

## **Proposal for a Network Communication Environment to Support Daily Dialogue between Young Children and Grandparents**

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*This study attempted to build a system environment that would lead to diversification in human relationships by enabling communication between a child and grandparent via the Internet using a computer. The day-to-day dialogue with a grandparent is realized via the Internet by employing a medium that would give direction to the dialogue and thereby enliven the communication. Along with presenting the possibilities of ICT to increase the opportunities for communication with people, which is indispensable for a child's development, by increasing the communication with close relatives, the study succeeded in presenting a new relationship with computers for a child that is different from the conventional software for children.*

**Keywords:** young children, grandparents, network communication, child's development

### **Background and Objective**

#### **Background**

The declining birthrate and trend toward nuclear families that considered as mother, father and children only increasingly seen in Japan have led to the problem of weakening of the human relationships surrounding children. One of the reasons is that there exists a situation where relationships with grandparents or siblings are not being maintained within the context of daily family life.

Furthermore such changes in the social setup are affecting the upbringing of children and insufficient communication skills are being cited as one of the contemporary issues in childhood education. The childhood development stage is an important phase where the child acquires language skills and builds human relationships, and the family forms the foundation for this stage. In daily life scenarios within the family, communication, starting from mother and child and with various other people, has a significant influence on the development of a child.

The decrease in the number of people forming the family leads to less opportunities for communication and this in turn is believed to lead to insufficient communication skills.

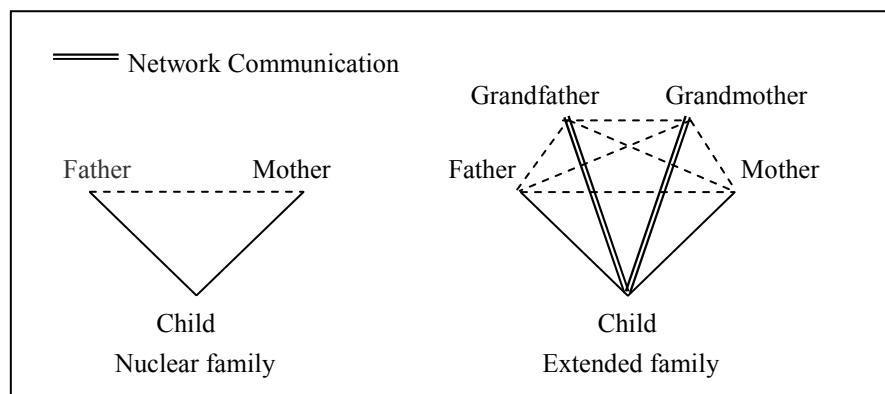
This study, targeted children in their early childhood, aims to construct a network environment, which facilitates the children's interaction with grandparents who live far away and with whom they seldom have a chance to meet (Figure 1).

## Objective

According to Vygotsky (2001) the origin of sophisticated mental activities of human beings rests in social activities. Speech, while playing the role of a tool to communicate externally with society, is also considered to be a tool for thinking.

Early childhood is the stage in which children start using language in daily life situations and also start expressing their various experiences through language and conveying them to others. This is motivated by the sense of trust and intention established through the pre-linguistic communications with the mother as well as various other people from their infancy. And, communication, especially "dialogue," is an activity that aims to enhance sharing of a theme by alternating one's position and the counterpart's between "speaking and listening." In this regard, the reason why the meaning gets conveyed adequately, even if the language context is insufficient, is because the counterpart uses the underlying situational context to receive the words and fill in the unspoken meaning. For a young child, who is still halfway through language development, it is important to have an adult listener, or "someone close," who can comprehend the unspoken meaning behind the words or the portion for which the child doesn't have the vocabulary by using clues from the existing familiar relational knowledge (Natsuki 1977).

Dialogue held with "someone close" on a daily basis is important for the child to acquire language skills, and the acquisition of language skills is thought to lead to communication ability. Therefore in this paper, I construct a system to generate daily dialogues between the child and grandparents via the Internet. Although there are some earlier studies which report that elementary school students communicate with other school students via the Internet (Inagaki 2004), there seems to be an absence of research dealing with young children. So, in order to create an effective style to enable dialogue between young children and grandparents via the Internet, I studied day-to-day dialogue patterns between young children and adults and applied



**Figure 1.** *Family Communication through the Viewpoint of Child*

that knowledge in the construction of this system. Then, I ascertain if the constructed systems work to promote communication between young children and grandparents.

