users, yet she was aware of them in **io**.  The teacher needed direction and support to move her project into a private or public discussion forum where she would be able to ask for feedback and engage in dialogue with educators other than her mentors.

A second teacher reported how a discussion in *Community Discussions* had helped her with her own inquiry project.  She added that others in the discussion had no idea of how they helped her. She was appreciative of having the opportunity to read and take from the discussion to help her own project.

### Online Participation and Interaction

Online communication in **io** occurred through e-mail and *Private* and *Community Discussions*. First, through e-mail, users were able to invite others to view their inquiry-based projects, to respond to projects, which they have been invited to review.  Through e-mail in **io** *Community*, users are able to send e-mail to *Email an Expert* and use e-mail to communicate with mentors and colleagues.  Second, with *Private Discussions* in *Community*, **io** users were able to host a discussion into which they could invite a select group of other **io** users. Third, all **io** users had access to *Community Discussions*.  All users had the ability to create and/or respond to these

discussions.  One's e-mail address appeared each time a person posted a message in either the *Private* or *Community Discussions*.  By selecting the e-mail address, a person is able to send a private message through e-mail to that particular person, rather than posting in the discussion forum.

### Private Discussions

Three of five *Private Discussions* the researcher was invited into were started in September by three mentors.  The fourth *Private Discussion* topic was initiated by a teacher working through the **io** planning process that began in July. The discussion thread continued with 27 messages being posted into November.  The fifth *Private Discussion* began in August and received its last message on the first day of the study.

Two *Private Discussions* were focused on specific inquiry-based projects.  A third discussion initiated by a mentor pursued the metaphor of classroom as a studio.  The fourth discussion initiated by a mentor was designed to be used as a forum for a select group of teachers from one school division to ask questions and raise concerns with each other and with two mentors responsible for **io** within that school division.  The fifth discussion involved teachers from one school working with one mentor.  The mentor initiated the *Private Discussion* as an online space where these teachers and the mentor could work together.

From September 3 to December 23, 2002, 100 messages were posted in the five private online discussions.  Participants in the study posted 87 messages. Ten of 12 mentors and 5 of 10 teachers posted messages in one or more of the five *Private Discussions*. Two mentors and five teachers did not participate in these particular discussions. Table 1 shows the number of messages posted per discussion by mentors and by teachers

**Table 1:  Number of Messages Posted by Mentors and by Teachers in Five io Private Discussions**

| Discussion | Initiated By | Mentor (n=12) | Teachers (n = 10 ) |
|---|---|---|---|
| Discussion One | Mentor | 14 | 0 |
| Discussion Two | Teacher | 16 | 4 |
| Discussion Three | Mentor | 1 | 0 |
| Discussion Four | Mentor | 5 | 0 |
| Discussion Five | Mentor | 23 | 24 |

The discussions occurred over various lengths of time during the study.  For example, one discussion involved 15 messages within a 13 day period of time.  A second discussion began on July 25 and resulted in 27 messages posted as of November 23.  A third discussion began on September 16 and, as of December 23, contained 50 messages.  During the time of the study in this discussion, the mentor posted 23 messages, teachers posted 24 messages and non-study participants posted 3 messages. Of the five discussions, this was the only discussion that continued to evolve after the study was completed in December.

**Private Discussions Vignette**

One *Private Discussion* was initiated by a mentor who worked with a group of teachers from one school. The mentor's first message was one of welcome and provided guidance to teachers in how to use the communication features of **io.** The mentor used e-mail to encourage the six teachers to use the virtual space for conversation. The following excerpt is from the first message:

> "I'd really like all of us to have a go so we can use the space for conversation. It would be neat if we could make decisions about the face-to-face time while using **io** rather than getting together face to face to go virtual!"

One of the mentor's challenges was to get teachers to use e-mail and to begin using **io** both for project planning and for online conversation. It was found that teachers needed to spend time becoming familiar with the technology and learning how to incorporate **io** into their planning and communication routines.

> "I know it takes some getting used to working in an on-line environment, so let me know what I can do to be helpful …Let's see if we can just play around for a bit - nothing too grand, just some mucking about to see what's in **io**."

On September 30, the mentor posted, "…we're in and cooking! Thanks for logging in, all of you. That's a big first step in forming our 'support group.'" Along with welcoming teachers as they began to log into their private online discussion, the mentor was sending e-mail and using the telephone to organize an initial onsite meeting with the teachers. The onsite meeting with teachers occurred in early October with the purpose of providing additional support and guidance as teachers began to work on their projects in **io**.

In early December, the mentor sent an e-mail to teachers because the work in **io** was not progressing. In her e-mail she asked, "How's everyone doing with inquiry planning? I'm worried that I haven't heard from you….Let me know how I can be of help." Six days after the e-mail was sent, the mentor sent a second e-mail to the group. She stated that one teacher in her message in the *Private Discussion* was asking for help with her topic. The mentor asked, "Can you hop over there and join in the conversation, please? We are about to get into the meat of her task, and we could use your feedback!" The e-mail was designed to encourage teachers to log into **io** and to contribute to the online discussion.

The private online discussion interactions that occurred until the end of October were based on getting people comfortable using the discussion forum, organizing the onsite meeting and helping people to identify and clarify their inquiry-based project ideas or topics. The interactions occurred between teacher-to-mentor. There was no indication of teacher-to-teacher conversations in the discussion forum. The teachers may have been having conversations about the work through face-to-face discussions, rather than online, because of the convenience of being in one school.

During the month of November, a teacher posted two messages in an online private discussion. The next message posted by her was in early December. It was in this message that she opened her work up to her colleagues online by asking them to look at her project's tasks. A day after the message was posted, the mentor provided a supportive response that included questions designed to further the teacher's thinking around the work. On the same day, the teacher responded by directing her message to all members of the online discussion. She shared her thinking about her project and sought their help in finding other educators who were interested in a similar inquiry. The following excerpt is from her message:

> "….DOES THIS MAKE SENSE??? Any suggestions anyone?…EVERYONE: I would also like to know from you guys if you have any friends who are also interested in sharing their investigation of an ecosystem and putting it on the web. Let me know."

