# UI DESIGN AND CROSS CULTURAL COMMUNICATION

## A Thesis by David Edem Dotse

**ASHESI UNIVERSITY COLLEGE**

**UI & CROSS-CULTURAL COMMUNICATION: A
JELYPALS PERSPECTIVE**

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Thesis

# Declaration

I hereby declare that this dissertation is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature: …………………………………………..………………

Candidate's Name: …………………………………………………………………..

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I hereby declare that the preparation and presentation of the dissertation were supervised in accordance with the guidelines on supervision of dissertation laid down by Ashesi University College.

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# <u>ACKNOWLEDGEMENTS</u>

# ABSTRACT

This thesis explores young Ghanaian students' conceptualizations of and reactions to a website. In a study that comprises a design evaluation of an online pen-pal website and usability testing with students, it attempts to determine to what extent such a website can be used to help African-American and African children form better perceptions of each other, and how a design of a website. The approach used first determines what Ghanaian students' expectations of a pen-pal website are, and comparing them to that of American students, and then having them testing it and giving feedback based on their reactions. Suggestions are then made for future measuring website usability and cross-cultural communication.

**Key Concepts:** *pen pal studies, cross-cultural communication, usability.*

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# CHAPTER 1: INTRODUCTION

## 1.1: PROBLEM STATEMENT:

We live in a world connected by technology yet divided by invisible barriers and social constructs. Ideas of race, religion and nationality are often the barriers to good cross-cultural relations among different social groups. This is often due to stereotypes held by both parties, whether consciously or unconsciously. There have been many attempts to combat stereotypes among groups. A lot of these attempts center on, or feature communication. A good way of achieving this is to use education, and focusing on younger, more malleable minds. So to what extent can technology be used to change mindsets?

One attempt to address to this is JELYPals. JELYPals is an online pen-pal website to connect young children in different African countries with African-American children. The site seeks to provide an environment that allows the children to learn about each other by exchanging information by way of pictures, text and video. The aim is to help them discover similarities between themselves and hence gain a better understanding of each other. It hopes to help counter stereotypes about Africans as well as African-Americans through the use of technology.

My thesis attempts to evaluate the design of the site in order to assess its effectiveness. I intend to study the design of the site, and determine the extent to which it is able to increase the children's understanding of each other's lifestyles and cultural values. I will explain further in the objectives.

## 1.2: OBJECTIVES

The objectives of this thesis, which were created around the aims of JELYPals, can be simply explained as an analysis of the site design as well as implementation, with emphasis on interaction design standpoint. The experiment will therefore be the outcome, and the conclusion the analysis of this outcome. They are as follows:

1. *Evaluating the effectiveness of the JELYPals pen-pal system in creating meaningful relationships between Ghanaian and American junior high school students.*

   o *Determining the efficiency of the site in terms of usability, using feedback from the students.*

Exploring the website's role to enable the students to form relationships with each other will be one of the aims of this research. I will be looking the types of relationships formed, be it that of acquaintances, or good friendship, and try to determine the cause of the type. This will be complemented by the usability feedback provided by the students, about general uses of the site as well. Specific areas to be tackled include:

**Communication:** The parts of the site which include communicating with the other pen pals, such as message-sending and note-posting.

**Navigation:** This refers the flow through the different pages of the site.

2. *Studying how the components of the website contribute to good communication between the African students and the African-American students.*

○ *Evaluating the ability of the site usage to influence/change the children's perceptions of one another's culture and lifestyle.*

○ *Understanding how the two different student groups envision a pen-pal website and how they react to the one presented to them.*

The paper is intended as an in-depth exploration of the JELYPals web site's main aim. This is to help promote mutual cultural understanding between African-American children and African children. This is done specifically through their pen-pal system, allowing students, under the guidance of their teachers to communicate with each other, and share information. *Cultural understanding* here refers to the students' formation of accurate perceptions of each other's culture, as well as the altering of stereotypes, or inaccurate notions previous held by both parties. The ability of the site to achieve this will be analyzed in the context of human computer interaction.

## 1.3: THEORETICAL FRAMEWORK

The discourse under which this thesis falls under is mainly keypal studies. Due to the fact that JELYPals is computer-based and runs via the internet, we must also place it under the field of Computer-Mediated Communication. And as a means of testing effectiveness, I adopt certain Usability Testing Methods, and must also find ways of measuring the perceptions of students towards perceptions. Bear in

mind also that this study focuses on young children, so all the research from all these fields must all link to this.

Much of my work is based on Hatami and Thorngate's 2010 work with online pen pals and cross-cultural communication. I attempted to replicate the results of their experiment i.e. the positive changes in perceptions of different cultures towards each other (Hatami & Thorngate, 2010), while applying aspects of their methods combined with others to young Ghanaian and American students.

## CHAPTER 2: LITERATURE REVIEW

A considerable amount of work has been done in the fields I am conducting research in. However, technology is changing at a very rapid rate. This implies that there will be always the need for new and up-to-date research in order to document, analyze and understand these changes. New technological designs, applications and meanings promote change and influence or alter the status quo (Okan, 2007). This idea, I believe is the basis for my research in exploring the uses of online communication, i.e. the JELYPals website, and its ability to change the perceptions of the African-American and Ghanaian children using it.  Understanding an online pen-pal system like JELYPals requires analysis of different fields of study. This includes the study of Computer Mediated Communication in building relationships, specifically "the psychological aspects of attitude and stereotype change and cultural awareness" (Hatami & Thorngate, 2010). It also involves analyzing online pen-pal systems, known collectively as the field of key pal studies. I will also draw from theories in Usability Testing, in analyzing design and flow. I will then attempt to link all three fields.

## 2.1: COMPUTER-MEDIATED COMMUNICATION

Computer Mediated Communication can be defined as multimodal, often (but not exclusively) Internet-mediated communication (Postmes, Spears, & Lea, 1998).

It has become a very widespread mode of communication in different facets of life, from social to professional life. I intend to focus on its use in the social aspect, specifically (with regards to JELYPals), its role in building and sustaining meaningful relationships.

## 2.1.1: CMC IN RELATIONSHIP-BUILDING

There is quite a lot of information regarding CMC and its use in relationship-building. After the creation of internet chat-rooms, forums and other social networks, CMC has evolved as a means of understanding the internet, in terms of interpersonal interactions. Needless to say, relationships on the internet can be analyzed in several different contexts.

While some argue against it as not being able to create authentic connection between two parties (Stoll, 1996), others believe it to be just as efficient at creating meaningful interaction (Rheingold, 1993). Some arguments against it focus on it being an inadequate means of sharing emotional content (Kiesler, 1984). Stoll asserts that in order to make friends, one must interact in real life and not in CMC, believing the latter to be a waste of time. It is also argued that the lack of non-verbal cues have the potential to dehumanize communication (Chesboro & Donald,

1989). This is because, as Baym (1995) points out, "it filters out important aspects of communication that participants in face-to-face communication are privy to (paralanguage-pitch, intensity, stress, tempo, volume), leaving a conversation in a social vacuum". This point has of course been fairly weakened since the advent of Voice-Over-IP communication software such as Skype. However it still holds in the context of a pen-pal website like JELYPals, which uses text as its primary mode of information exchange.

The counter-argument to this is that people bring their real-life problems and personalities online, so it does include emotional content (Chenault, 1998). Brittney G. Chenault argues that CMC offers a wealth of new possibilities for interpersonal communication, which should be explored instead of condemned (Chenault, 1998). It has also been argued that the anonymity or *pseudonymity* of CMC allows people to be "more of themselves than they normally express". I believe that this 'decrease in social inhibition' can also be due to the fact that both parties are not physically present, and as such, one does not feel the need to be pretentious. This point is further illustrated in the paper by Tom Postmes et al stating that, "it has been proposed that the breakdown of physical boundaries is accompanied by a breakdown of social boundaries imposed by traditional norms and social roles, presumably because electronic interaction gives the individual greater freedom from social structures" (Postmes, Spears, & Lea, 1998). With regards to JELYPals, this quality of CMC would allow children to be able to express themselves more openly to their pen pals, perhaps even better than if they were face-to-face. Drawing on the work of Carl Rogers on the perceptions of the 'true-self' and the 'actual-self',

other studies also recognized the reduced-cue environment that is provided by CMC (Sheeks & Birchmeier, 2007). However, Chenault believes that CMC is a social phenomenon. He goes on to state that debate about CMC should not be about 'if' it can provide meaningful, but rather how it can. I agree with this statement and believe that JELYPals website is a good example of how CMC is used to foster interpersonal communication. According to Baym, CMC not only lends itself to social uses but is, in fact, a site for an unusual amount of social creativity (Baym, 1995). I am inclined to agree with Baym on the potential of CMC, particularly as our lives become more and more dependent on the internet. This fact forces us to come up with new and creative ways to fit it around our lifestyles, help us to improve it. I believe that an online pen-pal system is exactly the kind of creativity that CMC is capable of fueling.

## 2.2: KEY PAL STUDIES:

CMC in regards to online pen-pal systems also addresses similar issues. There have been several online pen-pal studies between groups of different cultures. Some data from these studies suggest that the pen-pal communication can increase motivation for learning literature, improved language skills, and increase knowledge about the culture (Liu, 2003). One of these studies focused on educating the parties by having them engage with one another on the issues they were to learn about (Eastmond & Lester, 2001), and another allowed each group to answer questions posed by the other groups (Salmon & Akaran, 2001). A particularly interesting study involved Canadian and Iranian university students who

were allowed free rein for online e-mail exchanges for seven weeks (Hatami & Thorngate, 2010). Data showed that "attitudes of participants towards people from the other country became more favorable, even though their judgments of the similarities between two cultures remained unchanged. Negative stereotypes changed towards more realistic ones," (Hatami & Thorngate, 2010).