## **Study of Day-to-day Dialogue of Young Children**

In order to propose an effective style for realizing the dialogue between young children and grandparents via the Internet, I studied the day-to-day dialogue between young children and adults and applied that knowledge to the system.

### **Dialogue regarding experiences at kindergarten**

Mothers with children in kindergarten are said to make significant efforts at home to learn the children's experiences at the kindergarten. Through talks regarding kindergarten life, mothers are thought to compare and link the reported experiences with the children's likings and their frequently observed actions to construct a contiguous image of the child beyond space and time constraints (Komatsu 2003). In other words, the mothers are gathering information for relational knowledge in a "close relationship" from topics related to kindergarten life. Furthermore, the joint conversation of the child and the family regarding the child's experience is considered to be important, as it serves as the base for the child to "construct self." In light of the above, it could be surmised that a child talking about his or her kindergarten experiences in day-to-day conversation would promote not only mutual understanding, but also promote the construction of self and socialization of the child.

### **Dialogue through reading of picture books**

Reading of picture books to a child is regularly performed in many households. In particular, different styles of dialogue develop from reading at home. Even in the case of four-year olds, reading to a child functions as a "stage for emotional communication" such as enjoying the mother-child interaction with the "picture book" as an intermediary, and sustaining the diversity of conversation topics. And the reading style will reflect the picture book elements (Fujioka 1995). The picture book can be considered to have the aspect of a medium satisfying the role of an instrument that enlivens the conversation and not just a one-way medium.

### **Dialogue through play-acting**

Play-acting, which is the most conventional form of playing driven by imagination, begins by reproducing parts of real-life experiences. Towards the latter stages of childhood, newer experiences such as relationships, situations and activities involving a larger number of people who begin to get introduced into the game. Furthermore, not only the child's own, direct experiences but also knowledge gained from picture books and TV, as well as things heard from family members or kindergarten teachers, start getting used as material for the game (Uchida 1989). Play-acting can be considered as a performance of a type of "reflective thinking," where a child selects the most prominent characteristics of his or her world at that particular point of time. Sharing play-acting with a child is thought to enable an adult to gain information on the child's day-to-day activities and at the same time form a mental process for the child in which

he or she grasps the meaning of experience.

## **Advanced Research on Media Communication**

A video conferencing system is to be used as the environment for facilitating the communication in this research. The video conferencing system is one of the most commonly used tools for interactive learning between schools and it offers a realistic feeling close to daily face-to-face communication. In an environment where video conferencing can be used daily, awareness of the other person could be increased by continuously having a number of videoconferences of short duration (Inagaki 2004). If, however, interaction is carried out aimlessly with only vague themes and objectives, the motivation of the child is said to drop immediately.

Since this is so, a mechanism is necessary for attracting continued attention when children use a video conferencing system. The use of a common electronic blackboard in this remote joint operation is believed to enliven the debate owing to its interactive quality (Obata 1998). In this regard, this research will employ a catalyst that would constantly invigorate the communication between grandparents and children. I set up a medium to support and enliven the dialogue via the Internet that can be handled by both children and grandparents.

### **Proposal for the Style of Communication to be realized via the Internet**

Here, I introduce the style of communication designed into this system in order to realize, via the Internet, the day-to-day dialogue with grandparents who are in a far away place that is important for a child's development. This style is based on advanced research into the concepts of day-to-day dialogue and media communication.

#### *Format*

- A medium to enliven the communication will be set up.
- The medium should be something that promotes an orientation towards sharing day-to-day experiences.

#### *Style of dialogue*

- Report day-to-day experiences
- Engage in dialogue that will deepen mutual understanding
- Engage in dialogue based on imagination

The day-to-day dialogue with a grandparent is realized via the Internet by employing a medium that will give direction to the dialogue and thereby enliven the communication. This day-to-day dialogue is aimed at making the grandparent into "a close person" for the child by enabling them to accumulate underlying relational knowledge based on the child conveying his or her experiences. At the same time, this becomes a stage for the child to review experiences and thereby promoting the construction of self. Moreover, the accumulation of dialogue with "a

close person” is believed to lead to the acquisition of language skills. The aggregation of such day-to-day dialogue is thought to form the base for communication ability.

## Outline of the System Environment

A system environment that would realize the communication style was constructed. First of all, a network link was established between the grandparent and the child using the video conferencing system. I adopted Microsoft NetMeeting, because it is available without cost and has functions for video conferencing and screen sharing which meet the needs of this research. Then, three types of materials in two formats were created to be used with the video conferencing system.

