

VideoPal: Exploring Asynchronous Video-Messaging to Enable Cross-Cultural Friendships

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Abstract. Pen pal programs for connecting students from around the world through letter writing have been popular for generations. However, traditional technologies have several limitations in supporting pen pal activities. In this study, we explored the potential of video-based asynchronous messaging in supporting the development of children's cross-cultural friendships. This paper presents the results of a 2-month study of 30 children from the USA and Greece, exploring their uses of, and experiences with, email and an asynchronous video-based messaging tool we developed called VideoPal. The results from this work highlight the important benefits video provides compared to its text counterpart - email. We conclude with a discussion of the key factors that video enables to benefit the development of children's long-distance friendships.

Introduction

Pen pal programs for connecting students from around the world through letter writing have been popular for generations. Often, they are arranged informally through friendship networks in schools or churches (Bragg, 1989). Pen pal activities have been documented as supporting cross-curricular learning (Lemkuhl, 2002), developing cross-cultural understanding (Barksdale, Watson, and Park, 2007), and serving the need for a close and intimate friend for young children (Shulman, Seiffge-Krenke & Dimitrovsky, 1994). While traditional pen pal activities involve students exchanging postal mail to communicate with each other, advancements in communication technologies have transformed the way people keep in touch with each other. As a result, use of email is becoming more common for pen pal activities.

The work in this paper focuses on studying the use of asynchronous video messages to extend pen pal activities. We developed a video-based asynchronous

tool called VideoPal. Similar to the notion of a pen pal, instead of writing letters or emails, children can send short videos or screen recordings to each other. We were particularly interested in asynchronous video because: a) the primarily text-based nature of email is a limited symbolic representation system (Keil, 2002); b) video may be more effective for young children who have not mastered text-based technologies (Yarosh, Inkpen & Brush, 2009; Hayes-Roth and Gent, 1997); c) video can support non-verbal communication which is often missing or attenuated in text-based communication; and d) the asynchronous nature makes it an ideal tool to support communication between people from different parts of the world spanning many time-zones.

While recent technical and infrastructure developments make the potential of using asynchronous video to support pen pal activities ripe for exploration, there has been little investigation into this type of communication for children. In this study, we explored the benefits of asynchronous video-mediated communication to support pen pal conversations for elementary school students from Washington State, USA and Corfu, Greece. We seek to answer the following two questions:

- What benefits does asynchronous video provide for communication compared to text-based email?
- What are opportunities and challenges for children's use of video-mediated asynchronous communication?

We start with situating our work in the context of previous research on pen pal activities and computer-mediated communication (CMC). We then describe the VideoPal system and present results from a study of 30 children from USA and Greece using this tool for two months. Finally, we discuss key features of VideoPal that were important to support observed usage practices.

Related Work

We draw upon a rich history of previous work on technology mediated pen pal activities, non-verbal communication and video-mediated communication.

Pen Pals

Pen pals are people who write to each other regularly, particularly through postal mail. Writing letters to pen pals has been a popular practice for generations (Barksdale, Watson & Park, 2007) and is especially popular among young children. Further, children's fascination with other cultures, travel, and names of foreign places promotes their eagerness to learn about the daily lives of someone their own age living on the other side of the world (Bragg & McWilliams, 1989).

Pen pal activities have been shown to be beneficial for children. According to Vygotsky (1978), children learn things more effectively through experiences that are meaningful and relevant to them. In addition, pen pal activities give children

an authentic opportunity to learn about others and studies have shown that pen pal activities are effective in helping children develop cross cultural understanding (Barksdale, Watson, & Park, 2007; Kern, 1996; Hare, 1999; Charron, 2007). However, traditional technologies have several limitations in supporting pen pal activities. Exchanging postal mail is costly and can have lengthy delivery lags, which can be major obstacles to the development of pen pal friendships (Kern, 1996). Recently, text-based asynchronous communication tools, such as email, have been increasingly adopted to support pen pal activities because the cost of sending email is low and messages are delivered immediately (Kern, 1996).

In spite of the advantages email offers, the primarily text-based nature of email is a limited symbolic representation system (Keil & Johnson, 2002). To overcome this, some pen pal projects have explored the use of multimedia. For example, in one pen pal project between students from Singapore and Canada, the Canadian students used the fax machine to send local maps to Singapore to aid their communication (Soh & Soon, 1991). In 1989, Bragg and McWilliams organized a Video Pal program between two classes of middle school students from North Carolina and Alabama to learn about each other's state geography information. Students filmed videos about their local areas and sent the video by postal mail to each other. The video exchange program allowed students to see the geographical differences between these two places. Although it was successful, it was a cumbersome for the students to film the videos, sometimes requiring several months to produce one video. With current advances in the Internet and computing technologies, it is worth revisiting the idea that video could be an effective medium to support children's communication and collaboration.