As the mentor worked to encourage teachers to plan and communicate using **io**, the nature of the online discussion changed when the teacher brought her work into the conversation. There was a context for the discussion and the teacher sought out her colleagues for their input. It was at this point that the conversation between two teachers and the mentor moved from being administrative and project update information to being a conversation focused on personal work.

Of the six teachers, only one teacher posted in the *Community Discussions* forum. This teacher hosted a discussion, posted to an existing discussion in *Community Discussions* and read the postings in *Community Discussions*. She acknowledged that her mentor had encouraged her to "ask for participants in the *Community Discussion* area." She was concerned about posting, because she did not want to make mistakes for others to read. She noted that the *Private Discussion* was a "little bit more safe than the *Community Discussion*." The teacher reported that no one had responded to her invitation to other educators to join her discussion in *Community Discussions*.

This vignette illustrates three factors that influence teachers in shifting their thinking and their work to an online environment. First, educators need to develop a learning culture, which integrates technology into their day-to-day work. Second, using **io** needs to be incorporated into teachers' planning and communicating routines. Third, educators need to feel trust and confidence in the **io** work environment and feel comfortable sharing their ideas and activities with other educators.

### Community Discussions

In **io** *Community Discussions* (public, asynchronous discussion forum), the designers had purposefully organized discussions based on the framework of the **io** planning process (*What Matters*, *Learning Matters* and *Teaching Matters*). An additional section was added, *Community Matters*, which provided a forum for **io** users to seek colleagues interested in similar work or to connect with experts in the field. These four major categories were used to organize the discussions. For example, under the category of *Community Matters*, users could choose to engage in or host a discussion topic under the headings of *Looking for Partners* or *Connecting with Experts*. The pre-determined structure guided users to specific topics.

From September 3 to December 23, 2002, 244 messages were posted in the *Community Discussions* forum.  Forty-three *Community Discussions* topics were created under the topic of *Community Matters* and *What Matters*.  No discussions were created during that time under the topics of *Learning Matters* or *Teaching Matters*. Table 2 displays the number of discussion topics created per discussion category per element of the *Community Discussions*.  As of March 2003, 10 of the 43 discussion topics had received additional messages posted after December 2002. New discussion topics had also been started and contributions had been made to the *Learning Matters* and *Teaching Matters* categories.

**Table 2: Number of Discussion Topics per Categories in *Community Discussions***

| Categories | Discussion Headings | Discussion Topics |
|---|---|---|
| Community Matters | Looking for Partners | 5 |
| | Connecting with Experts | 8 |
| What Matters | Identify a Topic | 18 |
| | Focus a Topic | 10 |
| | Establish Fundamental Concepts | 1 |
| | Integrate Technology | 1 |
| Learning Matters | | 0 |
| Teaching Matters | Track Students | 0 |
| | Assess Students | 0 |

From the start of their participation in the study, 22 participants posted 161 of 244 messages in the *Community Discussions*. Non-study participants posted 83 messages.  Sixty-six percent of messages posted were by study participants.  The 12 mentors, including two developers, posted 152 messages and three teachers posted 9 messages. Table 3 denotes the dominance of the mentors' presence in *Community Discussions* during the study.  Mentors posted 94.4% of the study participants' messages.

**Table 3: Number of Messages Posted per Discussion Category by Mentors and Teachers**

| Categories | Discussion Headings | Mentors (n = 12) | Teachers (n=10) |
|---|---|---|---|
| Community Matters | Looking for Partners | 24 | 1 |
| | Connecting with Experts | 11 | 1 |
| What Matters | Identify a Topic | 57 | 1 |
| | Focus a Topic | 55 | 6 |
| | Establish Fundamental Concepts | 3 | 0 |
| | Integrate Technology | 2 | 0 |

Mentors had a strong presence in *Community Discussions*.  Particular mentors had a stronger presence in various discussions because of their expertise, the role they perform in **io** and the purpose of the message being posted. Interview data revealed that no one found that the dominance of mentors had a negative impact on the development of community. However, a discussion started by a mentor on behalf of a teacher resulted in four mentors posting a total of five messages.  Neither the teacher who created a project based on the topic nor any other teacher

joined the conversation. The teacher for whom the discussion was started noted that the private discussion for her occurred through e-mail with her mentors. She did not indicate whether or not she had read the discussion on the topic. She did state that the e-mail discussion with her mentors "probably should have been in the other place so that other people could have seen them."

Of the 43 discussions started or continued during the research period, mentors started 17 discussions, teachers who were study participants started two discussions and teachers who did not volunteer for the study started 24 discussions. Table 4 displays the number of discussions initiated by teachers and mentors. It was found that teachers initiated or hosted more *What Matters* discussions as compared to initiating discussions in *Community Matters*. It is within the *What Matters* section that teachers initiated discussion around their inquiry-based topics and sought input from the general **io** population.

**Table 4: Number of Discussions Initiated by Mentors and Teachers per Category in** *Community Discussions*

| Categories | Discussion Headings | Mentors (n = 12) | Teachers (n= 10) |
|---|---|---|---|
| Community Matters | Looking for Partners | 2 | 1 |
| | Connecting with Experts | 6 | 0 |
| What Matters | Identify a Topic | 6 | 0 |
| | Focus a Topic | 3 | 1 |
| | Establish Fundamental Concepts | 0 | 0 |
| | Integrate Technology | 0 | 0 |

Of the 43 discussion topics, 81.4% of discussions involved 6 or fewer messages per discussion. Ten discussions involved only one message. Eleven discussions involved two messages. Five discussions involved three messages. Five discussions contained 10 to 14 messages per discussion topic. One discussion involved 24 messages and another involved 44 messages. The discussion involving 44 messages occurred over four months, with 26 messages posted by five mentors.