Another study worth mentioning is Harrison and Kitao's research on key pal[1] friendships and their influence on learner development (Harrison & Kitao, 2005). This study involved two groups of students who partook in a survey about their experiences with a key pal they were working with as part of a course project. The study consisted of 25 men and 46 women who filled out a questionnaire not much different from the ones in Hatami and Thorngate's study. The questionnaire used a 6-point Likert scale as well as free response statements and was divided into two stages. They concluded their study saying that key pals could be an extremely rewarding response for students and can be a possible motivation to learn. I believe that this potential for a rewarding experience is what JELYPals is capable of.

The results of their study lead me to believe in the capability of a system such as JELYPals to change perceptions of the children towards each other. I intend to adopt Hatami and Thorngate's framework for measuring attitudes towards participants for my own study. The Likert scale used in the Harrison-Kitao work also proves useful to me. However, the nature of questions that were asked in the study requires some level of maturity, which junior high school students do not have.

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[1] Key pal refers to an online pen pal.

Therefore, I will modify my methods by using free response statements mixed with Likert scale responses.

## 2.3: CULTURE, ATTITUDE AND PERCEPTIONS IN CMC:

In understanding how people form perceptions of other cultures as well their effects on communication, we must first understand the concept of perception. Perception is defined as the subjective process of acquiring, interpreting and organizing sensory information (Nelson). In the *Journal of Personality and Social Psychology*, Xi Zou et al. discuss some mechanisms of cultural influence. Their study revolved around the idea that culture affects people through their perceptions of what is consensually believed. They base this on the theory held in social psychology that individuals, in many cases act on ideas that they believe are commonly held, or in other words, what is known as the status quo (Zou, Tam, Morris, Lee, Lau, & Chiu, 2009).

They go on to introduce the concept of perceived consensus. Different from objective consensus, this refers to what an individual personally believes his society's standards to be, and not necessarily what they actually are. Their method involved three different studies, all variations of the first, which aimed to measure perception of personal and consensual collectivism across different cultures. The crux of their findings supported the argument that on average, individuals tend to conform to what they believe is the consensus of their general culture.

Diana Petkova's work in Cultural Diversity also seems to agree with, and expand on this. Drawing from the work of Freud and others, she posits that the cultural identity is shaped by the comparison between other cultures, and the affirmation of 'self' is brought about by the 'othering' of differing groups. In other words, identity is grounded by some sense of shared group characteristics distinct from others (Petkova, 2006). This theory accounts for the formation of stereotypes of other groups with shared characteristics.

From her work, it is quite evident how the formation of stereotypes between African-Americans and Africans could arise. According to Petkova, different cultural groups find their identity by identifying what is different about them from other groups. Although Africans and African-Americans do share some physical similarities, the foremost being race, there are other factors which distinguish the two such as language. Such distinctions therefore would therefore need to be more carefully scrutinized in order to affirm the individual identities of African and 'African-American'. Taking into account to the years of cultural evolution apart from each other, it makes sense that these two groups which came from the same land see themselves as far removed from each other.

Petkova's main study involves the analysis of certain stereotypes, and their effect on the attitudes of the subjects. Stereotypes, in this context, are defined as beliefs about certain personality characteristics that other social, ethnic or national communities possess. She notes the danger of stereotypes in fostering hostility and xenophobia (Petkova, 2006), due in my opinion, to misunderstandings. I feel that most stereotypes are created either from misinformation or misrepresentation of a group to a person, or through negative experiences with a culture which one has

come to accept as the norm in that particular culture. Petkova goes on to explain that it is necessary for cultures to have extensive knowledge of other cultures in order to overcome such stereotypes. In the case of African-Americans and Africans, communication and interaction between two groups over an extended period (as is the case with the JELYPals) could be the key to this enlightenment.

Petkova's research with Bulgarian and Finnish students was a study measuring perceptions of different cultures towards each other. This study, slightly similar to Hatami and Thorngate's work, also makes use of Likert scales, and simple adjectives or statements as measures. It does not however, measure perceptions again and does not initiate any communication between the two groups as in the Hatami and Thorngate work. It is not a pen pal study but still provides useful information on ways of measuring perceptions. One example of this is the question that was asked in the study about marrying into a different culture. The respondents were simply asked how they felt about intercultural marriage and were given the option of choosing from a scale of 'happy', 'not so happy', 'not happy at all' to 'any answer' to reply. This mode of answer does not leave any room for detailed explanation, but at the same time allows for the most measurable form of test, as opposed to an interview which would be full of details which might be harder to analyze. It is important to note now that the aim of understanding perceptions in the case of the JELYPals students is not just for its own sake. It is also to see if there is a correlation between their perceptions and how they communicate, i.e. using the website.

Other studies have focused on the perception of symbols by people of different cultures as a means of investigating possible differences in visual

perception. Sauman Chu's work involving symbols from the U.S and Hong Kong is of particular interest. His studies suggest that the meaning of a sign is dependent on the interpreter's personal history and culture (Chu, 2003). This could give ground to my hypothesis that people of different cultures would have different conceptualizations of a design. If a symbol could have different meanings in different cultures, then one can conclude that that concept would have different representations across different cultures. In the case of JELYPals, is it worth to consider that the African-American and African students might envision a pen-pal website differently as per their different cultures? And if so, is it worth it to incorporate elements that appeal to both cultures? I intend to explore this.

Xi Zou's work is very important to this paper, because the very foundation of the JELYPals website is inter-cultural communication. The perceptions of the participants, according to Xi Zou, will be influenced by what they believe to be the general consensus of their culture. Of course, we know that the aim of the JELYPals website is to influence these perceptions, if they happen to be biased or inaccurate. But in order to change perception, we must first understand what it means to perceive. This then brings us to the next question- how can we measure perception?

Since the idea of perception is inherently subjective, the reliability of a survey measuring that property becomes an immediate concern. The accuracy of the survey is dependent on several factors, including communication mode and coordinate efforts (Nelson). This implies that the means of gathering the information will determine its accuracy.

In Hatami and Thorngate's study, the groups were given questionnaires to measure knowledge about, attitude towards and perceived stereotypes of each other's cultures (Hatami & Thorngate, 2010). The questionnaires used numeric scales (0-9) largely to measure these properties. Additionally, the tests were administered before and after the e-mail and the differences were analysed to see there was any change, and what the cause could be allocated to. Although, I think this is a very elaborate and thorough study, the methods cannot be directly applied to my study because it deals with younger children.

Understanding different individual's cultures and mindsets in CMC is very important because it will more often than not predict the outcome of the communication. Lin (2008) discovered that interlocutors from different social and cultural traditions tend to use their own cultural values and systems to comprehend and interpret new social situations (Baumer & Rensburg, 2011). Additionally language is not culturally neutral, as it is continuously reinvented, moulded and constructed by cultural norms (Deutscher, 2005; Kasper & Kellerman, 1997; Mills, 2008). This is why it is important to use an appropriate method to understand the cultures of different parties involved in CMC.

Cultural perceptions will form a basis for the interactions between the students using JELYPals. The fact that they are from different countries will influence the way they speak, and understand each other.

## 2.4: USABILITY TESTING (WITH CHILDREN)

As part of the design process, it is essential to consider the website usability. While efficient algorithms and elegant code are important, as Nielsen (2010) said, *if a website is difficult to use, people leave*. Some research pertaining to usability testing with children focuses on the means of getting relevant information out of the children. For instance, studies show that working with children age 3 and under simply cannot yield profitable results.

As is advised, the most efficient means of conducting usability tests is having participants partake in specific scenarios, while the tester observes and records (Leavitt & Shneiderman, 2006). Specifically, with regards to testing a system like JELYPals with young children, I feel that they would need a guide and some sort of objective, for two reasons. The first is to direct their efforts, as children often need instruction in what they are doing. The second is to maintain their interest, the way games capture the attention of kids. They would be more likely to concentrate on the task if they felt that it was a kind of game, a 'mission' they had to accomplish. According to chapter 13 of *The Handbook of Usability Testing*, testing with children should be as simple and to-the-point as possible (Rubin & Chisnell, 2008).

"Children *get* usability, but most are not patient with complexity. Rather than persisting, the typical reaction is to stop and do something else. They are also highly aware of what is appropriate for their age and abilities and will tell you quite clearly. Expect high-energy sessions and frank comments." (Rubin & Chisnell, 2008)

Again, I find this to be a valid point. Allison Druin (2002) also reports that children are incredibly honest and harsh in their assessment of technology, and have little patience for what they don't like. I believe that it is very important to consider these when designing. JELYPals, in particular, being designed and targeted towards children would need to be very meticulous in doing this in order to provide the best user experience for them.

## 2.4.1: CHILDREN VS. ADULT USERS

A study conducted with children ages 3 – 12 by the Nielsen-Norman group, was conducted nine years apart and came up with the following differences in browsing habits between children and adults through their observations (Nielsen, Children's Websites: Usability Issues in Designing for Kids, 2010).

**Table 2.4.1.1:** *Browsing Habits of Adult & Child Web Users (Taken from Nielsen, Children's Websites: Usability Issues in Designing for Kids, 2010)*

| Characteristics | Children | Adults |
|---|---|---|
| Goal in visiting websites | Entertainment | Getting things done Communication/community |
| First reactions | Quick to judge site (and to leave if no good) | Quick to judge site (and to leave if no good) |
| Willingness to wait | Want instant gratification | Limited patience |
| Following UI conventions | Preferred | Preferred |
| User control | Preferred | Preferred |
| Exploratory behavior | Like to try many options Mine-sweeping the screen | Stick to main path |
| Multiple/redundant navigation | Very confusing | Slightly confusing |
| *Back* button | Not used (young kids) Relied on (older kids) | Relied on |
| Reading | Not at all (youngest kids) Tentative (young kids) Scanning (older kids) | Scanning |
| Readability level | Each user's grade level | 8$^{th}$ to 10$^{th}$ grade text for broad consumer audiences |
| Real-life metaphors e.g., spatial navigation | Very helpful for pre-readers | Often distracting or too clunky for online UI |
| Font size | 14 point (young kids) 12 point (older kids) | 10 point (up to 14 point for seniors) |
| Physical limitations | Slow typists Poor mouse control | None (unless disabled_) |
| Scrolling | Avoid (young kids) | Some |

| | Some (older kids) | |
|---|---|---|
| Animation and sound | Liked | Usually disliked |
| Advertising and promotions | Can't distinguish from real content | Ads avoided (banner blindness); promos viewed skeptically |
| Disclosing private info | Usually aware of issues: hesitant to enter info | Often recklessly willing to give out personal info |
| Age-targeted design | Crucial, with very fine-grained distinctions between age groups | Unimportant for most sites (except to accommodate seniors) |
| Search | Bigger reliance on bookmarks than search, but older kids do search | Main entry point to the Web |

What comes up as interesting information is that young children do not rely on the 'Back' button. The study does not offer an explanation for this, but it does however note that children make use of spatial navigation, and real-life metaphors. This is potentially useful information in designing navigational tools that would work for children. In designing the JELYPals website, this could be considered. It is also worth noting that as previously stated above, children (like adults) do not have much patience for websites on their first encounters with them, but however tend to be more exploratory when going through websites. This implies that it is necessary simply to capture a child's attention and they will, by their curious nature, have the desire to browse the whole attention. This useful information when designing for children as well as developing usability test methods, but what exactly do those methods entail?