Nonverbal Communication for Children

Nonverbal communication includes the use of gestures, body languages, postures, facial expressions, eye contact, and variations in the pitch and tone of voices, etc. to convey information (Mehrabian, 1972). The role of nonverbal communication in human interaction has been well researched. Studies have shown that nonverbal behavior can be used to regulate conversations and express emotions (Ekman, 1999). Appropriate use of nonverbal communication can lead to productive communication because facial cues can convey effective emotional signals to eliminate conversational confusions (Ekman & Friesen, 1968; Littlejohn, 2002). Further, Mehrabian demonstrated that nonverbal communication is particularly important for communicating feelings and attitude when nonverbal behaviors are incongruent with words (Mehrabian, 1972).

Nonverbal behaviors are also common and important in children's communication. Various studies have shown that children are usually ineffective communicators because they have not mastered the necessary linguistic or cognitive competencies (Piaget, 1926; Krauss & Glucksberg, 1969). Bruner

asserted that all knowledge begins with action, progresses towards iconic representations, and then can be expressed with language. His theory suggested that a language-based medium like email would be more complex for children than a medium that leveraged actions, bodily movement, or imagery because children generally have an easier time expressing their knowledge and ideas through action rather than words. Furthermore, Mundy et al., (1995) demonstrated that nonverbal communication skills provide an important foundation for children's language development. Among various computer-mediated communication (CMC) technologies, video-mediated communication is perhaps the most desirable to support nonverbal communication among children (Ballagas, Kaye, Ames, Go & Raffle, 2009).

Video-Mediated Communication

Synchronous video-mediated communication, like videoconferencing, has been well studied in the workplace, and recently video conferencing has been increasingly adopted in homes to connect extended family members, allowing us to draw on relevant findings from this field (Bly, Harrison, & Irwin, 1993). Two CMC theories suggest that video has several distinctive advantages over text-based emails and thus could be more effective in supporting communications. According to media richness theory, video as a medium allows the simultaneous observation of multiple cues, including body language, facial expression and tone of voice. It is of a personal nature and utilizes natural language, which is high in variety (Daft & Lengel, 1984). Social presence theory suggests that communicating partners can have more awareness about each other's states using videos than using other media, like email or on the telephone (Short, Williams & Christie, 1976), and thus, video could be good for supporting communication among children. Ames et al. (2010) compared children's use of phones and synchronous video conferencing system and suggested that the benefits of video for children include that a) the visual aspects keep children engaged in synchronous video chat, b) less help from parents is needed for children to participate in video chat rather than in phone conversations because children can participate by simply sitting in front of the camera, but c) parents need to provide some scaffolding, namely conversation support, to keep children talking. However, since the context in that study was connecting children with adults, it is not clear whether this kind of conversation support is still needed when children talk with their peers of similar ages.

While previous research has examined the advantages and disadvantages of video (Issacs & Tang, 1994), there is significantly less theoretical grounding as to what computer-mediated asynchronous video can and cannot do for communication. Several ethnographic studies of video conferencing systems in domestic settings have pointed to a strong need for using asynchronous video

based communication to connect family members from different time zones (Kirk, Sellen & Cao, 2010; Cao, Sellen, Brush, Kirk, Edge & Ding, 2010; Modlitba, Schmandt & Globetoddler, 2008). Modlitba et al., (2008) found that children prefer using video chat to using telephones to talk to their travelling parents, but their parents' busy schedules makes it hard to coordinate synchronous video chat. Thus asynchronous video could be particularly rewarding. In another study, Cao et al., (2010) suggested that asynchronous video would be a more flexible means of communication because it only requires that one party be available and could be “initiated outside the communication window dictated by the time difference”.

There has been some previous research on using asynchronous video to connect family members. Zuckerman and Maes (2005) proposed the Contextual Asynchronous System (CASY), which enables family members to send ‘good morning’ and ‘good night’ asynchronous video snippets into a shared family database. The recipient views the snippet in the context of going to sleep or waking up. While they did not actually build the system, they asked participants to use email to send videos as attachments and found that asynchronous video communication increased participants' feeling of connectedness. This work suggests that asynchronous video-mediated communication has great potential for connecting children with other family members, but an empirical study is needed to understand the specific opportunities and challenges of computer-mediated asynchronous video based communication tools with children.

VideoPal System

VideoPal is a computer-mediated, video based asynchronous communication system. It enables users to capture videos, record their screen, upload an existing video, and send, receive, and reply to a video message. Video messages are threaded by topic and each conversation is visually represented. The VideoPal user interface is primarily composed of four windows: the main window (Figure 1), the message play window (Figure 2.a), the create new message window (Figure 2.b), and the screen recording frame (Figure 3).

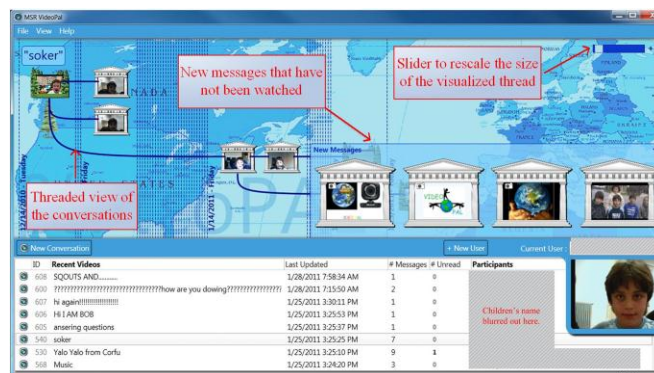


Figure 1. The main window of VideoPal.