### Connecting Teachers with Experts Vignette

One Galileo mentor became a resource person for the science inquiries and sought out experts in various fields of study to be resource people for teachers and students. The mentor used three approaches to encourage more public communication among **io** users. First, when she received e-mail requests from teachers who required expertise for their inquiry projects, she would determine if her response would be of interest to other educators. If so, she would post the response to the e-mails in *Connecting with Experts* section in *Community Discussions*. She began the message by greeting the particular teacher by name so that teacher knew the message was directed to him/her. By doing this, the information she shared was available for all **io** users who may have similar interests. Second, she posted information about various items that she thought teachers would be interested in or would appreciate knowing about the resources in appropriate public discussion categories. Third, she participated in various *Community Discussions* to share her expertise, ideas and resources. Using this approach, she was contributing to the discussion, as

well as making connections with a larger group of educators who were involved in the discussions.

## Participation and Interaction in Community

Of the 248 messages posted in either *Private* or *Community Discussions* by mentors and teachers in the study, the average number of messages posted per person was 11.3. The minimum number of messages posted by a mentor was one and the maximum was 95. The average number of messages posted by mentors was 17.6 messages. In contrast, 4 of 10 teachers did not post in the *Private* or *Community Discussions*. One teacher posted 12 messages, which was the largest number of messages posted by a teacher in the study. The average number of messages was 3.7 messages per teacher.

Ninety nine percent of the messages were posted between 8:00 a.m. and 12:00 a.m. Mountain Standard Time. Mentors posted 67.3% and teachers posted 32.4% of their messages between 8:00 a.m. and 6:00 p.m. Mentors posted 31.8% and teachers posted 67.6% of the messages between 6:00 p.m. and 12:00 a.m. Mentors posted 0.95% of the messages between 12:00 a.m. and 8:00 a.m. Mentors posted the bulk of their messages during the day and teachers posted more of their messages after 6:00 p.m.

Interactivity in *Community Discussions* resulted in 90.2% of messages being in direct response to other messages or direct commentary on a topic. It was explicit interaction. Nine point seven percent of messages were independent statements, which did not directly relate to the topic or were only indirectly related to the work.

From examination of the types of participation that occurred in *Private* and *Community Discussions*, 93.1% of messages were content-based, with content focused on some facet of inquiry-based projects. The emphasis of these messages was on content, rather than being administrative, technical or social in nature. Only 6.8% of messages were classified as administrative in nature. Administrative messages addressed such items as arranging onsite meetings.

The nature and depth of online discussion within *Community* was found to be rich. Mentors brought to the discussion a range of topics, resources and questions. They drew upon literature and shared their experiences, as they delved into topics and responded to their colleagues. In a discussion in *Focus a Topic*, two mentors displayed their passion for the topic through their articulation of ideas and sharing that they wished they were working on the particular project. The passion and energy around the topic conveyed through mentors' words provided readers with some understanding of the degree of commitment and investment these mentors have in helping teachers to explore topics and issues as part of the inquiry process.

On examination, the content of 248 messages posted in the *Private* and *Community Discussions* were categorized in terms of manifest content (e.g., people's names or direct references were used), sharing personal information and experiences, affirming statements, closing statements, sharing resources and collegial networking. Table 5 displays the comparison between the classification of message content for mentors and teachers. Mentors posted 211 messages in the

two discussion forums, compared to 37 messages posted by teachers who participated in the study.

**Table 5:   Message Content that Fostered a Sense of Community**

|  | **Mentors (n= 12)** | **Teachers (n=10)** |
|---|---|---|
| **Total Number of Messages** | **211** | **37** |
| Manifest Content | 38.4% | 75.7% |
| Personal Information or Experiences | 33.6% | 45.9% |
| Affirming Statements | 18.0% | 13.5% |
| Closing Statements | 21.8% | 62.2% |
| Sharing Resources | 17.1% | 13.5% |
| Collegial Networking | 33.2% | 40.5% |

In 38.4% of the 211 messages, mentors referred to people by name.  They would begin their messages by greeting the person or persons by name.  Within the messages, they might insert a person's name to cue the reader to whom the message was directed.  Teachers on the other hand, personalized their messages by referring to people by name in 75.7% of 37 messages.

Mentors and teachers shared personal information and personal experiences in 33.6% and 45.9% of the messages respectively.   Sharing personal information about themselves and their experiences helped to frame a context around an individual.  Personal information added another dimension to the discussion.  Consider, for example, the following thoughts:

"I used to do exactly the same thing…I was working with a teacher just this past week and she mentioned that she knows…."

"My own answers over the years are as follows…."

"I am going to a conference on all the latest and greatest in technological gadgets. I will see what I can find for you."

In 18.0% of mentors' messages and 13.5% of teachers' messages, participants used such affirming and supportive feedback as:

"Great ideas you two.  Thanks for the conversation."

"I have appreciated you discussing your project with me."

"What a wonderful start you and the kids have made to the year. I am anxious to hear how the day…"

"…what a wonderful way for the students to investigate…"

There was a sharp contrast between mentors and teachers in their closing remarks to messages and in their ending messages with the sender's first name or first and last name.   Twenty one

point eight per cent of mentors' messages contained such statements, whereas 62.2% of teachers' messages included such statements.  Participants used such closing remarks as:

> "Looking forward to the adventure!"

> "Can't wait to hear from you."

> "Let me know if you want to dive into this, I am excited about the opportunities
> this project holds."

> "Talk to you soon."

Seventeen point one per cent of mentors' messages involved sharing resources.  Mentors would list web sites, materials, books, names of authors and/or books as sources of information related to the discussion topic. Thirteen point five per cent of teachers' messages contained shared resources.

Mentors and teachers encouraged collegial networking in 33.2% and 40.5% of their messages respectively. They asked people to share ideas.  If they knew of someone who needed to participate in the discussion, people would invite them to join or e-mail them to let them know of the situation.  Mentors encouraged teachers and invited them to share their ideas and their work with colleagues. Such following statements were used:

> "My project involves…Any thoughts, good connections or avenues to pursue here?"