## 2.4.2: METHODS OF TESTING

The logic behind choosing a particular usability method depends on several factors. When designing a test, things like the purpose, the interaction tasks, the participants, facilitator, the context, procedure and the capture of data are all important things to consider. Additionally, a test is also measured by indicators of its performance. These (similar to experiments in general) include validity, reliability, effectiveness, efficiency and robustness. When it comes to children, we can see how all these are necessary. For instance, the procedure for testing children in Haatso, Ghana would definitely differ in some way from children in New York. The facilitator in New York might not know how to relate to Ghanaian children, and consequently get useful information out of them. At the same time, the method used should be fairly easily replicable in both cities, and valid even in those different contexts. Thus the importance of carefully choosing a method cannot be overemphasized.

I felt that one of the two possibly useful methods for this study, 'Think-Aloud' is worth bringing up (I say these methods are potentially useful because they involve the children speaking up and voicing their opinions in real-time. As opposed to writing or interviewing after, where the information is lost in transcription or due to passage of time and waning of interest respectively). Allowing children to verbalize their interaction experience, *Think Aloud* makes use of the user's immediate reactions to the website. It involves test participants describing their experiences usability problems while they navigate the web site, the test facilitator and other observers identify what the usability issues might be based on the

verbalization and body language of the participants. This of course would consist of constant feedback as the testing is in session (Als, Jensen, & Skov, 2005). Constructive interaction, which is the second method, on the other hand involves integrating users as pairs and having them conduct the test together, while giving their feedback. Also known as the 'Co-Discovery' method, it involves two test subjects collaborating in trying to solve tasks while using a computer system. It is said to be a variation of the Think-Aloud concept (Als, Jensen, & Skov, 2005).

There are other methods worth considering of course. A study undertaken by Van Kesteren et al (2003) on six different methods for prompting verbal communication in children provides a good overview.

| Method  Characteristics | Usability Test (UT) | Thinking Aloud (TL) | Active Intervention (AI) | Retrospection (RT) | Co-Discovery (CD) | Peer Tutoring (PT) |
|---|---|---|---|---|---|---|
| *Nr. of subjects per session* | 1 | 1 | 1 | 1 | 2 | At least 2* |
| *Technique for eliciting verbalizations* | No technique (based on coincidence) | Instruct and practice thinking aloud prior to test   Prompt during test | Ask subject questions during the interaction ** | Ask subject questions during review of just recorded video** | Co-operating, subjects consult each other during the tasks | One subject teaches a less experienced subject |
| **Skills required** | Child should be able to | | | | | |
| *For verbalization* | not applicable | think aloud | answer questions about just preceding plans, actions and evaluations | answer questions about recalled plans, actions and evaluations | express themselves to other children | teach their understandings to another child |
| *Extra skills* | | | | recall what is done before and be patient to watch the session again | | teach by explaining and not by taking over the tasks |
| *To perform tasks* | perform tasks individually | perform tasks individually | perform tasks individually | perform tasks individually | perform tasks in co-operation | perform tasks individually with help of a tutor |

*Fig. 2.4.1.1.1: Characteristics & Requirements of Different Methods. Taken from Van Kesteren, Bekker, Vermereen, & Lloyd, 2003*

**Usability Test (UT):** This is the type of testing which involves no technique and no prompts but allowing children to perform tasks individually. This method's outcome would most likely be unpredictable at best.

**Thinking Aloud (TL):** This type of test involves prompts from facilitators, with students expressing their thoughts throughout the process. This is a more natural process which allows for little interference or guidance.

**Active Interaction (AI):** This method involves the prompting of users by facilitators by asking them questions throughout the test.

**Retrospection (RT):** Test subjects are asked questions while reviewing a recorded video of the test. This combines recollection with interviewing.

**Co-Discovery (CD):** This involves students collaborating with each other. This could be potentially timesaving (two students at a time, instead of one during testing) and help children be more vocal.

**Peer Tutoring (PT):** This method consists of one experienced student teaching another.

From the table, the tasks seem to increase in complexity, skills required and number of participants required. Nielsen (1993) proposes that constructive interaction (or Co-Discovery) should be used when working with children as it is closest to their natural pattern of behavior. Interestingly enough, the Co-Discovery did not work well in the study, and the children did not cooperate. Of course this could always be due to factors in the experiment design which was not studied, but

it is still worth noting. The need for instructor intervention at appropriate times was more stressed as a concluding point (Van Kesteren, Bekker, Vermereen, & Lloyd, 2003).

Other categories of usability testing include the *Independent Group Design*. This is the case where different parts of the web site are tested by different groups of people. This allows more numbers of people to partake in the study by being at different sections of it (Rubin & Chisnell, 2008). There is also the *Within Subjects Design*. In this case, a smaller number of participants take part in the experiment, but test the entirety of the website.

### 2.4.3: MERITS & CHALLENGES OF TESTING WITH CHILDREN

As mentioned earlier, children tend to be very honest with their feedback. This of course is good for the designer.  However not all children can be this way, and shy children can be more reserved with information. Additionally, it is more difficult to negotiate testing time and obtain permissions for children who are in school (Druin, 2002). As opposed to adults who can decide for themselves, working with children involves communicating with a third party and working around their school schedules, both of which can be time-consuming. It is therefore important to ensure that all permissions are sought before tests need to be conducted.

Working with Ghanaian children in testing the feasibility of the JELYPals site will require some usability methods. Based on the analysis of these approaches, I believe that a method balancing both freedom of expression and guided instruction will be the best way to go.

## CHAPTER 3: METHODOLOGY

The site was not ready for piloting at the time, and so the study took place primarily in Ghana with no communication. Perceptions were measured only once and the focus of the study was moved towards how Ghanaian students would react to a pen-pal website.

## 3.1: DATA COLLECTION

The first factor that I attempted to measure was the perceptions of students towards African-Americans and their understanding of pen pal websites. I adopted methods from Hatami and Thorngate's study on intercultural perceptions to do this. I also collected data on the students' experience with computers and the internet. This was achieved primarily through the use of questionnaires and short answer questions. I also conducted a usability test of a prototype site of JELYPals. All tests were performed during the children's break period, with the permissions of the primary and junior high school head teachers. Either a teacher or teaching assistant was present during all the tests.

## 3.2: QUESTIONNAIRE APPROACH

The study was conducted with Ghanaian school children aged 8 – 12, from classes 3 to JHS 1. That is the age group of the intended target audience, when the site is complete. The purpose of the questionnaires was to find out what the students thought of African-Americans, and what they felt a pen pal website should be like.

It was originally intended to be carried out over a period of 4 weeks, with the Ghanaian students communicating with the African-American students using the website. However, JELYPals did not pilot as expected, so tests were limited to the questionnaire asked one time.

The students were administered a questionnaire of 19 individual questions. These tests were conducted over a period of roughly one hour during the students' free time and were done starting from the JHS1 class down to class 3. I wanted to get a roughly equal number of students in the different ages. However, I allowed as many students as could participate in the tests to do so, just so that in case some of the responses would not be usable I would still have a large number.

Challenges expected during the course of the questionnaire administration were ensuring the students' concentration throughout, knowing that children lose interest much faster than most adults.  As such, individual class teachers for each class were present during the period of the test administration in order to help control the students, without attempting to interfere with the process.

Questions were read out one-by-one, and students were given time to answer, and seek further clarification when needed. The students were asked about their experience with computers, and the internet. They were also given a list of positive and negative adjectives, and made to choose which one (in their opinion) most accurately reflected African-American behaviour.

Sample Questions include:

Are African-Americans:

- Lazy or Hardworking?

- Aggressive or Peaceful?

- Shy or Outgoing?

These particular test questions were adopted from *Stereotype* section of Hatami and Thorngate's *Cross-Cultural Understanding Questionnaire,* which featured the same questions. I changed the questions from a numerical scale to a discrete one, because I realized that the numbers confused the children.

They were also asked to describe how they thought a send messages, pictures and video to a pen pal via website would look like (through words or drawings). Although interviews would have been a better means of getting that information, the sheer number of potential students needed and the length of interviews would take meant that it would be simply better to include it as a questionnaire question.

Student responses were collected and collated as more data was gathered throughout the week.

## 3.3: USABILITY TEST APPROACH

10 students were asked to test a mock-up version of the actual JELYPals website, designed in Indigo Studio[2]. The test method used was the Constructive Interaction approach, with questions asked immediately after. Although, it has failed in certain tests (Van Kesteren, Bekker, Vermereen, & Lloyd, 2003), it also believed to be one of the most natural ways children can test a website (Nielsen, Usability Engineering, 1993).

The prototype design was based on mock-up versions of the site provided by the founder, and the actual site, to the extent to which it was developed at the time. Of course, the prototype was needed because the entire site has not been completed to date. As much as possible, it was ensured that the prototype stayed true to the site designs, so as to convey the actual effect of using the actual site.