The main window allows users to quickly see which conversation threads are available, the properties of each thread (e.g., number of messages, number of unread messages in the thread), a visual presentation of one conversation, the new messages which are shown at bottom of the visualization panel, and the current users' profile photo. From this main window, users can create a new video or play an existing video message. The visualization panel in the main window displays a topically threaded sequence of messages which shows the flow of a conversation – seeing who responded to whom and when, based on the way messages branch. Each video thumbnail is visually decorated to indicate where the video is from. Videos sent from Greece are surrounded by a Parthenon and videos sent from Washington (The Evergreen State) are surrounded by a forest. At the bottom right corner is the new message panel, which shows the thumbnails of the new videos that have been sent to the user but have not been watched yet.

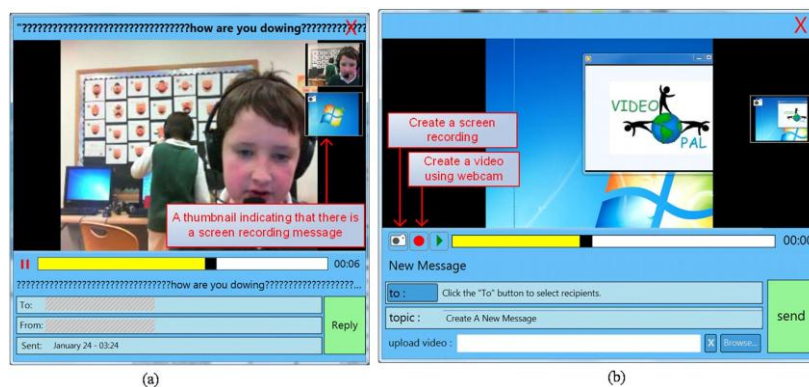


Figure 2. (a) the window for watch a video message; (b) the new message window, children can create a new video using webcam, or create a screen recording or upload a video.

Clicking on a video thumbnail in the main window will open the message play window (Figure 2.a). Children can easily create a reply message by clicking the reply button. Clicking on the New Conversation button in the main window or clicking the reply button in the “message play” window will bring up the new message window (Figure 2.b). Here the children have three different options: 1) they can choose to create a new video using the webcam by clicking the red record button, or 2) create a screen recording by clicking the camera icon, or 3) send an existing video by uploading a video from the computer. The screen recording feature enables users to share parts of their screen while simultaneously narrating if desired. The screen recording frame (Figure 3) outlines the area of the screen that will be recorded. Users can drag to resize the frame to choose the area of the screen they wish to record.

The Field Study

This section describes a two month field study we conducted using VideoPal and email to connect children from the USA and Greece.

The Children and Contexts

The VideoPal project started with a project in a private school in Washington State, USA (WA). One tradition in the WA school is that every year, each grade selects a country to study, and learns about that country's culture and lifestyles. In the final week of the fall semester, the children give presentations about what they have learned about that country to all the teachers, students and their parents. In previous years, the students learned about their chosen country by reading books and looking for information on the Internet. This year, the fourth grade students were studying Greece.

In the fourth grade at WA, there are 2 classes. Class1 has 13 students (6 boys and 7 girls), and Class 2 has 12 students (6 boys and 6 girls). All of the students from WA are 9 to 10 years old. Both Class1 and Class2 have a technology lesson every week which is taught by a specialist teacher in a technology lab. The technology lab contains 17 desktop computers.

We explored potential partner schools in Corfu Greece, but because of infrastructure challenges in the public school system, as well as difficulty getting permissions in place in time, the Greek side of the VideoPal project was administered through Ionian University. In the end, five students (3 boys and 2 girls, ages 11 to 12 years old in fifth and sixth grades) volunteered to participate

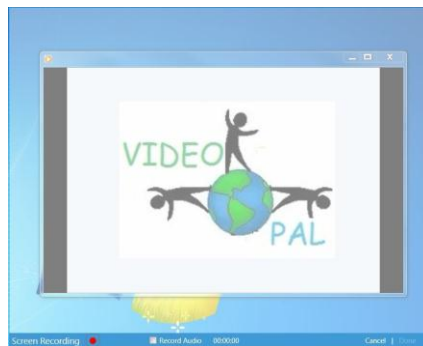


Figure 3. The screen recording frame

in this project. Instead of the project being a part of their school day, all of the students from Corfu took part in the study during their spare time. These students came to Ionian University every Friday evening to use VideoPal and correspond with their pen pals. One teacher also volunteered to come participate in the project and facilitate the interactions. The key motivations for these children and their parents was that it was regarded as a good opportunity for them to practice their English and it also enabled them to learn more about computers.