> "I am looking for teachers who are interested in designing a project that revolves
> around… Please contribute to this discussion and let me know..."

> "…is a close friend of mine so if you would like me to contact him at anytime just let me
> know."

> "I've asked a couple of teachers who did work with ….to jump into the discussion over
> the holidays with ideas that worked for them."

> "If you are interested or know someone who is please let me know through this
> discussion thread and we could develop more of the project here together."

> "… mentioned this discussion to me and suggested that you were thinking in an
> interesting cross curricular way."

### Enhancement of Online Interaction

To enhance online interaction among **io** users, mentors noted that participants need to understand the potential of community.  Teachers need to move beyond using **io** only for the development of inquiry-based projects and for interacting one-on-one with their mentors.  For greater interaction

to occur, users need to include checking online discussions as part of their daily and/or weekly routines. Developing such routines among participants is part of the culture change that occurs as people become more involved in using the full capacity of **io**. There is also a need for more people to enter the online community. It takes time for people to develop social bonds, to feel comfortable and to develop a trust that will nurture interaction and foster a greater collective effort within a learning community.

There was no consensus in the six teachers' responses to increased online interaction. Rather, they offered four suggestions. First, teachers should be given time and the expectation that they were "accountable for reporting back, feedback, sharing" sessions that occurred on a "monthly basis, or even bi-weekly, it would help to motivate people to become more involved". One teacher remarked, "I really do want to learn how to use it and I'm really curious." Teachers supported the idea that in the early stage of using **io**, greater "hand-holding" is appreciated. Second, if people received e-mail prompts or notices when things change in *Community* or when they need to look at specific *Community* items, it would cue them to go to *Community.* Teachers noted that although educators were becoming more accustomed to checking their e-mail, they might not have established the routine of logging in to **io**. Third, to enhance the human element in the online environment, they recommended that **io** users have their pictures posted as part of their user profiles. More information, accompanied by pictures in personal profiles, would help people to know their new online colleagues. These changes would strengthen the human element online. Another suggestion for humanizing the online environment was to have a yearly celebration bringing people together for a face-to-face meeting. This may not be possible as access to **io** grows beyond the local geographic area. Fourth, there is a need for enough mentors to continue encouraging people to interact online. One teacher observed that Galileo mentors are involved in a great number of conversations and are more aware of what other educators are doing and how they might help teachers to connect with other teachers with similar interests and projects.

### Community Climate

The climate or atmosphere in **io** was conducive to learning. One mentor noted that **io** users were "asking questions and posting questions in a common forum…People feel comfortable to learn." Another mentor found that people posted anything they wanted "without fear of being dismissed or ridiculed." People were serious about what they posted, and they were "looking for connection…communality and they're looking for purpose."

Six mentors and five teachers reported that they felt a sense of trust, affiliation and connection within the **io** *Community*. Both mentors and teachers observed teachers sharing finished and unfinished projects, asking others for their opinions and being invited into *Private Discussions,* where their work was being discussed in a professional manner. They were more open to sharing their work, knowing that no one would pass judgment on it and that there was "no ulterior motive." From the mentors' perspective, the responses people received to their projects and ideas were "kind, thoughtful, supportive, collaborative and … really smart responses."

## Interaction in Virtual and Non-virtual Learning Communities

Six mentors and one teacher described their online interactions to be similar to their interactions in the non-virtual learning community. The teacher who observed this similarity saw the discussion as an exchange of ideas about how people think, learn and how best to assess the thinking and learning processes. These topics were discussed both in face-to-face and in online communications.

In contrast, five teachers who found their interactions online to be different from those in face-to-face learning environments reported various reasons why their interactions were different. One teacher felt that not knowing other people's backgrounds influenced how she engaged in online conversations. A second teacher found her online interactions to be more sporadic than would have been the case in a face-to-face environment. She stated that in face-to face exchanges you get "instant feedback" and "build on the feedback." A third teacher, admitting that she responds immediately and thinks about it after, found that what had changed was being able to go back and read what she has posted and to see where her "learning has come from and where it is going to." She found this to be "absolutely amazing." Another teacher stated, "I did feel a little more isolated, being just me and the computer."

Mentors commented that, in face-to-face situations, they were under pressure to maintain the intimacy of the relationship through immediate communication. In online communication, on the other hand, the intimacy can continue to occur but both mentor and teacher were under no immediate pressure to continue communicating to maintain the relationship. Nevertheless, mentors acknowledged that working in an asynchronous environment does result in the loss of verbal and non-verbal cues found in face-to-face interactions, thereby influencing relationship building.

## Community Building

### Positive Factors that Influence Community Development

Participants identified seven factors that have been successful in fostering the development of community. First, there was an acceptance of where people were in terms of their knowledge and skills. The personal tone within **io** honours and acknowledges what people know and what they bring to the learning environment. Second, there was a supportive learning environment that nurtured risk-taking by participants. Third, conversations were contextual and "relevant and pertinent to the daily lives of teachers." Fourth, the design of **io** involved a user-friendly interface that provided a positive climate for interaction, was rich in resources and accommodated users in terms of private and public online and offline communication. Fifth, for community to be developed, users need to establish connections with mentors and with other teachers. They found that face-to-face connections at the initial onsite meeting were considered important in establishing connections with people on a personal level. Sixth, mentors needed to be tenacious in communicating with **io** users for the purpose of establishing relationships within the learning community. Seventh, educators' previous relationships with and knowledge of Galileo had an impact on the commitment of those using **io**.