This study experiments with communication via the Internet, and I realized it would require a great deal of support, as well as trial and error on the part of child and grandparent to prepare the environments. So I chose my son and my mother as subjects, and prepared contents for them.

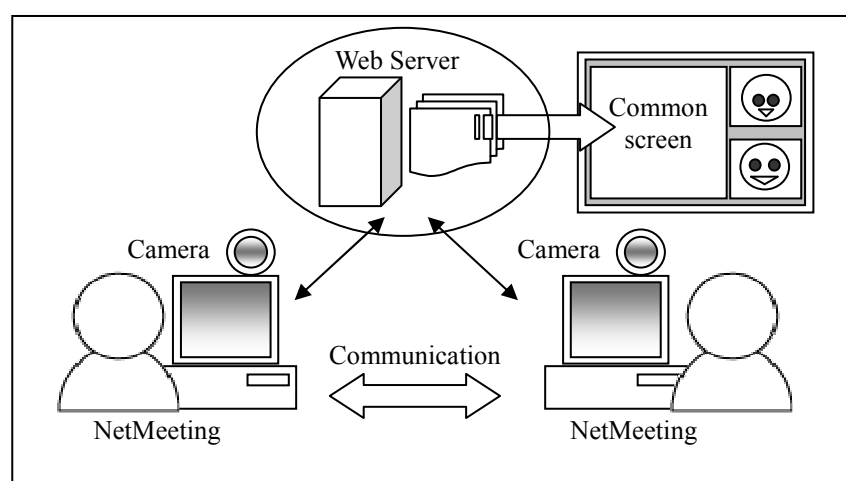
### *1. Sharing a web page*

- Picture book that promotes speech
- Growth chronicle of cherry tomato

### *2. Sharing of play-acting space*

## Communication that uses web pages as the medium

Web contents were prepared so that the grandparent and child could share them via the Internet and engage in dialogue (Figure 2).



**Figure 2.** System Configuration Sharing of Web Page

### *Picture book that promotes speech*

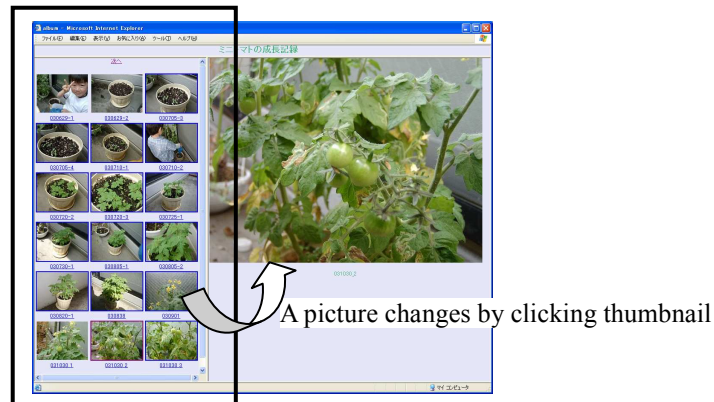
A web-based picture book was created so that the grandparent could read it to the child in the course of the dialogue. The contents were incorporated in such a way as to encourage speech, similar to regular picture books. In this picture book, the hero was a frog which my son had interest in at that time in kindergarten. And the central character, “Mr. Froggy” asks some questions. The grandparent reads out “Mr. Froggy’s” question from the picture book; the child answers the question and then they proceed to the next page. As “Mr. Froggy’s” comments include familiar things such as sports festivals and fights with friends, the conversation would lead to the child reporting the day-to-day activities at kindergarten, and so on to the grandparent.

### *Reporting on day-to-day activities*

The communication format is one in which day-to-day happenings themselves are recorded as materials and the child makes a report based on those records.

This time, I choose the growth chronicle of cherry tomato, because cherry tomato is often included in children’s lunch boxes and I thought it would be attractive for my son. The growth of a cherry tomato seedling planted in early summer was recorded regularly with camera and the pictures were posted on the web page (Figure 3). The child was expected to make a report to the grandparent by showing that data and the dialogue to progress based on the topic of growing a cherry tomato plant. The periodic reporting of growth was expected to lead to communication that is linked to real-life situations including time-line.