Study Procedure

Because the number of students in WA was asymmetric to that of Corfu, we divided the 25 children from WA into 5 groups. Each group communicated with

one child from Corfu during the study. Since we paired boys to boys and girls to girls, one girl from Corfu communicated with 7 girls from WA, and the other girl from Corfu communicated with the other 6 WA girls. Each of the Corfu boys communicated with 4 WA boys.

The study consisted of three phases. The first phase was a training session, lasting one week. In this phase, the children were taught how to use VideoPal to send videos and how to use email. Each of the students from WA was given an email account assigned by their school, which ran on a Microsoft Outlook Exchange Server. Each of the Corfu children was given a hotmail account. During this phase each child had the opportunity to practice composing and sending email and they also sent an introduction video about themselves to their pen pal.

During the second phase, which lasted three weeks, the children discussed 2 pre-selected topics every week, one using email and one using VideoPal. Topics were provided to the children to scaffold their use for the first three weeks since they did not know each other. The topics were selected by the teachers from WA, along with a list of suggested questions for the WA children to ask. The topics were counter-balanced to ensure that all the children used both email and VideoPal to communicate with their pen pal, and that each topic was covered using both media. Each week, children from Class1 used VideoPal to discuss one topic and used email to discuss the other topic, and Class2 swapped the method they used for each topic. The children from Corfu typically sent one reply video message and one email to their pen pals each week. The topics covered included school, hobbies/sports, food, holidays, music, family and pets.

The third phase was the freeform use portion, lasting four weeks. The children were no longer required to use both email and VideoPal, but instead could choose whatever medium they desired. They were also allowed to opt out if they no longer wanted to correspond with their pen pal. Additionally, the children were free to talk about whatever they wanted, and did not need to discuss pre-defined topics. Because other material was being covered in the WA school during technology class, the children were given a 30 minute period when they could use the technology lab and send a message to their pen pal. The children from Corfu continued coming to Ionian University on Friday evenings to participate.

Data Collection

A wide range of data was collected to address our research questions including: surveys, interviews, and analysis of the videos and emails the students sent to each other.

During most of the sessions, a researcher was present to assist and observe the children when they were sending their pen pal messages. All of the videos and emails the children sent to each other were recorded and transcribed for later analysis. The students also completed three paper based surveys: one at the

beginning of Phase 1 (pre), one at the end of Phase 2 (mid), and one at the end of Phase 3 (final). The pre-survey collected students' background information, including how interested they were in learning about the other country, their prior pen pal experiences, computer experience and experience using email, video chat, and IM. The mid survey and final survey gathered feedback on their use of VideoPal and explored the differences between VideoPal and email. At the end of Phase 2 and Phase 3 we also conducted semi-structured interviews with the students to get a better understanding about what they liked and disliked about VideoPal and email.

Results

We report on the children's previous experiences with pen pal activities and communication tools. We then report on the children's use of VideoPal and email during the study and their perceptions of the benefits of each.

Background Data

In the pre survey, both the WA and Corfu children were asked to rate, on a 5-point scale (from very boring to very interested), how interested they were in learning about the other country and meeting new friends from the other country. Almost all the students (97%) rated themselves as being interested or very interested.

Prior Pen Pal Experience: Most of the students from WA (92%) had some pen pal experience. Nineteen participated in a pen pal project organized by their school the previous year where they sent letters to children from Ghana, but at relatively low rate (i.e., once every few months); however, none of these children currently have a pen pal. For the children from Corfu, one of the girls used to have a pen pal and she used email to communicate with her pen pal for 2 years.

Experiences with email, IM and Video chat: Many of the children had never used Video chat before but they were relatively familiar with email. See Table I for a detailed report on the children's prior experiences.

Tools	Never Used	Some Experience	Use Every Day
Email	40%	50%	10%
IM	67%	30%	3%
Video Chat	60%	33%	7%

Table I. Students' prior experiences with email, IM and Video chat.

Overall Experience

Overall, the children from both Corfu and WA were extremely excited about the opportunity to exchange messages with children from the other country. When we asked the children what the best thing about the project was, many commented on the opportunity to meet someone from another country. Some of the comments included: “*Sending videos and emails and having the chance to be able to know someone from Greece is just amazing*”, “*I can meet friends in the US*”, “*Seeing somebody in Greece and talking with them and seeing what life was like in Greece*”, “*making a new friend*”, and “*communication with people that I will probably never meet*”.

Phase		WA	Corfu	Mean Length(SD)
2	Video	77	22	28.66s (sd=1.64)
	Email	69	16	41 words (sd=23)
3	Video	97	41	14.20s (sd=10.0 ¹)
	Email	18	12	21 words (sd=3)

Table II. Summary of # of emails and videos sent in Phase 2 and Phase 3.

VideoPal vs Email: A Peek at the Messages Exchanged

Usage data for both email and VideoPal are shown in Table II. In Phase 2, on average every student sent 1 video message and 1 email each week (which was the suggested use given the study protocol). The length of both the videos and emails were relatively short. In Phase 3 the children were free to choose whatever medium they wanted to use to communicate with their pen pal. We saw that video was strongly preferred with the children sending more than three times the numbers of videos compared to email. Additionally, the length of the videos and emails decreased during this phase. Further analysis showed that it was because in this phase instead of reciting a list of questions or answers, the messages were less scripted and more conversational.