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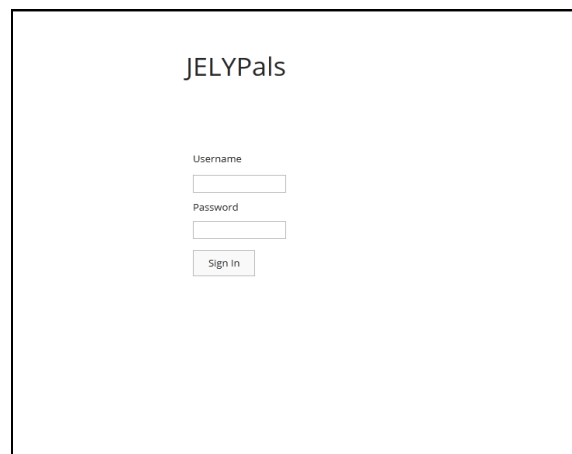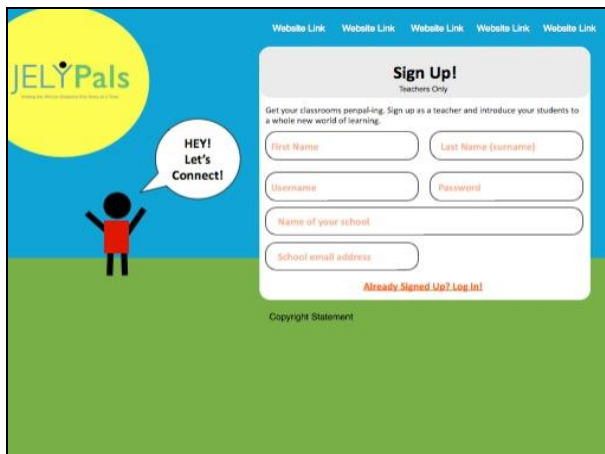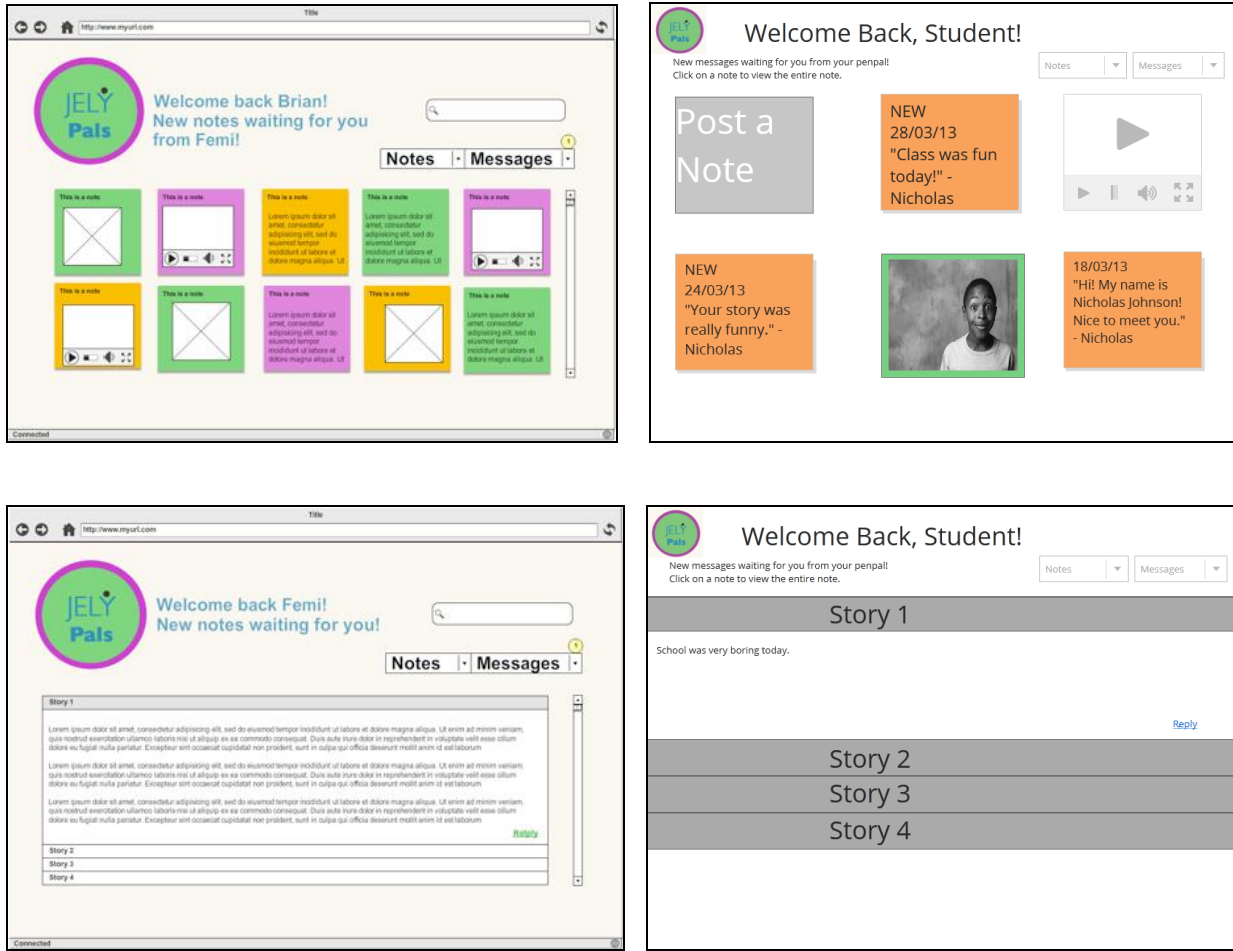
*Fig. 3.3.1: Sites Mock-ups (Left) and Actual Prototype Screens (Right)*

The children were made to perform two tasks on the site. These were in the form of two scenarios. The students were to assume that their school was signed up to the JELYPals system, and they were paired with a pen-pal named Nicholas. The tasks were to 'post a note' to Nicholas' pad, and then go to the inbox page and reply his second message, or 'story'. The pairs of children would then have to work together to complete the task.

The pair children were then interviewed at the end of the tests and asked about their general impressions.

The questions they were asked were:

1. How did you find the tasks? (Easy, Quite Easy, Quite Hard, Hard)

2. What did you like about the task?

3. What didn't you like about the task?

## CHAPTER 4: FINDINGS

## 4.1: QUESTIONNAIRE FINDINGS

The study was conducted at the Ghana Atomic Energy Commission School in Haatso, Ghana over 5 days in March 2013. 50 students, ages 8 – 14, from classes 3 all the way up to JHS 1 were involved. The students, under the supervision of their class teachers and the instruction of the study conductor, answered the questions[3].

Many of the younger children had difficulty understanding the questions (a flaw in the method, I recognize) and could not correctly complete the questionnaire. In the end, there were only 33 usable responses. This made me consider revising the questionnaire, but time constraints prevented me, and I felt I had a large enough sample to work with. The information received reveals patterns in the children's perceptions. 16 of the responses came from 11- 12 year olds, and 8, 9 and 10 year old were less represented.[4]

The responses showed that although most of the children had access to personal computers, laptops or smartphones at home (73%), majority of them did not use the internet on a consistent, weekly basis. 63 per cent of the students reported that they never used the internet, with only 6 per cent of them reported that they used internet 5-7 times a week.

29 per cent of the respondents stated that what they normally did on the internet was 'research'. One answer, more specifically referred to 'researching on

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[3] See Appendix A for a complete list of questions and scenarios.
[4] See Appendix B for all response statistics.

new planets'. Whether this was for personal interest or for a school assignment was not stated.

18 of the 33 responses said that they did have pen pals with whom they communicated with in different ways. 4 out of those responses did not currently have pen pals but had had them previously. The remaining did not have pen pals and had never had them. An equal number of students (4) said they spoke to their pen pals using Facebook, using a phone and sending letters. The remainder did not give a response for mode of communication.

The portion of the questionnaire which captures the students' opinions of African-Americans was a simple exercise, first explained to the students. The students were given two adjectives, one positive and one negative, and asked to choose which one they felt represented African-Americans more. An example of this, the first question, was whether they thought African-Americans were 'lazy or hardworking'. Overall, the students seemed to have very favorable opinions about African-Americans. Of all the fifteen questions (contrasting attributes) about African-Americans, majority of the respondents chose the more positive trait for each of them. There was no case where a negative response surpassed a positive one. The closest to this was 'Peaceful & Aggressive', in which 13 respondents felt that African-Americans were more aggressive, and 19 respondents felt the opposite. The second closest to this was 'Loud & Quiet', where 11 respondents felt African-Americans were loud, and 22 thought they were quiet.

All-in-all, the results seem to suggest a highly positive view of African-Americans from the students.
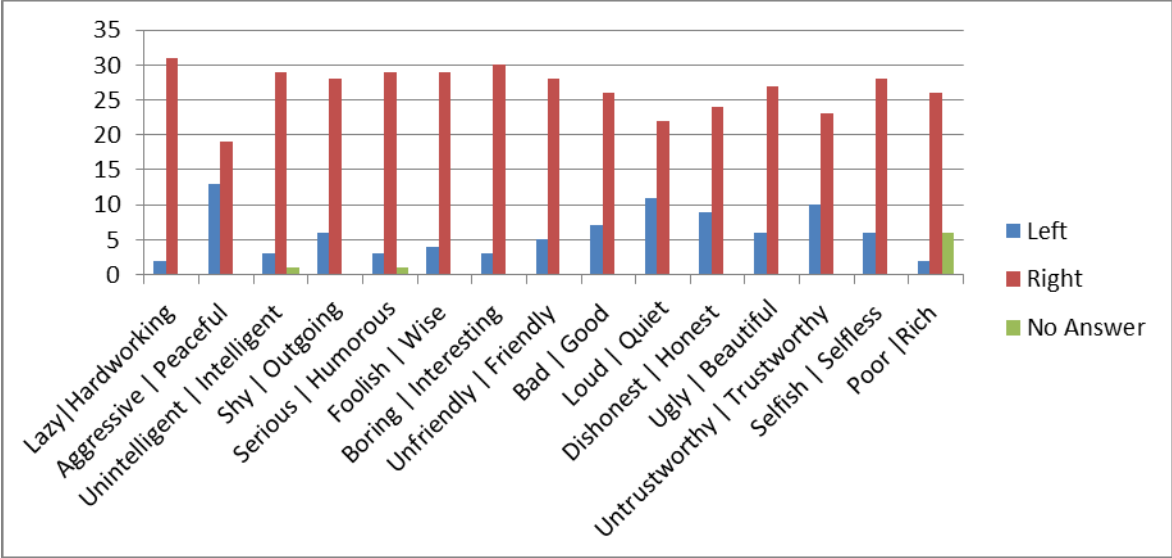
*Fig. 4.1.1: Column Chart of Students' Perceptions of African-Americans*

Also, many of the students seemed to have difficulty understanding and conceptualizing a pen pal website. The questions concerning illustrating provoked vocal reaction of confusions when it was read out. When asked how they felt certain aspects of a pen-pal website would look like, some random responses like, 'it would be attractive', 'lovely', and 'I think it would look horrible' were given. Many of the students verbalized their confusion during the administration of the survey, so this was expected. Although, I did not iterate on the test design, I spent a lot of time explaining to the students before and during the test.