**Negative Factors that Influence Community Development**

From participants' interview data, seven factors have been identified as having a negative impact on the development of community. First, the length and number of online messages in *Community* can be compared to the "drink from the fire hose" phenomenon. A small group of those who were engaged in lengthy and in-depth discussions may appreciate the length and depth of the online discussions, yet it might be "exclusionary." The depth and nature of discussions may be intimidating and result in educators not contributing to the discussion. Rather, there may be a need for opportunities where educators can engage in conversations grounded in their daily practices or current experiences before moving into more reflective pedagogical conversations. Second, limited commitment to the community and the absence after initiating discussions have had a negative impact on other members of the community. Third, the dependence that had been fostered through previous Galileo onsite mentoring resulted in some teachers finding it difficult to make the transition to the online Galileo mentoring service. Fourth, teachers, who chose to focus on the *Project* side and not take advantage of the discussion forum, were considered a liability to community development. Fifth, the lack of time to use **io** had an impact on the development of community. People's personal and professional commitments need to be balanced with the time needed to participate and interact, if the community is to develop. Sixth, in one instance, some teachers had a misconception of the professional development purpose associated with **io**. This resulted in time being dedicated to helping teachers develop a better understanding of the ideology and philosophy that grounds inquiry-based work. Seventh, there was an "unsureness on the part of the participants" in making their teaching practices public. Becoming collaborative learners was part of a culture shift for those teachers. These negative factors had an impact on educators in terms of how the community was formed and how it developed.

**Phases of Community Development**

When asked to identify various phases in the development of community, participants placed greater emphasis on the *Project* design component than on the *Community* and *Resources* components of **io**. Reflecting on their experiences, they identified three phases of community development as presented in *Figure 1*.

*Figure 1*. **Phases of Community Development**
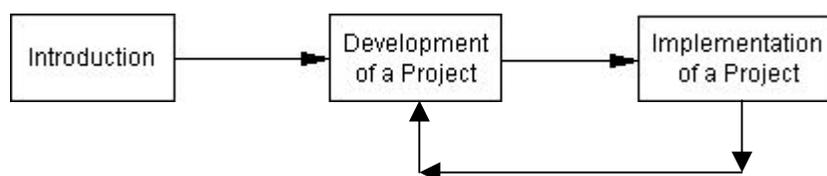


The first phase, introduction, is where users learn about the various features of **io** and begin to navigate within the online environment. At this stage, there is a flurry of activity both within the initial design process and in *Community*. Teachers reported feeling that they had information overload. They not infrequently experienced hesitancy and resistance to using the online service. However, they were encouraged to start discussions and may have received e-mails from their

mentors as a strategy to introduce them to the online community component.  They may have begun to enter initial information in the *Project* component of **io**.

The second phase, development of a project, is where educators begin to work through the inquiry-based planning process.  The greatest amount of time is spent on the *What Matters* stage of the planning process.  In this phase, users tended to use private modes of communication (e.g., e-mail between mentor and teacher, e-mail sent by a teacher to *Email an Expert*) or the *Private Discussions* feature of **io** to initiate discussions with mentors and/or other teachers.   The focus of communication tended to be on specific items or issues related to project work.  When they began to refine their projects, teachers reported checking their e-mail and private online discussion messages on a regular bases.   Online interaction resulted in asking thoughtful and deep questions around the inquiry topics. In this phase, teachers were in a seeking of guidance and information frame of mind.  It is here where online discussions began to occur among **io** users.

The third phase, implementation of the project, is where work became public.  Mentors found greater discussion occurring in *Community* after a project has been implemented.  As teachers began to formulate ideas for their next projects, they sought out and shared ideas within the larger community.  There was a greater understanding of what the virtual community can offer users, and openness on the part of teachers emerges within the online community.

**Insights and Understandings of a Virtual Community**

### Design, Structure and Facilitation for Community Development

In the design of virtual communities for teacher professional development, participants' recommendations fell into three categories.  First, there is a need to develop new images of virtual learning communities that are not based on online course environments for teacher professional development.  The work they are doing online needs to be wrapped around something that they are doing in their classrooms and thereby providing a foundation for them to begin questioning and re-examining their own pedagogy.  These new images reflect a shift in culture where teachers are working in public spaces, making connections within and beyond the scope of school systems and working collaboratively with colleagues.

Second, the structural environment of the online space needs to be rich in resources and must provide a guided inquiry-based learning design process and provides opportunities for both private and public online communication.   This structure empowers users to invite others to view their inquiry-based projects and to engage in online dialogue through e-mail, private discussion, determined by the host of the discussion, and public discussion.  Users have choice within the community, and they are not pressured within the virtual community to meet required expectations of participation and interactivity. Rather, it is their intrinsic motivation and personal desire for professional development that influences how they work within the community.

Third, the facilitation of community comes with a greater social and virtual presence in community.  With the shift to working in an online environment, users may not yet have an understanding of online communication and netiquette.  Mentors' online presence is needed to model participation and interactivity within the virtual community.  All subscribers need to have

opportunities to get to know other members of the community. Teachers expressed the need for more information on people's backgrounds and experiences to be shared so that they can have a better understanding of those they are communicating with online. This information is helpful in developing "physical and emotional contact" with people online. Teachers reported difficulties engaging in online conversations when you don't know the other people.

**Elements of Sustaining a Virtual Community**

According to participants, purposeful and pertinent discussions, capacity to grow, connection and longevity are all needed to sustain a virtual community. *Figure 2* displays the four elements and shows the interconnecting relationship between the elements.