During Phase 3, participation was optional and the children could choose to not participate if desired. All of the Corfu children continued to participate each week, while some weeks a small handful of students (2-4) from WA choose not to send messages to their pen pal. During the final interview we asked these students why they sometimes chose not to participate, and most replied that it was because they had a lot of homework, or because they had an after-school activity requiring preparation time. Even though some of the WA students did not participate some weeks, all participated at some point during Phase 3.

¹ In the final 2 weeks of the study, 13 screen capture messages of boys playing a video game were sent. All of these were significantly longer in duration than the average video message and did not contribute to a conversation. These were coded as outliers and are not included in the median length calculation.

Below is an exemplary video conversation (using pseudonyms) from Phase 2. In this conversation, the child from WA asked questions about family and pets and the child from Corfu responded. In addition, Figure 4 shows screenshots of videos children sent to each other during the project.

John (40''): Hi Achilles, I do not play soccer. I am really bad at it. I have a question for you. Do you have any pets? If you have any pet, what kind? Is it common or unusual for Greek families to have pets? What kinds of pets do people have if they do? Do Greek people have any special traditions related to pets? Just wondering. How many people are in your family? How many brothers and sisters do you have? Do you see your grandparents, aunts, uncles, and cousins very often? What kinds of things do you like to do with your family? Are you named after someone in your family? If yes, who? Bye.

Achilles (34''): Hi, my favorite pets are dogs. My dogs! They are beautiful, smart, and cute and they are hunter dogs. We don't have a special custom in Greece with our pets. We will just take them at the mountains to hunt and bring something birds to eat or rabbit. I love my dogs!



Figure 4. Screenshots showing example videos the children sent to each other.

The children used email in similar ways. Children from WA asked questions on a specific topic and the Corfu children responded. Below is an exemplary email conversation:

Jessica: Hi, I have a dog named Daisy. I have a few more questions to ask u. What kind of music do u listen 2? Do u play any instruments? Do u listen 2 any American music?

Aalisha: Hi...I want to tell you about my favorite music. I play piano six years and also I am in a choir. I like music too. I am interested in pop and classic music. On the other hand Greek music is very good. I have a question for you. Have you ever listened Greek music? If yes, what song do you know? Many Kisses. Eleni.

VideoPal vs Email: Children's Perceptions of Use

In the mid and final surveys students were asked to rate their experience using VideoPal and email, from very happy (5) to very unhappy (1) (e.g., "Please show us how you feel about using VideoPal to communicate with your friend over the past several weeks"). We used emoticons as visual aids for the choices (see Figure 5). Although both email and VideoPal were rated highly, the mid-survey



Figure 5. Emoticons used in the survey to measure children's experience using VideoPal and Email

	Happiness		Easier to use		More useful		
	VideoPal	Email	VideoPal	Email	VideoPal	Email	Equally the same
Phase 2	4.48	4.07	76%	24%	48%	11%	41%
Phase 3	4.59	3.97	82%	18%	66%	3%	31%

Table III. Results from the mid and final surveys regarding children’s experience using VideoPal and the final survey revealed that the children were happier with their experience using VideoPal than email (Marginal Homogeneity Test $p < .05$) (see Table III).

We also asked children which tool they felt was easier to use (see Table III). Results from both the mid-survey and the final survey revealed that most of the children (76%) felt that VideoPal was easier to use than email (mid: $\chi^2(1, 29) = 7.76, p < .05$, final: $\chi^2(1, 27) = 10.70, p < .05$). The children were also asked which they felt was more useful for them to learn about their friend. Most of the children felt that VideoPal was either more useful, or equally useful. A one-sample chi-square test of children’s perception of usefulness showed significant differences in proportions, (mid survey: $\chi^2(2, 29) = 7.10, p < .05$, final survey: $\chi^2(2, 29) = 16.83, p < .001$. Post-hoc tests showed that more children felt that video was more useful than email ($p < .05$). The perceived difference in usefulness actually grew in Phase 3 with more children stating that VideoPal was more useful, and only one child stating that email was more useful.

“VideoPal is more fun!”

Data from both the mid and final surveys and interviews indicated that the children generally liked using both email and VideoPal, however, when asked which medium (email or VideoPal) they would use if they could only have one, all of the children except two chose VideoPal. The children were also much more enthusiastic about their use of VideoPal. Some comments included: *“VideoPal is more fun”*, *“(I like) the awesome movies from Corfu”*, *“I like sending videos to my friends and my video pals.”*, *“I have enjoyed making the videos and sending them to people”* and *“I like to talk with my friends, and I want to see them every Friday because I love to have communication with them”*.

Several distinctive features of video emerged that explained why the children preferred video to email. This included: being able to see and hear their friends, enabling them to know their friend better, enabling a feeling of being there, showing things easily, and avoiding typing. The following sections elaborate on each of these findings and also discuss the benefits of email.