### 4.2: STUDENTS' IMPRESSIONS & EXPECTATIONS OF A PEN PAL WEBSITE

The data from the questionnaire which gave the general conceptions of a pen-pal was compared to that of some American students from the Propel school in

Pittsburg, USA. There were 29 original drawings by the American students of what they felt a pen pal website would look like.

Written Responses from the Ghanaian students were categorized into three groups: *Specific, General* and *Miscellaneous* responses. The general group represented the responses by students that were their illustration of the system in words. S responses were those that described the process, or an action taking place in some way. The miscellaneous response refers to those that do not fit in either of these categories, or whose meanings are unclear. These categories were created to help make sense of the qualitative data that was produced in the form of written responses.

**Table 4.2.1: Responses to Sending a Message on a Pen pal Website:**

| SPECIFIC | GENERAL | MISCELLANEOUS |
|---|---|---|
| "Go to e-mail address, type your message, type the persons email address and send it." | "It will look like sending a text message." | www.stonashB@yahoo.com.gh |
| "I will click her profile and call her and we chat." | "It will look like sending a text message." | |
| "After I finish typing I would look for the send button and click it." | "It will look colorful and orderly." | |
| "I will type a short | "Attracting" | |

| | | |
|---|---|---|
| passage" | | |
| | "Charming" | |
| | "I think it would look horrible." | |
| | It will look like a notebook. | |

The comparison to a notebook is a very interesting one in my opinion. This shows the students' comparison of the abstract concept of sending messages online to the real-life metaphor of writing in a notebook. Additionally, most of the students visualized a typical message box and send button.

**Table 4.2.2: Responses to Sharing a Picture, Song or Video on a Pen pal Website:**

| SPECIFIC | GENERAL | MISCELLANEOUS |
|---|---|---|
| "I will click picture" | "The picture could be attractive" | "It would not be all that clean" |
| "The picture should be on my email website, type the persons e-mail address and send it." | "The picture should be on my email website, type the persons e-mail address and send it" | "Smoothly." |
| "I will click share picture." | "It will look like a picture message." | |
| | It will look like the one in your own computer. | |

The two tables provide interesting fodder for discussion. The first thing one notes is that majority of the children preferred to write down their methods than draw.

Illustrated responses were also provided by some students. Examples of the drawings produced by the students' were the layout of a typical webpage, with a web address bar, with writing underneath.
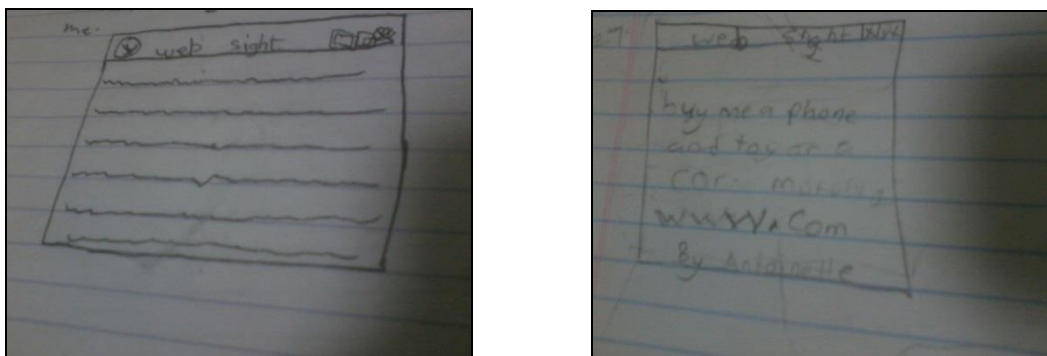


**Fig. 4.2.1: Drawing of Pen pal website by two Ghanaian student participants**

Another trend seen in the drawings were the use of stick figures, drawings of faces, and human bodies. These in the cases seen, seemed to depict themselves and their friends (pen pals). In context of the questions asked, the students seemed to be using their faces to show the process of themselves sending the messages, or sharing the videos with their pen pals. One respondent in particular, produced an illustration of a person actually explaining to his pen pal that he was sending them a message.
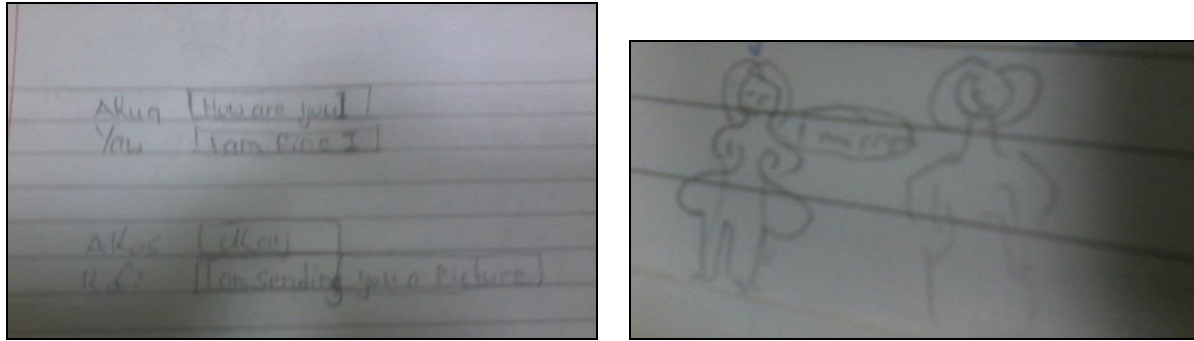
***Fig 4.2.2: Drawing of pen-pal site message-sending feature produced by two Ghanaian students from the study***

This indicated to me that most of the students understood the questions literally. The ones that drew pictures of faces seemed to be using the idea of communication as a two-way process between two parties. Thus I suppose that such children would expect the 'send message' feature to include pictures of themselves and an action of actually 'sending' a message.

The other main type of drawings were from students who drew the layout of a typical webpage was using their understanding of the word 'website' as a reference point for their answering the question. This seems to tally with my idea that the children took the questions literally. It also implies to me that these children would want to see the familiar elements of a normal website in a pen pal website, should they use one.

**Other methods** that the students cited as ways they would like to talk to their pen pals included telephones, Skype and letters. 5 respondents chose letters, 5 chose the telephone and 3 chose Skype. The remainder did not make any suggestions.

## 4.3: COMPARISON WITH AMERICAN SCHOOLS

The drawings produced by the American students contained quite a number of similarities to the results of the Ghanaian schools. Looking at both sets of drawings and comparing the written responses of the Ghanaian students also, we find that the thoughts of how a pen-pal website should look like or be are not so different.

There were instances where two drawings from two different students from Ghana were almost identical. The first example can be seen in the left image in Fig. 4.3.1, which looks like a message thread. We can see that the two students had a similar idea in mind.
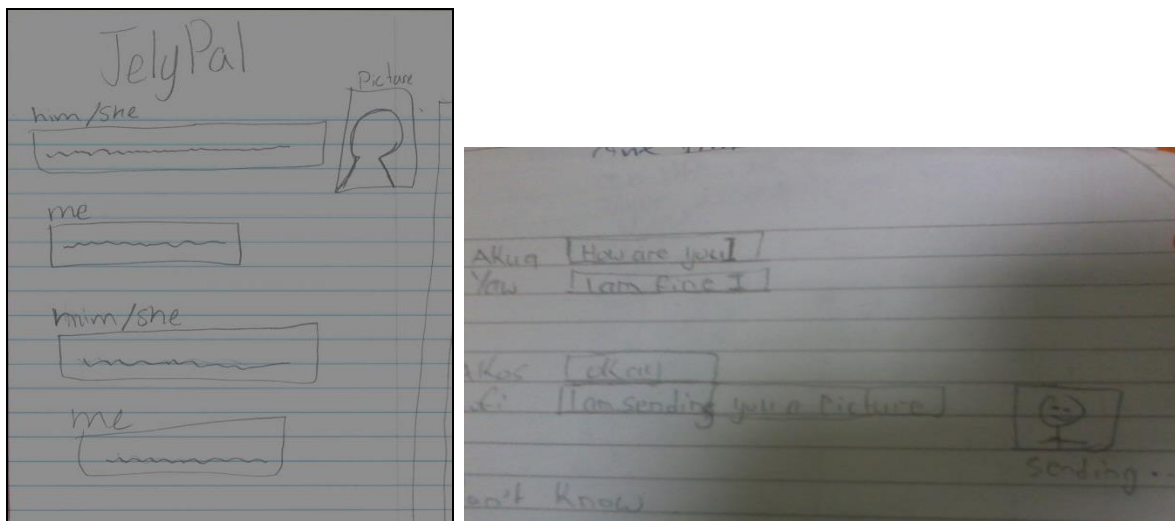