*Figure 2.* **Four Elements of Sustaining a Virtual Community**
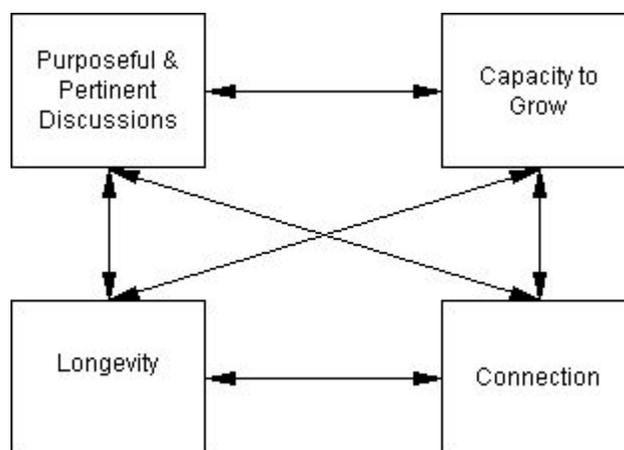


First, the work and discussion that occur within the virtual community must be purposeful and pertinent to users, if the community is to develop and to be sustained. It must be pertinent to the daily work of teachers and teachers need to see evidence of how their professional development impacts student learning and their own teaching practice. To be sustained, community cannot operate as merely an external, add-on factor to teachers' professional lives. Rather, it must become an integral component of the professional culture, which exists as part of the educator's practice and daily routine.

Second, the community needs to have a capacity to grow and expand. It needs to have enough members who are engaged and interested in sustaining the community. It needs to have the capacity to meet the needs of users. One teacher described it as self-sustaining because a person gets addicted to getting feedback and you want to use it. There is something in community that draws members back into it. Passionate and committed members are needed to sustain the community.

Third, the human connection needs to accommodate one-to-one, many-to-many and many-to-one rather than one-to-many relationships. The community needs to nurture breadth of expertise coming together in a virtual space and joining forces for the betterment of colleagues and the

professional development of teachers. To effectively nurture the human connections, strategies and techniques need to be in place, both online and offline.  With online work, attention needs to be given to the development of people's social presence, so that richer connections can develop among members of the community.

Fourth, the sustaining of a virtual community requires time for the community to develop and to be fully realized.  One mentor noted, "it may take two or three years for some people to actually grab hold of it in a meaningful sense." Clearly, the tenuousness of year-to-year licensing does not help the sustainability of the community.  Institutional educational stakeholders involved in **io** need to consider and give more weight to factors that contribute to the stability and longevity of the community.

### Summation on Developing and Sustaining Virtual Communities

The 22 participants saw the potential of virtual communities for teacher professional development.  They acknowledged that the design of a virtual community needs to be grounded in a collegial philosophy and culture that nurture the evolution of the community.  The community will be sustained when members value their community.  As one participant stated, a virtual community needs to be "more ecological, more organic…rather than the hierarchical" structure.

For virtual communities to be realized and sustained requires shifting the collective mindset in terms of professional development.  Dr. Clifford stated that with **io** they were making professional development "increasingly contextual" and were endeavouring to change the conventional mindset of e-learning environments.  The shift opens new possibilities and venues for teacher professional development and impacts on how people think about teaching, learning and schooling.  The motivation and commitment to being a member of  such a community makes professional development more personal and more meaningful for each educator. Through their participation and interaction, members of the community shape the evolution of the community.

### Part VI:  Discussion of Findings

This study has examined how a virtual community of educators and learners has evolved and developed within the first four months of the implementation of **io**.   An online professional development and teacher planning service requires a cultural shift by educators. First, working online is not a commonplace for educators.  Salmon (2000) states, "CMC [computer-mediated communication] is just such a new and potentially alien world for many participants" (p.28). Learning not only the technical aspects of **io**, but developing competence and confidence in participating and interacting in **io** constitute a critical learning experience for some educators. Developing routines using computer-mediated communication technology as part of educators' professional practices and routines has had an impact on the evolution of the **io** *Community*.

Second, the inquiry stance that is an integral component of **io** provides educators with opportunities to work in a collaborative, collegial space, as they interrogate ideas and engage in

pedagogical conversations around their own work and practice.  The conventional, insular work environment that teachers commonly experience is being transformed as educators begin to take up the opportunity provided in **io** to engage in discussions and share projects as part of their community experience. In this transformation, teachers experience  new roles and responsibilities as they begin to work  within a collaborative public forum that allows them to interact both with a select group of people and with the larger **io** community.

Third, the professional development experience in **io** is contextually based on the work of the teachers and provides a "just in time" learning experience that is responsive to the particular needs of educators.  This professional development experience places the participant teacher at the centre of learning activity. It is an active learning environment that fosters a network of social relationships and promotes collaborative learning.  The benefit of the anytime and anywhere aspect of the online learning environment accommodates teachers' personal and professional lives.  Timely responses and thoughtful and respectful feedback from colleagues are needed to nurture a positive professional growth atmosphere and to help foster the bringing of people together in a stimulating and challenging e-learning environment.

**Factors that Influence the Development of *Community***

Based on the data, four factors have been identified that influence the development of community in **io**.

- Designing for a community
- Strategies to promote a sense of community
- Group facilitation
- Contextual and rich discussions

### Designing for a Community

First, communities need to be planned.   Moller (1998) states, "use of the technology does not spontaneously cause communities to occur; communities of learners must be planned" (p. 120).  In the design process of **io,** designers have planned and created conditions that foster and nurture the evolution of community.  The technological attributes and the interface used in **io** give users the flexibility to determine how, when and to what degree to use the online service.  Educators in **io** can choose to communicate one-to-one (e.g., e-mail, mentor-to–teacher), one-to-small group (e.g., *Private Discussions*) or one-to-many or many-to-many (e.g., *Community Discussions*).  The predetermined discussion categories based on the inquiry process have been designed to focus discussion topics and can be used to guide users to specific discussion items as laid out in the planning process.

It is human experience and interaction mediated within the collaborative environment both online and offline that foster the essence of community in **io**.  McLellan (1997) summarized Schrage's (1990) position on collaboration by saying that the "goal in creating collaborative experiences is to create a *shared experience* rather than *an experience that is shared*" (p. 185).  The **io** design and mediation by mentors in the early stage of implementation, using various strategies and

approaches to nurturing a collaborative environment, have been conducive to fostering the development of a learning community.