The pictures were posted  
on the web page regularly



**Figure 3.** *Web Pages of Growth Chronicle of Cherry Tomato*

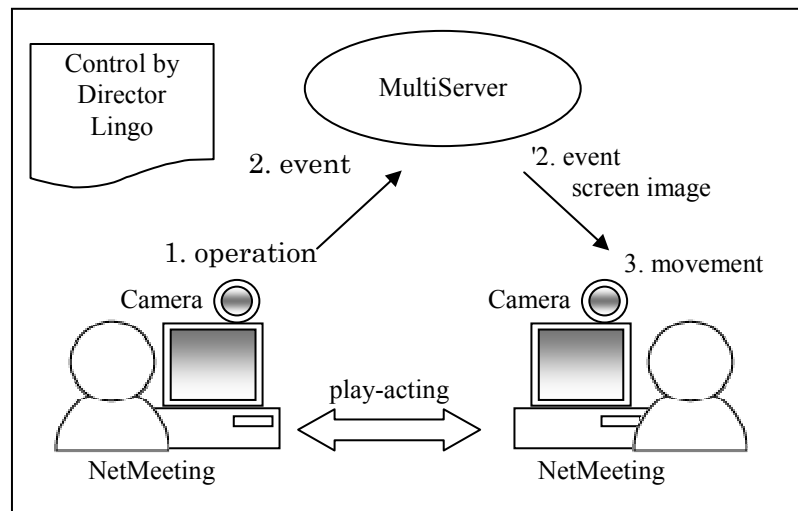
## **Communication using the play-acting space**

This system was built using Director from then Macromedia as a MultiServer system to establish a link between applications in shockwave format and other applications. The same screen was shown simultaneously to both users through the following method:

- The user performs the operation.
- The operation details are transmitted by the MultiServer.

- MultiServer transmits the operation details to all the client applications connected to the session.
- Client applications display the screen based on the information received from MultiServer.

The application allows various combinations of image, motion, sound, and so on to be shared as if in play-acting (Figure 4).

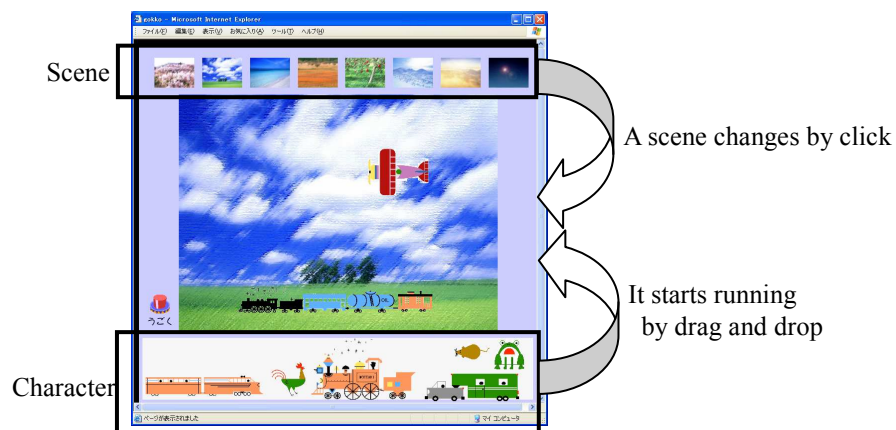


**Figure 4.** *System Configuration Sharing of Contents by the Multi-server*

#### *Communication using the play-acting space*

A play-acting application was created so that the grandparent and the child could freely develop a story together. The play-acting space provided the background necessary for developing the characters and the story. Characters provided included vehicles, such as steam and electric locomotives which the child prefers, and backdrops included seasonal scenes.

Using these, each person was expected to transform into the character he or she selected, and communication was to be established by speaking whatever that came to mind. Then, various new worlds could be created by changing the scenes, such as both of participants starting an adventure or going out for fun (Figure 5).



**Figure 5.** *Application of the play-acting space*

## Result of the Experiment and Thoughts

I conducted a communication experiment based on this system environment with a four-year old boy and his grandmother. The cherry tomato growth chronicle was used every three weeks for a total of three times and “Let’s play with Mr. Froggy” and the play-acting space were used twice in an interval of a month (Figure 6). In the experiment there was no limit, so they use the contents freely. A total time of their use is almost 30 minutes (Tables 1-3).