*Fig 4.3.1: American(Left) and Ghanaian (Right) Student's Drawing of a Penpal Website*

Other examples can be found in Fig 4.1, which shows a picture of two figures who seem to be conversing, with a speech bubble depicting the conversation. This can be said to be the respondent's idea of how a pen-pal conversation should look like. On the left side, an American student has produced a similar drawing, which makes use of video chat. Also on the right side of Fig. 4.3.2 we see a Ghanaian and American student depicting a face as the main element of the design. There is a slight difference however in that the second has a speech bubble.
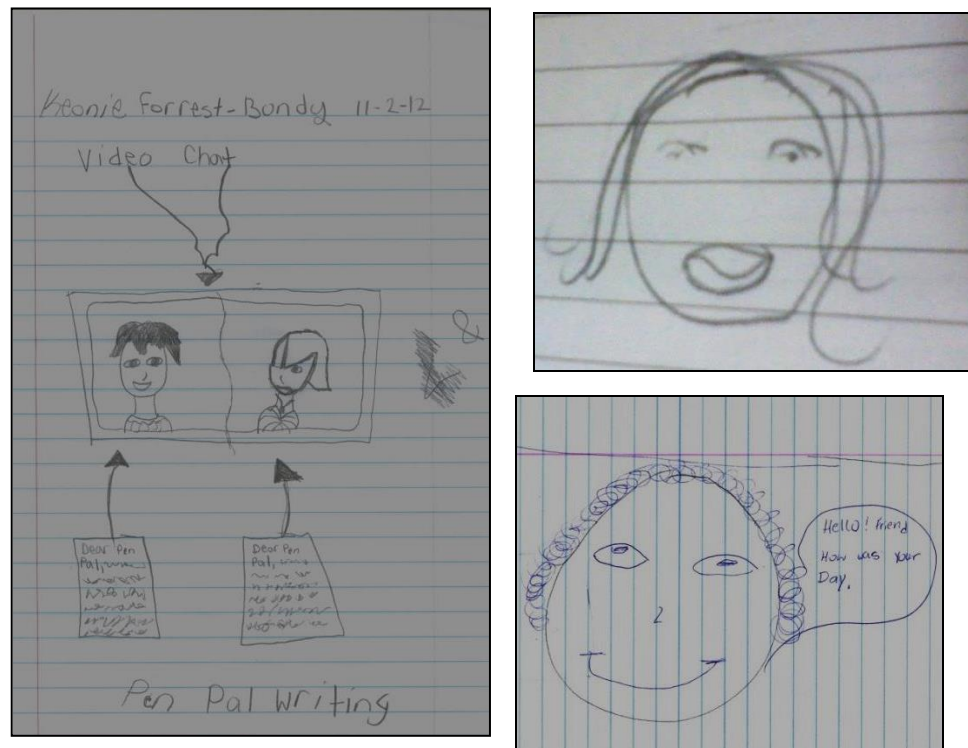


*Fig 4.3.2: American (Left), Ghanaian (Top Right) and American (Bottom Right) depictions of a Messaging feature.*

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Also, the Ghanaians students' requests to use Skype and letters as alternative are also portrayed in some of the Propel schoolchildren's drawings. Many of the American children seemed to see video chat as the way they expected the system to work, however it is also interesting to note that they also expected letters to be involved.
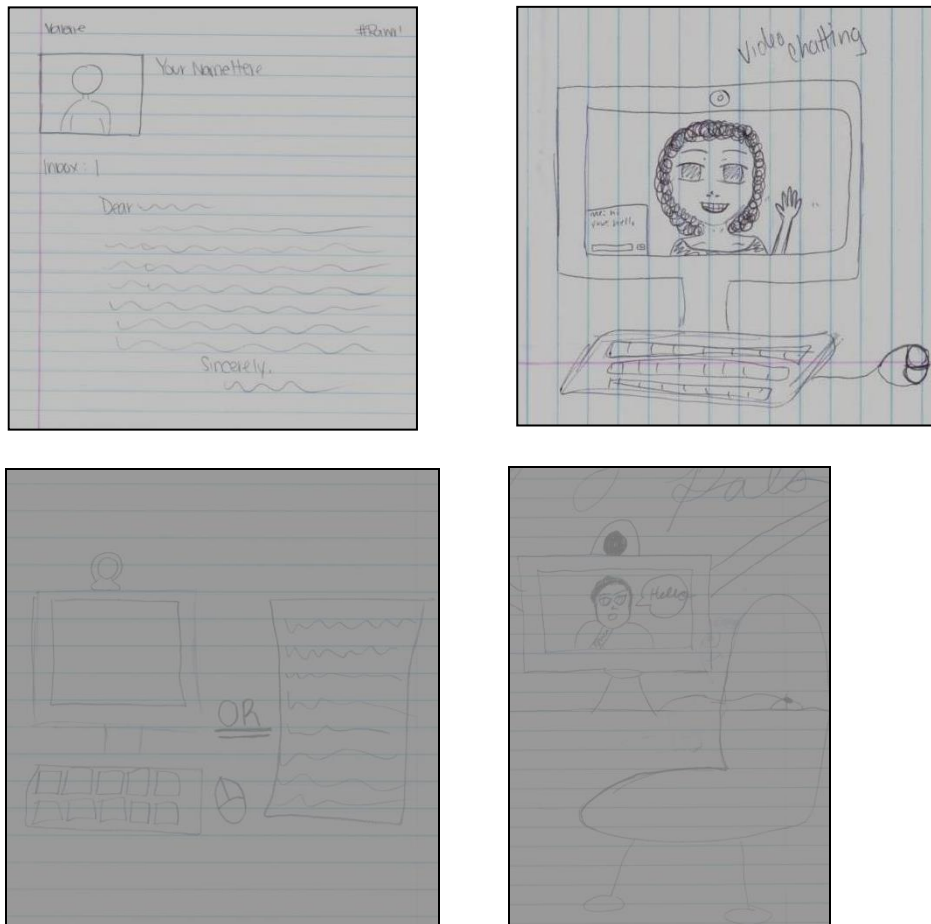


***Fig 4.3.3: American students' drawing depicting letters and video chat***

### 4.4: USABILITY TEST RESULTS

The age distribution of the test subjects was from 11 to 12 years, with 8 out of the students being 11 years old. The students tested in 5 groups, on my personal laptop. 7 of the test subjects found the two tasks to be 'easy'. The other two found

it 'quite easy' and 'quite hard'. None of the respondents were able to specifically point out one particular thing that they liked about the design. The usability issue which was commented on was the fact that there were two ways to post a note- which confused one of the students. Aside from that, no other comments were made about negative aspects of the design. The students generally thought it was nice-looking. One group also remarked that they would like to have a face-to-face chat where they could call and talk to their pen-pals group. Another usability issue that also came up (although not related) was a child being unfamiliar with the mouse pad (attempting to use two hands with it) which made her struggle a little with working on the task.

Some observations made during the usability test and interviews were that, in most of the tests, the constructive interaction method produced one dominant partner and one dormant partner. The dominant partner was usually the first to start the experiment by moving the mouse, with minimal support from the second partner, who would usually be quiet and watch the process. In one cases, the dominant partner took over from the dormant during a period of hesitation from them. Even with additional prompts from the facilitator (myself), there was not much of an increase in dormant partner contribution.

An additional observation was that most of the children were not too expressive during the interviews. They tended to give short positive answers and no negative answers. E.g.: "What do you think of this website?" "It's very nice." "What don't you like about it?" "Nothing." Even after repeating the questions, and asking

about student opinions on different sections of the experiment specifically, majority of the students seemed to have little to say.

My explanation for this is either that the presence of the facilitator intimidated the children from answering honestly, or that they genuinely did not find much to complain about in the site. I am inclined to believe that the answer is a mix of both. Some of the students were able to give their opinions while some were not. Also in some of the cases where the students were less vocal, they simultaneously found the tasks easy, so the case could be made that there was little to complain about in their case.

### 4.5: LIMITATIONS

The fact that the site was not piloted on time prevented the experiment from being fully carried out. We were not able to measure the students' change in perceptions of each other. Also, the lack of communication with the American school also prevented tests from being done with them, save for the test of their perceptions of a pen pal website.

## CHAPTER 5: CONCLUSION

The study provided some interesting results concerning the perceptions of the Ghanaian students of a pen-pal website. It is quite fair to say that there were no sharply distinct differences between Ghanaian and American students perceptions of what a pen-pal website should look like. Perhaps the main difference could be the prevalence of drawings depicting video chat from the American students as opposed to Ghanaians. This could be possibly be due to the fact that majority of the Ghanaian students in the study do not use the internet and so perhaps may be less exposed to video chat functionality, or perhaps another unforeseen factor.

Feedback from the usability test showed that the Ghanaian students were fairly comfortable with the design of the site, as has been prototyped. However, the responses showed that they would like some means of calling their pen-pal. A suggestion may be to include a 'Call Pen pal' button or feature somewhere in the site. Other recommendations, such as the message feature looking like a notebook, or like a letter (since it was requested as an alternative means) could also be considered. The responses also showed that the Ghanaian students in the study had a very positive view of African-Americans.

Recommendations for future work would be first of all to test with a site that is fully functional with a group of kids, and measure their perceptions towards African-Americans over a period of time. Also, one could also include testing how

incorporating the children's suggestions might improve their User Experience and perhaps better their perception of African-Americans over time.

# Bibliography

Als, B. S., Jensen, J. J., & Skov, M. B. (2005). Comparison of think-aloud and constructive interaction in usability testing with children. *Als, B. S., Jensen, J. J., & Skov, M. B. (2005, June). Comparison of think-aloud and constructive interaction in usability testing with children. In Proceedings of the 2005 conference on Interaction design and children* (pp. 9-16). ACM.

Baumer, M. V. (2011). Cross-cultural pragmatic failure in computer-mediated communication. *Coolabah, 5*, 34-53.

Baym, N. (1995). *The Emergence Of Community In Computer-Mediated Communication.* (S. G. Jones, Ed.) Thousand Oaks, CA: Sage.