Educators in the study have had opportunities to meet onsite (in school and at seminar days) and online (e-mail, *Private* and *Community Discussions*). They have been able to gain from their interactions both onsite and online. Their onsite discussions and the one-to-one interactions clearly have had an impact on the development of the larger community. Their community discussions extend beyond what had been designated as the "*Community*" space in **io**. The diversity of communication channels within **io** accommodates educators at their various levels of comfort with the technology and influences their choice of contacts within in the **io** community network.

### Strategies to Promote a Sense of Community

Mentors have implemented various strategies to encourage and promote a sense of community in **io**. Mentors who took the lead in having a virtual presence in *Community Discussions* have been using various strategies to encourage and engage **io** users in the *Community*. For example, one strategy involved the action of moving e-mail exchanges between a teacher and a mentor into the *Community* so that a larger audience could benefit from the discussion. Mentors and teachers who have been active in *Community* have been conscious of creating and/or promoting an inviting atmosphere through the use of affirming statements, personalizing messages and sharing personal information. One of the challenges for mentors who had a strong presence online has been to find a balance between when to facilitate discussions and share expertise, and when to wait for other **io** users to become more involved in the discussion.

Various strategies and techniques have been used to promote the development of a sense of trust, affiliation and connection among users. Community has come to be seen as a safe place where educators can be adventurous and can be risk-takers as they open up their ideas and their practice to a larger professional audience. It has been reported that the community is professional and academic in nature. Participants have found it to be a supportive and non-judgmental environment. There has been an acceptance of where people are in terms of their knowledge and skills. The personal tone within *Community Discussions* assists greatly in honouring and acknowledging what people know and what they bring to this learning environment.

### Group Facilitation

Group facilitation has been seen as one factor having an impact on the realization of a sense of community. The strong presence of mentors in *Community,* using various strategies, has worked to model and foster discussions aimed at fostering group interaction, rather than one-to-one interaction. Mentors have worked to build relationships and rapport among users through their onsite and online interactions. Group facilitation in the **io** *Community* is being achieved through the diverse roles mentors perform in terms of being the encouragers, standard setters and experts. As more teachers use and engage in the *Community* section of **io**, they gain from observing what has occurred, from responding to invitations to participate and from taking the initiative in making connections within the *Community*. Through their interactions initiating contact and

responding online to **io** users, mentors help to foster a sense of belonging and connection to the group and to the community.

### Contextual and Rich Discussions

The richness of discussions that occurred onsite and online contributed greatly to the evolution of the community. Conversations within the **io** *Community*, within *Private* and *Community Discussions*, were contextual and "relevant and pertinent to the daily lives of teachers." The discussions were grounded in the inquiry-based project planning process. The design of **io** affords all users the opportunity and the ability to initiate and to respond to online discussions. Online discussions could be started at any time around any topic that was pertinent to users. Given that there is no requirement to post to the discussion forum, discussions can consist of a single message, a few messages or a number of messages extending over time. The flexibility of control by the **io** user provides a learning space that allows ebbs and flows in online discussions over time. An item posted in September might not be of interest to another user until a few months later. Another individual might gain from this online message and pick up the discussion later and extend it in any chosen direction. The community then evolves in direct response to the needs and aspirations of its members.

### Items to be addressed in Developing and Sustaining the io *Community*

A sense of community was clearly evolving during the first four months of the implementation of **io**. From the data, five factors have been identified as having influenced the development and sustaining of community:

- Establishing the importance of community
- Commitment to community
- Resolving online communication anxiety
- Online social presence
- Shared leadership and responsibility

### Establishing the Importance of Community

Providing people with access to **io** accounts and showing them how to use them does not necessarily result in their using those accounts or interacting in **io** or in **io** *Community*. It has been reported that people were not using **io** as part of their regular professional routines. Educators were not using online communication tools in ways integral to the development of community.

Hill (2001) claims the "establishment of importance of community at the inception" (p. 10) must be made explicit to all members. Doing this helps people to appreciate the value and the benefits of community and helps them to be aware of how they can take advantage of the various opportunities community provides. Opportunities for the articulation, discussion and acceptance of a shared vision, the goals and aspirations of community among community members ought to occur to promote the development of community. Community members have a vital role to play in shaping the community and ensuring that the community is responsive to their needs. When

educators value their community, they place a higher priority on their community and they devote more time to fostering relationships and to sustaining the community.

### Commitment

For community to be developed and sustained, members of the community must understand the personal investment required and must appreciate the fluid nature of a community. There must be a personal investment and commitment by community members, if the community is to exist for the betterment of the larger group and not just for core individuals. The level of personal commitment varies among people within particular situations and over time. According to Shaffer and Anundsen (1993), one element of community functioning as a dynamic whole is when a group of people "commit themselves for the long term to their own, one another's and the group's well being" (p. 10). The **io** users therefore need to be conscious of their commitment in terms of what they can gain and what they can give to the community. In addition, mentors and teachers need to explore ways of creating opportunities for strengthening relationships and nurturing group affiliation over time to accommodate fluctuations in community members' commitment.

### Resolving Online Communication Anxiety

Working in an online environment designed to promote connection among educators requires the development of competence and confidence using computer-mediated communication for community development. Kearsley (2000) states that an online learning community "is a new phenomenon in education" (p. 58). As a new phenomenon, steps ought to be taken to honour educators as they enter this new world and to help them to address communication anxiety. Strategies need to be in place to help participants to successfully interact in the asynchronous online forum.

It was reported that some teachers were not in the habit of checking their e-mail, let alone going into the **io** *Community* to read and respond to what colleagues had posted. Opportunities for mentors and teachers to engage in purposeful activities have a two-fold purpose. First, educators need to experience and to learn from various features of computer-mediated communication within a context that is meaningful to them. Second, they need to engage in purposeful and pertinent discussion around issues of interest. For example, the use of a private discussion forum with a small group of teachers engaged in a discussion of interest allows participants to develop confidence in using asynchronous communication and provides a venue for them to begin developing the routine of checking the online communication tool. Building self-esteem and confidence in using technology and empowering educators to take ownership of online discussions will assist greatly in fostering the development of community.