“You Get to See the Person”

The children found it beneficial to be able to see their pen pal friends and hear their voices. The most common reason the children gave for wanting to use VideoPal was that they could *“see the person”*. As Aalisha explained, *“I like to*

see them on the Video. It is better than email.” Jane commented that “*you can see who you are talking to and listen to their voice and everything. For the email, you might in a million years, never even see the person*”. Kim mentioned that “*I like VideoPal better because you can see the person and see what they talk like*” and “*you can actually hear how they speak, what they look like and see what other kids are doing*”. Monica said “*You get to see their personality, what they look like. It is cool because you get to see them from a far off place*”, and Achilles explained that he could “*talk face-to-face*”.

The children also felt that being able to see their friends gave them the opportunity to interact with them in a personal way and get to know their personality. Matt said, “(I like VideoPal because) *it is easy to goof off with video and you can see their expressions in the video.*” Emily said “*I like VideoPal because you can do more in person*” and Karen said “*I really like that you can see the person and tell their personality*”. Amy emphasized that “*I think one good thing about VideoPal is that ... if they really get excited about something, you can see their motions like I am so excited about this. I can explode.*” Maggie also commented that “*you can actually see their emotions in VideoPal*”.

“You Get to Know Them Better”

In the final interview many of the children commented that they felt they were able to get to know their pen pal friend better because they used video. Jane commented that “*You get to really know your pen pal a lot better. You get to see what they look like. You get to know their personality and how they talk.*” John remarked that “*I know him better because of video. You can see what they look like*” and Emily explained that “*you could recognize them*”.

As mentioned above most of the children from WA had traditional pen pals from Ghana the previous year. They exchanged 3-4 letters with these pen pals over the year. When asked to compare how well they knew their Corfu pen pals as compared to their Ghanaian pen pals, almost all of the children felt that they knew their Corfu pen pals better. As Maggie explained, “*It seems like we have known our Greek VideoPals for more than a year ... and like Ghana, it feels like we’ve only met them for a day.*” The two students who did feel like they knew more about their friend from Ghana explained that her letters were quite long and gave a lot of detail about her family. However, despite knowing a lot of facts about their pen pals from Ghana, they felt that they knew the personality of their Corfu friend better.

“It Feels Like You Are With Them”

During the final interview, some of children commented that a benefit of VideoPal was that it helped them feel like they were “with” their friends. As John explained, “*it is kind of like they are right in front of you*”, Katrina commented,

“Because it feels like you are there”, and Jason remarked “you can have a conversation with them”. These feelings of being there were never expressed for email. Feeling like they were with their friends also made it easier for the children to feel like they were having a conversation with their pen pals. As Eleni mentioned, “I like VideoPal because I like to have a conversation with them, which is more important than email.”

“You Can Show Them Things”

Another benefit the children expressed for VideoPal was that it enabled them to “show” their friends things. As Adam commented, “if they are trying to show you somethingyou can just show them”. Given that the children used VideoPal in computer labs, this limited their ability to share somewhat, although there were some opportunities where the children did show each other things (Figure 6). For example, Aalisha plays the piano and loves music so she showed her music books in one of her VideoPal messages. Aalisha also took the opportunity to show her WA friends how to tie a knot in one of her VideoPal messages. In another message, Eleni explained to her WA friends that it was her birthday and showed them the shirt she received for her birthday.



(a) (b) (c) (d)
Figure 6. (a) showing a watch he got for Christmas; (b) showing the shirt she got for her birthday; (c) showing her music book; (d) showing how to make a knot.

“I Don’t Like to Type”

One practical reason why many of the children preferred VideoPal was that they were not good at typing. For example, Kim mentioned “(I didn't like emails because) you have to type... (Typing) is just boring!” John: “I am really a slow typer, and it is easier for me to say what I want to say”. Debbie: “I am not a good typer and I don't want to type”. We also noticed during our observations that many of the children type using one finger.

Benefits of Email

While VideoPal was generally preferred by the children, email was still desired and many children wanted access to both. One key benefit was that email helped

overcome problems with accents, or audio problems. For instance, Amy commented “*You can get more information in email because in VideoPal sometimes it is hard to hear them or they have some accents. But in email, you can just see the words on the screen.*” Adam also commented “*Email is better because you can always understand them.*”

A second benefit to email was that the children did not need to worry about their appearance when using email and felt that it could hide emotions, if desired. For instance, Rose commented that “*If you had a bad hair day and you don’t want anyone else to see it. You want to use email*”. Amy also commented “*if you don’t want to see the person’s feelings, email is better*”.

Another benefit of using email to communicate with their pen pals was that email sometimes made it easier to manage the exchange of facts in a more relaxed way. For example, Achilles commented that “*you cannot manage video message when there are many questions asked.*” Eleni explained that “*(I can) take time to write details, comment on photos*”. Aalisha also mentioned that “*(email) is easier to focus on things and it is slower and relaxed*”. This was also an issue because editing and search facilities were not provided in VideoPal. For example Matt mentioned that “*You have to, like think before you do it. If I say something wrong, you have to redo the whole video. (For email), you can just (use) backspace*” and Maggie complained that “*If you can’t remember the questions that they asked you, you can’t really go back, you have to restart the whole video.*”

As noted earlier, being expressive was clearly important to the children. Email does provide some forms of expression. In our study, 20% of the emails included text that was meant to express emotion such as a series of exclamation marks or emoticons. For example:

Jane: HEEEEEEEEEEEEEEEEEEEEELLLLLLLLLLLLLLLLLLLLLLLLLLLLLLOOOOOOOOOOOOOOOOOOO

Eliza!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! I am very excited. We are going to have a snowstorm!!!!!!!!!!!!!!!!!!!!