Chenault, B. G. (1998). Developing personal and emotional relationships via computer-mediated communication. *CMC Magazine, 5*(5).

Chesboro, J. W., & Donald, G. (1989). *Computer-mediated communication: human relationships in a computerized world.* Tuscaloosa & London: University Of Alabama Press.

Chu, S. (2003). Cross-Cultural Comparison of the Perception of Symbols. *Journal Of Visual Literacy, 23*(1), 69-80.

Druin, A. (2002). The Role Of Children In The Design Of New Technology. *Behaviour And Information Technology*, 1-25.

Harrison, M., & Kitao, K. (2005). Keypal friendships and their influences on learner development. *CALL-EJ, 7*(1).

Hatami, J., & Thorngate, W. (2010). Changing Stereotypes in Iran and Canada. *Journal of Intercultural Communication, 23*.

Hayward, J. (2011, April 18). *African_American_child_face1-300x200.jpg.* Retrieved April 6, 2013, from Westside Republicans Web site: http://westsiderepublicans.com/wp-content/uploads/2011/04/african_american_child_face1-300x200.jpg

Kiesler, S. B., Siegal, J., & McGuire, T. W. (1984). Social psychological aspects of computer-mediated communication. *Computerization and Controversy*, 330-349.

Leavitt, M. O., & Shneiderman, B. (2006). Research-Based Web Design . *US Department Of Health And Human Services*.

Lin, M. (2008). Pragmatic Failure in Intercultural Communication and English Teaching in China. *China Media Research, 4*(3), 43 - 52.

Liu, P. (2003). Developing an e-pal partnership: A school based International activity. *Childhood Education, 79*(2), 881-888.

Markopoulos, P., & Bekker, M. (2002). How to compare usability testing methods with children participants. *Interaction Design & Children, 2*.

McGarty, C., Yzerbyt, V. Y., & Spears, R. (n.d.). Social, Cultural and Cognitive Factors In Stereotype Formation. In C. McGarty, V. Y. Yzerbyt, & R. Spears, *Stereotypes as Explanations: The Formation of Meaningful Beliefs About Social Groups* (pp. 1-10). Cambridge University Press.

McLoughlin, C. (1999). Culturally Responsive Technology Use. *British Journal Of Educational Technology*, 231-243.

Nelson, T. (n.d.). Perception Question. In P. J. Lavrakas (Ed.), *Encyclopedia Of Survey Research Methods* (pp. 580-581). Sage Publications.

Nielsen, J. (1993). *Usability Engineering.* Academic Press.

Nielsen, J. (2010, September 13). *Children's Websites: Usability Issues in Designing for Kids*. Retrieved April 8, 2013, from Nielsen Norman Group: http://www.nngroup.com/articles/childrens-websites-usability-issues/

Okan, Z. (2007). *Towards a critical theory of educational technology.* Cukurova.

Petkova, D. (2006). Cultural Diversity in People's Attitudes & Perceptions.

Postmes, T., Spears, R., & Lea, M. (1998). Breaching or Building Social Boundaries? SIDE-effects of computer- mediated communication. *Communication Research, 25*(6), 689-715.

Rheingold, H. (1993). *The virtual community: Homesteading on the electronic frontier.* Reading, Mass.: Addison-Wesley.

Rubin, J., & Chisnell, D. (2008). *Handbook Of Usability Testing.* Indianapolis: Wiley Publishing.

Salmon, M., & Akaran, S. (2001). Enrich your kindergarten program with a cross-cultural connection. *Young Children, 56*(4), 30-32.

Sharp, H., Rogers, Y., & Preece, J. (2007). *Interaction Design: Beyond Human-Computer Interaction.* West Sussex: John Wiley & Sons Ltd.

Sheeks, M., & Birchmeier, Z. P. (2007). Shyness, sociability, and the use of computer-mediated communication in relationship development. *CyberPsychology & Behaviour, 10*(1), 64-70.

Stoll, C. (1996). *Silicon snake oil: Second thoughts on the information highway.* New York: Anchor Books.

Van Kesteren, I., Bekker, M., Vermereen, A., & Lloyd, P. (2003). Assessing usability evaluation methods on their effectiveness to elicit verbal comments from children subjects. *Proceedings of the 2003 conference on Interaction design and children* (pp. 41-49). ACM.

Zou, X., Tam, K. P., Morris, M. W., Lee, S. L., Lau, I. Y., & Chiu, C. .. (2009). Culture As Common Sense: Perceived Consensus Versus Personal Beliefs As Mechanisms Of Cultural Influence. *Journal Of Personality And Social Psychology, 97*(4), 579.

# APPENDIX

## APPENDIX A

## QUESTIONNAIRE:

## General Information Section:

1. Nickname/Number:

2. Age:

3. Hometown Region:

4. First language:

5. Other spoken languages:

6. Class/Form:

7. Do you have a personal computer/laptop/smartphone?

8. How many times a week do you use the computer/laptop/smartphone?

9. How many times a week do you use the Internet?

10. What do you normally do on the Internet?

11. Please rate yourself (on a scale of 1-10) on how well you think you can use a computer/laptop/smartphone.

The age, hometown and class questions are meant to establish a specific demographic of the student. The language section is to establish whether they are bilingual or multilingual. The questions concerning computer and the internet and the others are meant to determine a general sense of the students' level of computer literacy, which may or may not influence their conceptions of a pen-pal website.

## DETAILED SECTION:

12. Do you have a pen-pal, or a friend you talk to who is not in the country?

13. Have you ever had one?

If no, skip to question 15.

14. If yes,

Do you/did you communicate to him/her through

- Letters?

- E-mail?

- Facebook?

- Other? (Please specify)

## PERCEPTIONS SECTION:

15. Use the scale 0-9 to answer the following questions about what you think of African-Americans.

- Lazy 0 1 2 3 4 5 6 7 8 9 Hardworking

- Aggressive 0 1 2 3 4 5 6 7 8 9 Peaceful

- Unintelligent 0 1 2 3 4 5 6 7 8 9 Intelligent

- Unpatriotic 0 1 2 3 4 5 6 7 8 9 Patriotic

- Serious 0 1 2 3 4 5 6 7 8 9 Humorous

- Typical 0 1 2 3 4 5 6 7 8 9 Unique

- Foolish 0 1 2 3 4 5 6 7 8 9 Wise

- Boring 0 1 2 3 4 5 6 7 8 9 Interesting

- Unfriendly 0 1 2 3 4 5 6 7 8 9 Friendly

- Bad 0 1 2 3 4 5 6 7 8 9 Good

- Loud 0 1 2 3 4 5 6 7 8 9 Quiet

- Closed 0 1 2 3 4 5 6 7 8 9 Open

- Dishonest 0 1 2 3 4 5 6 7 8 9 Honest

- Ugly 0 1 2 3 4 5 6 7 8 9 Beautiful

- Untrustworthy 0 1 2 3 4 5 6 7 8 9 Trustworthy

- Selfish 0 1 2 3 4 5 6 7 8 9 Selfless (Kind)

- Poor 0 1 2 3 4 5 6 7 8 9 Rich

## DISCUSSION SECTION:

16. Have you used a website to talk to a pen-pal before?

17. If yes, what was it like? Please describe it.

18. If no, why not?

19. Please use words as well as drawings/ sketches to answer the following:

   i. If you wanted to send a message to your pen-pal on a website, how do you think it would look like?

   ii. If you wanted to share a picture, video or song with your pen-pal on a website, how would you do it?

   iii. Is there any other way you would want to communicate with your pen-pal? How would you do it?

## APPENDIX B

**RESPONSE STATISTICS:**
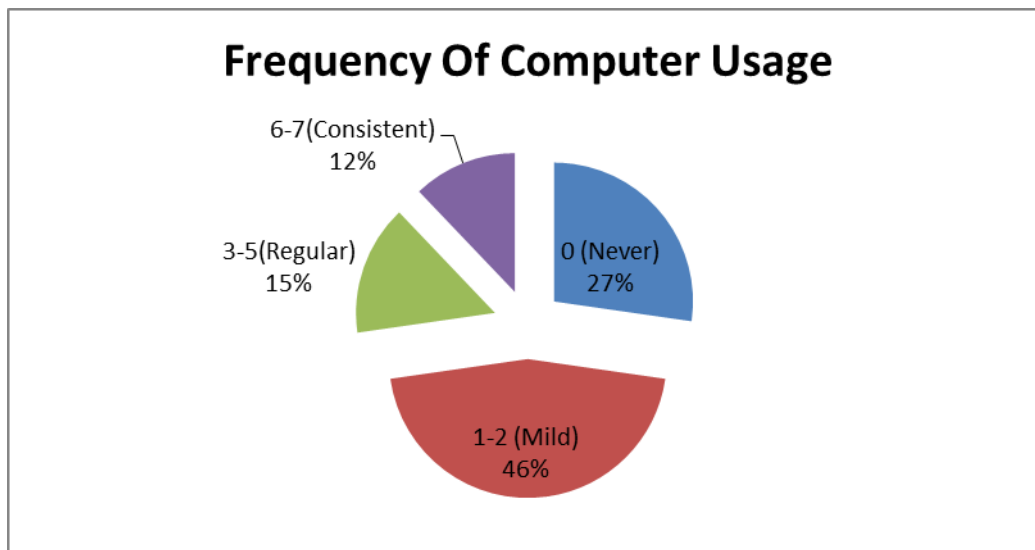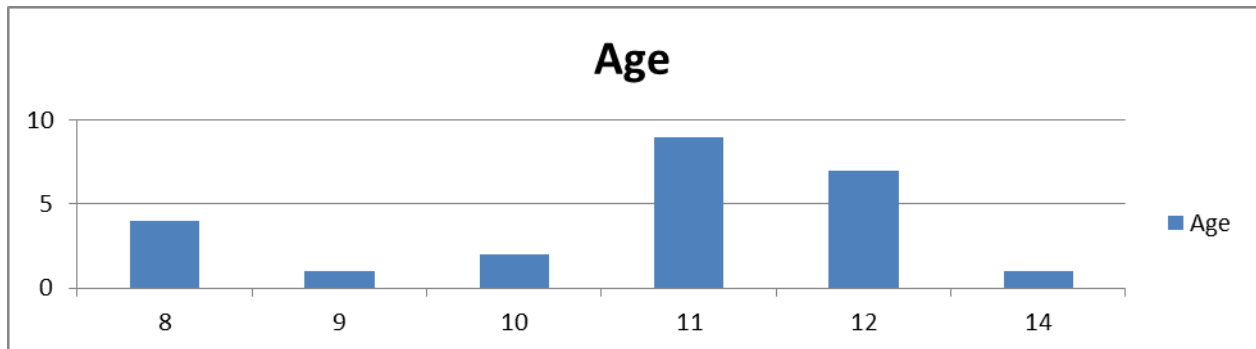
**Frequency Of Internet Usage (Weekly)**