This system aimed to generate the following forms of dialogue:

- Report day-to-day experiences
- Engage in dialogue that deepens mutual understanding
- Engage in dialogue based on imagination

Each of these three forms of dialogue were identified as categories from the protocols in different media and their frequencies were analyzed (Table 4). By engaging in dialogue constantly through the medium, the conversation was never broken up and the three forms of dialogue came up frequently. All three media share the common aspect that day-to-day experiences can be shared using network communication. Occasionally there were instances in which the child’s expression was not audible and the grandparent had to ask repeatedly, but that also decreased as the session progressed. By a gradual process, grandparent as “someone close” could have more the existing familiar relational knowledge of the child.

When the grandmother began to use a computer, she did not enjoy it. She had previously just tried a few games. However, after this experiment, she came to know more about the computer. For example, she took a photograph with a digital camera and transmitted photograph data to her computer. On the other hand, the child immediately liked conversation using this system. He seemed to report his daily life comfortably. Furthermore, when the child and grandparent met after a long time, they talked happily about many topics. It seemed that they got more familiar with each other than ever before.



**Figure 6.** *Scene from the Experimental System*



**Table 1.** *The example of a dialog with Picture book that promotes speech*

Grandmother	Please let me know about your friends.
Boy	I'll teach you many things. It's Taka-chan and Kaigo-kun.
Grandmother	And who ... ?
Boy	Kano-chan, I want to marry her. A girl is that all.
Grandmother	Well, it's good. (This communication takes about 10 minutes.)

**Table 2.** *The example of a dialog with Growth chronicle of cherry tomato*

Grandmother	Did the mini tomato change from yellow flowers?
Boy	It became very much in large numbers.
Grandmother	How many did you count it would be?
Boy	I do not yet count.
Grandmother	Is it in large numbers more from ten pieces?
Grandmother	Do you want to eat this for lunch box early? (This communication takes about 5 minutes.)

**Table 3.** *The example of a dialog with the play-acting space*

Boy	Winter. It is winter now.
Grandmother	Is it winter now?
Boy	Everybody of a vehicle went to the skiing area. And they did ski jumping.
Grandmother	Oh, Is it in large numbers?
Boy	They did ski jumping.
Grandmother	Who did?
Boy	Everybody of a vehicle did.
Grandmother	Oh my God! Hahaha. (This communication takes about 15 minutes.)

**Table 4.** *Generating frequency of a dialog*

Type of Dialogue	Frequency
Report day-to-day experiences	15
Engage in dialogue that deepens mutual understanding	3
Engage in dialogue based on imagination	8

From these results, I consider that communication via the Internet between grandparents and a child using this system may be effective in order to build bonds of the heart. It was difficult to continue this dialog without technical assistance, although both grandparent and the child wanted to do so. It is still difficult for them to use this system, so they cannot start dialog by themselves. The usability to start a dialog must be improved in the future. And by simplifying

the usability, I want to provide this system for other families as well. In further study, it will be necessary to conduct this experiment with more children and grandparents participating.

## **Future Issues**

In the experiment this time, communication and observation were started after preparing everything (from the test environment to uploading of the photographs for report records) in advance. However, this might not be possible in a large-scale implementation of the system. Since there is great significance in having continuous communication in order to deepen the mental bond between the child and the grandparent, it would be necessary in the future to simplify the report creation as well as the connection setup and application activation.

In order to promote day-to-day dialogue, it would also be necessary to constantly enhance the contents of the system by taking into consideration the growth phase of the child. Moreover, the environment should be built taking into consideration the communication style appropriate for the growth phases after child participants grow past four years old.

Also, the interface that does not give stress to the child is indispensable so that the child can keep using the computer as part of his or her daily life. Similarly, the problems faced by the elderly, such as vision deterioration and other physical problems, also need to be addressed.

In addition, there are concerns associated with computer usage such as the possibility of social withdrawal. Taking into consideration the positive and negative aspects of media influence, it would be necessary to have voluntary controls such as avoiding excessive usage. In this paper, I analyzed the results of only one case. It is necessary to observe many more cases, including other families, to confirm what network communication should be.

## **Summary**

This study attempted to build a system environment that would lead to diversification of human relationships by enabling communication between a child and grandparent via the Internet using a computer. Within addition to this demonstration of possibility for ICT to increase opportunities for small children to communicate with people, which is indispensable for children's development, by increasing the communication with close relatives, the study succeeded in presenting a possible new relationship between children and computers, different from that promoted by conventional software for children.

Going forward, I'd like to study not only the three communication style in this study, but also the other kind of communication style that promote communication between young children and grandparents.

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