Aalisha: Hello. I am Eliza and I’m eleven years old. I live in Corfu. I go to the 5th class of Primary

Shcool. My favourite hobby is dancing, volleyball,basketball and my favourite subject is **History**. 🎵

🎵 What is your favourite hobby??? 😊😊😊

Information Density

We were interested in whether the amount of information exchanged using VideoPal and email was different. All the videos and emails were transcribed and coded for the number of questions asked in each video and email, and the number of words in each video and email. Since all the questions asked in the videos or emails were questions suggested by the teachers, the number of questions asked was further normalized based on the number of questions suggested for each topic. Two 2 (media) x 3 (weeks) within-subject ANOVAs were performed. One was performed on the normalized questions asked and the other was done on the number of words in each message (see Figure 7).

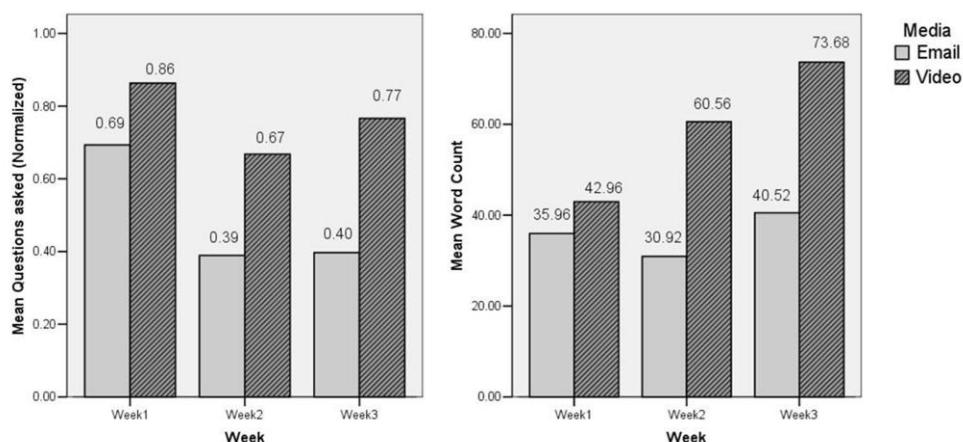


Figure 7. Results of the 2 x 3 ANOVAs: left, the normalized # of questions asked; right: the word counts.

The 2 x 3 within-subject ANOVA on the normalized # of questions asked revealed a significant effect of media, $F_{1,11}=7.31$, $p<.021$ ($p<.001$); namely, a higher percentage of the suggested questions were asked in videos than in email; the effect of time (from week 1 to week 3) was also significant, $F_{2,22}=4.25$, $p<.028$. The interaction was not significant, $F_{2,22}=2.48$, $p=.107$.

The 2 x 3 within-subject ANOVA on the number of words revealed a significant effect of medium, $F_{1,11}=10.42$, $p<.009$ ($p<.001$), namely, more words were spoken in the videos; the effect of time (from week 1 to week 3) was also significant, $F_{2,22}=3.84$, $p<.04$. Finally, the interaction was also significant, $F_{2,22}=5.36$, $p<.02$.

It was not surprising that the children felt that they could get more information from the videos (as reported earlier) given that video provides nonverbal information, such as gestures, eye gaze, emotions and expression information. However, it was interesting to find that video also provided more verbal information than email. The children asked more questions and spoke more when using video as opposed to email.

Scaffolding Use

According to Bruner (1975), scaffolding represents the support provided by adults to help children do something beyond their independent efforts. In this study, the WA teachers provide scaffolding for the first three weeks in the form of suggested discussion topics and questions. The scaffolding was provided because it was felt that the children would find it difficult to come up with questions to ask or things to talk about since they did not know anything about their pen pal at the beginning of the study. The suggested questions were given to every child with a reminder that they were just suggestions, and they should feel free to rephrase them if desired. All of the children used the suggested questions, and often placed

the list near the computer so that they could easily refer to it while composing a message to their pen pal.

Free Choice

In Phase 3 the children were allowed to use whatever medium they desired, and were free to send messages about any topic. As reported before, VideoPal was used significantly more than email during this phase. Additionally, VideoPal tended to be one that the children used first. For example, at the beginning of the sessions, most of the children would first start up VideoPal, check for new video messages, and then send a VideoPal message to their pen pal. About half of the children would then choose to return to class, while the remainder checked their email and sometimes sent a reply.