### Online Social Presence

From the data, it was found that teachers tended to interact with educators (teachers and mentors) they knew, rather than with people with whom they shared common interests or disciplines. In the study, educators did not acknowledge that they had "met" new people or had become acquainted with people from other locations as part of their community experience. The potential for making

connections with other educators based on commonalities may not be reached, if people continue to associate only within homogeneous groups.  How therefore can mentors and teachers develop greater online social presence?  If greater social presence exists, would **io** users be more open to inviting people they don't personally know into their discussions or to view their projects?  With greater sharing of personal and professional information, background experiences, expertise and areas of interest as part of the participant profile, would users refer to this information when engaging in online discussions?  Developing personal profiles is only one strategy to be considered.

A second strategy in developing an online social presence is to extend and expand collegial interaction among **io** users for the purpose of developing social bonds and interdependence within community. In the early stage of implementation, through their interactions and participation, mentors and teachers were promoting a "togetherness" environment.  However, promotion needs to transfer into action in terms of greater social bonding, growing a sense of group identity and establishing a sense of group cohesion.  Open and frequent communication within the public forum is vital to nurturing social bonding and building social cohesion.

### Shared Leadership and Responsibility

For genuine community development, there is a need for shared responsibility among mentors and teachers. There is a greater dependence of teachers on mentors in **io**, than there is of teachers and mentors being interdependent within the community.  Among participants in the study, it was found that mentors had a greater presence online than did teachers.  How can a community be sustained if only a core group of people take responsibility for nurturing the community? What happens to the community's development when there is reliance on mentors' interaction and participation in the online discussions?

One challenge for mentors is to find a balance between when to facilitate discussions, when to share expertise and when to wait for other **io** users to become more involved in the discussion.  Within **io**, teachers need to see themselves both as valued members of the community and as members with some responsibility to carry the discussion.  Rather than relying on mentors, they must participate more vigorously in community activity and must be willing to participate in the community and work with each other.  Teachers have a vital role to play in sharing leadership in community development.

### Issues Related to Phases of Virtual Community Development

In community development, there tends to be a progression that begins with a focus on individual activity, moving to small group activity and then to overall community activity.  Hill, Raven and Han (2002) support the approach that community building in web-based learning environments occurs first by "focusing on the individual and, over the duration of the course, moving to teams and finally the overall community" (p. 391). Based on data from the study, a similar process was seen to be evolving, with three critical phases:  induction, small group interaction and community. In the induction phase, individuals were being introduced to and becoming familiar with the various facets of **io**.  They began to work individually on their projects.  Interaction tended to be between teacher and mentor.  In phase two, as teachers were developing their

projects, they began to connect to mentors and to other teachers through private communication and some public communication. They shared their projects with people they respected and trusted. They participated in private discussions, where a small group of people discussed common topics and/or issues. In the third phase, educators had created a network of people with whom they felt comfortable interacting privately and publicly as part of the community. In the third phase, there is greater diversity in the knowledge and skills of those who were meeting within the larger community. At the end of four months, what has emerged is the challenge of how to assist educators in moving through the three phases.

In her (2001) study of community building, Brown identified three levels of community development: *online acquaintance* or the *making of friends*, *community conferment* and *camaraderie*. From the data, participants in the study met the first level of community development because they had opportunities to meet other **io** users, albeit with people from their own school or school division. There was less emphasis on developing relationships with online acquaintances. They had developed some degree of online acquaintance with a select group of **io** users, rather than with people from the larger **io** population. Mentors, who had a strong presence online, achieved the second level, *community conferment* or acceptance. At this level, through their interactions, they had a sense of personal satisfaction and an affiliation with the larger community through their interactions. Some teachers may have begun to move into this level. Given the early stage of implementation, it is difficult to predict if members in the community will advance to the *camaraderie* stage, though that would be a worthwhile goal.

## Part VII: Conclusion

Communities are complex, organic and multifaceted. Clark (1998) states, "online learning communities should be grown, not built. Online communities are strongest when grown by members into unique and supportive, environments" (p. 5). With the first four months of implementation, it is apparent that designers have been conscious of how they designed the online interface to foster community. Mentors have worked in offline and online forums modeling and using various strategies to encourage **io** users to participate and interact within the community. Teachers have been introduced to and are at various stages in using **io**. Through the work of educators in and through **io**, a sense of community has been established and is beginning to evolve as educators embrace new images of virtual communities. These new images reflect a shift in culture, where educators are working in public space, working collaboratively with colleagues and experts beyond their school jurisdictions and are engaging in purposeful and pertinent discussions.

In the article, *The Social Dimension of Asynchronous Learning Networks*, Wegerif (1998) claims, the "success or failure in the online course depended upon the extent to which students were able to cross a threshold from feeling like outsiders to feeling like insiders" (p. 34). The success of community development in **io**, is dependent on users crossing a similar threshold, where they not only see themselves as members of the community, but share leadership and responsibility within the community. And at the same time, there is a need to foster and to sustain the community over time. What is required for **io** users to cross the threshold really depends on users and their philosophy and commitment to the **io** community and to smaller communities within the larger

community.  From a research perspective, it will be important to continue monitoring how and when people cross the threshold, and what changes occur in terms of their behaviour in the community when people acknowledge and function as "insiders" in their community.

Working online, working within a collaborative forum, working within an inquiry stance and working as members of a learning community all require a major culture shift.  For this shift to occur, educators must move out of their current comfort zones as their current values and beliefs about teaching and learning are challenged.  Having opportunities to develop a deeper understanding of the importance of community will assist educators in embracing the culture shift that is required, if they are to contribute to the vibrancy of the online community.

Within the early stage of **io**'s implementation, mentors and teachers are learning and working together to realize the potential of community.  With the anticipated scalability of **io**, attention needs to be given to factors identified in the study that need to be addressed in the acculturation process.  As educators embrace this culture shift, the power of the community will grow and the potential of a dynamic, synergistic community can be realized.

## Part VIII:     References

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