Given that the children were free to talk about anything, the topics were quite varied. This included recent events, presents they got for Christmas, their upcoming birthday parties, new clothing, things they have learned recently, events that they have been to, their common interests (music, sports) and things happening in their everyday life (losing a tooth, a van on fire near the school). Additionally, the conversations seemed to be much more natural in this phase. Instead of reciting a list of questions or answers, the messages were more conversational. For example, during one VideoPal conversation, two children discussed their favorite songs, while in another two children discussed birthdays and a tooth that one of them lost recently (which she showed in the video).

Jackie (11''): Hi, Achilles. My friend told me that you are a huge Lady Gaga fan. So am I. I just want to say hi. I also like Lady Gaga. Bye.

Achilles (12''): So you like Lady Gaga. Who is your favorite song? Alejandro?

Jackie (13''): Hi Achilles, my favorite singer is Lady Gaga. It is Alejandro, Paparazzi and Bad Romance. What's yours? Bye.

Aalisha (11''): hello, tomorrow I will have my birthday party. My present for my birthday is this shirt. When is your birthday? Bye

Jane (14''): Hi Aalisha. My birthday is Feb14th, Valentine's Day. But my birthday party will be on Feb.13th. And I lost my tooth today.

Aalisha (7''): So! really! I lost the same tooth this day. Bye.

The children also used email to talk about similar topics, like presents they got for Christmas, their favorite books or favorite songs.

Aalisha: Happy new year!!!! How did you spend your Christmas Holidays?? What present did you get?? My present was a karaoke set. What about you??? AALISHA

Rose: Oh my goodness!!!!!!!!!!!! That's so funny because I wanted a karaoke set for Christmas and I didn't get one but you got one! Ha ha ha! I got nail polish, a wii game, and some candy. I spend my Christmas with my family at home. Happy New Year to you too! Rose

Discussion & Conclusion

This cross-cultural VideoPal project has been very successful. Most importantly, the children from WA and Corfu developed friendships and have loved using VideoPal (none of the children want the experience to end). The project offered children an authentic experience to talk to children from the other side of the world and learn about each other's cultures and lifestyles. Given our global economy, this kind of cross culture dialog can be very beneficial for children.

In terms of research goals, the results from this study have highlighted the potential of video to support rich conversations for children, compared to email. The children generally preferred VideoPal to email because they felt that it was more fun to use and they liked being able to see each other. The children also felt that the use of video was more personal, that it enabled them get to know each other better, and made them feel like their pen pals were closer to them. The use of video also enabled the children to communicate in a natural way, utilizing natural language, body language and facial expressions. These results are consistent with media richness and social presence theories and demonstrate that these benefits can be realized using asynchronous video messaging with children.

Besides the richness of video, we also believe that the asynchronous nature of VideoPal was critical to its success. For cross-cultural pen pal activities where the children are located many time-zones apart, synchronous communication is not possible. Additionally, even if the children are in the same time zone, synchronous interactions require that both parties be available at the same time. Given the busy schedules in most schools, trying to coordinate exact meeting times would be problematic. Finally, current networking infrastructure in most schools would inhibit real-time video communication, especially with many children trying to interact simultaneously. Our use of asynchronous video enabled messages to be delivered off-line, and therefore the children's exchanges were not impacted by network latency.

One key design goal for the VideoPal system was that it should be easy for the children to send and receive videos, and follow a conversation comprised of several messages. The children in our study found VideoPal easy to use, and even easier to use than email. This, combined with the fact that children often find it easy and natural to talk and express themselves using video, led to more frequent use of video and higher information density in the videos compare to email.

Although this study uncovered many benefits of video, the children also enjoyed using email and we observed several benefits of email. For example, email can help overcome accent issues, audio problems, or feelings of self-consciousness. It was also felt that email could make it easier to manage the exchange of facts in a more relaxed way.

The VideoPal project has been an invaluable learning experience for the children. Although the VideoPal system was designed as a generic video

messaging system and has not been adapted to the particular needs of schools and learning, the teachers have reported that the students who are participating have increased both their technical and personal skills. In particular, the Corfu teachers have reported that the students have improved their English and computer skills, as well as gained increased self-confidence in talking with others. Since learning is a social process, besides the immediate social context, students are benefited by socializing with remote students from the same or different cultures where they can discuss common topics of shared interest. A potential area for future work is to examine the use of VideoPal for a particular course or learning activity, such as a common school project that takes place over distance.

Some of the limitations with this study included the fact that we had an imbalanced number of children from WA and Corfu. As a result, the children from WA usually received emails and videos that had been sent to a group, and may have felt less personal. Additionally, the sending and receiving of messages was done as a structured activity once a week. It would be interesting to see how the communication would differ, as well as the resulting relationships, if the children could correspond more frequently, whenever they desired.

The results of this work clearly demonstrate the power of asynchronous-video to connect children in cross-cultural exchanges; however, there are many other interesting research questions in this space that have yet to be explored. For example, what happens when the children get to know each other better, would this reduce the need for video and increase their use of email? What if the children do not speak a common language, are there ways they can utilize video and machine translation to communicate despite not being able to understand each other's language? Also, can VideoPal be used to structure peer learning over distance? These questions remain fodder for future work in this area.

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