3-5(Regular) 6%
6-7(Consistent) 0%
1-2 (Mild) 31%
0 (Never) 63%



**Internet Habits**

Research | Games
Facebook | N/A

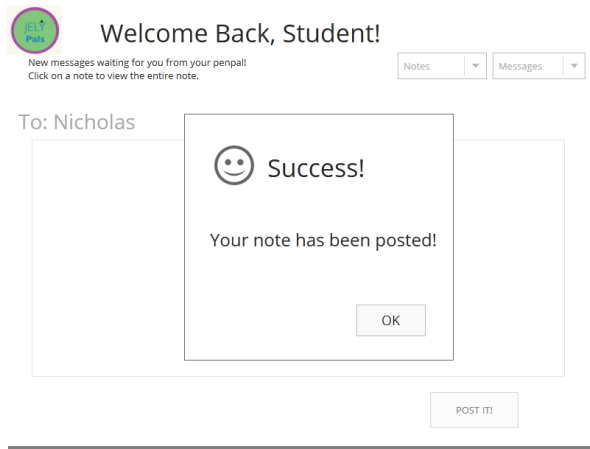29%
11%
6%
54%
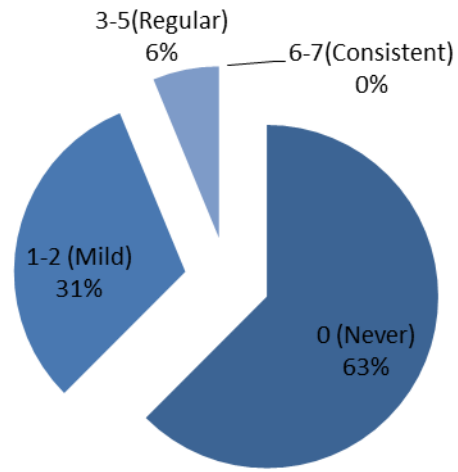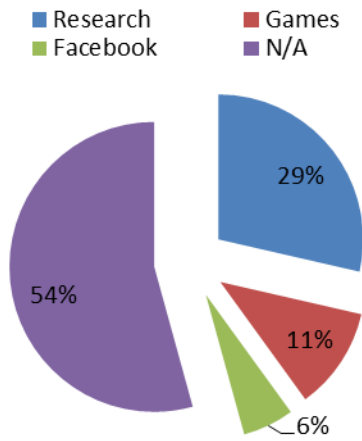
**APPENDIX C**

**JELYPALS MOCK UPS**



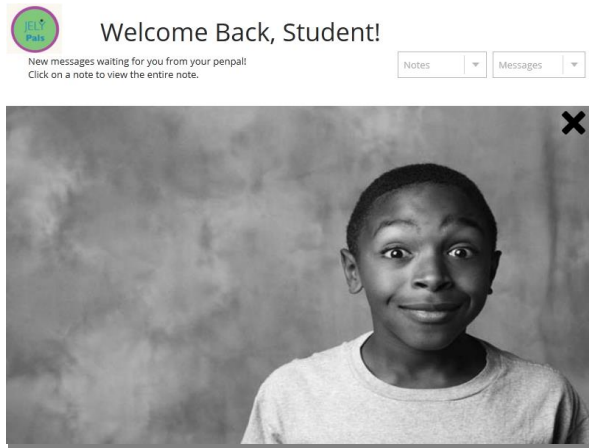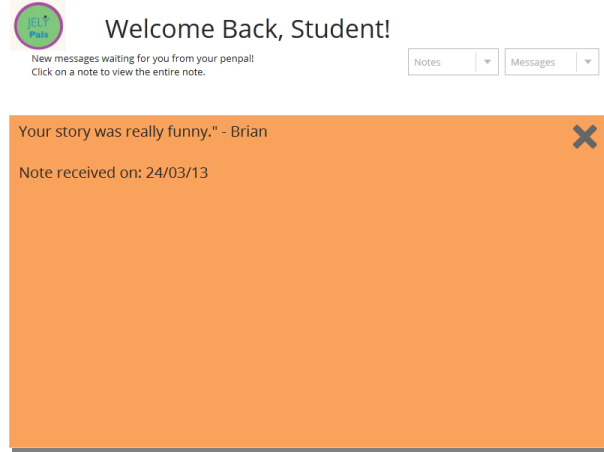*Screen 1: Login Page*
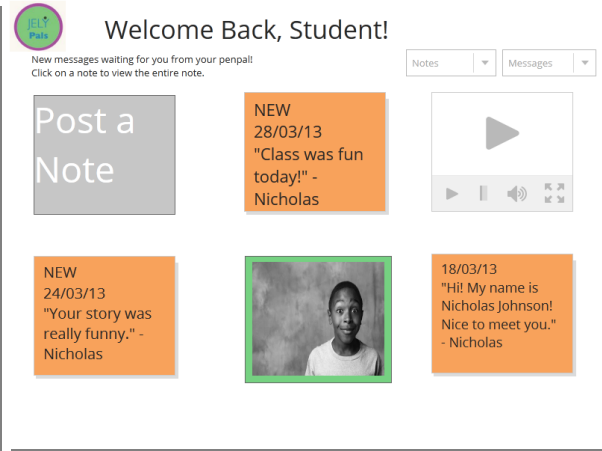


*Screen 2: Home Page*
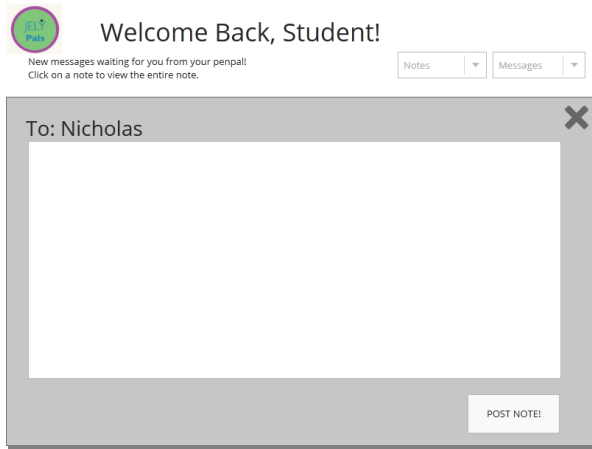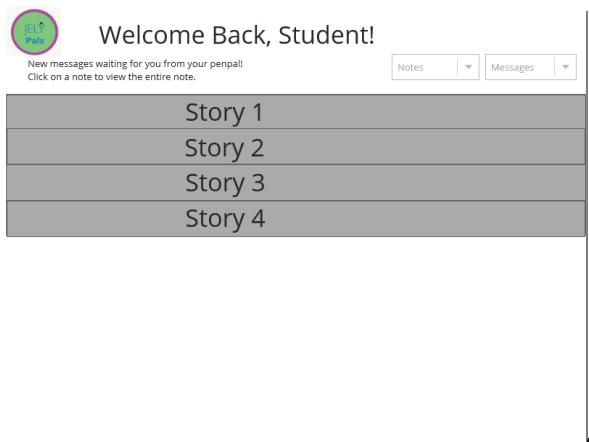


*Screen 3: Clicked 'Post A Note'*



*Screen 4: Clicked 'Post Note' button*

Screen 4: Clicked 'Student's Picture'[5]
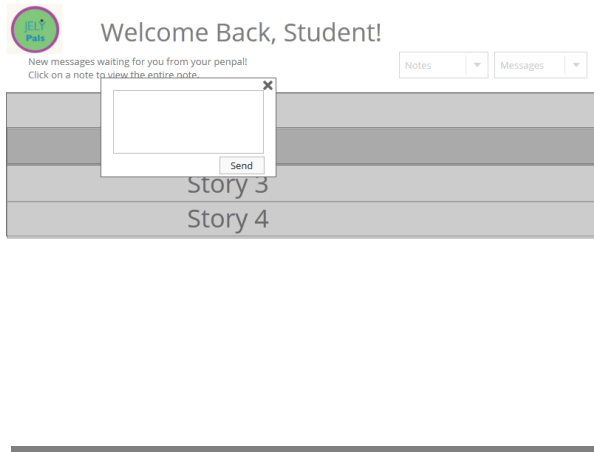


Screen 5: Clicked 'Orange Note'



Screen 6: Clicked 'My Messages'
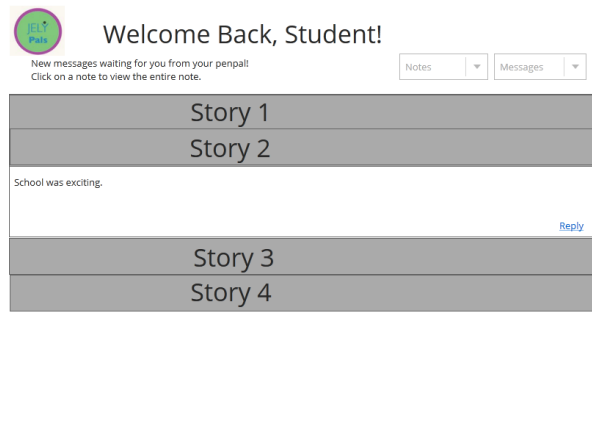


Screen 7: Clicked 'Story 2'

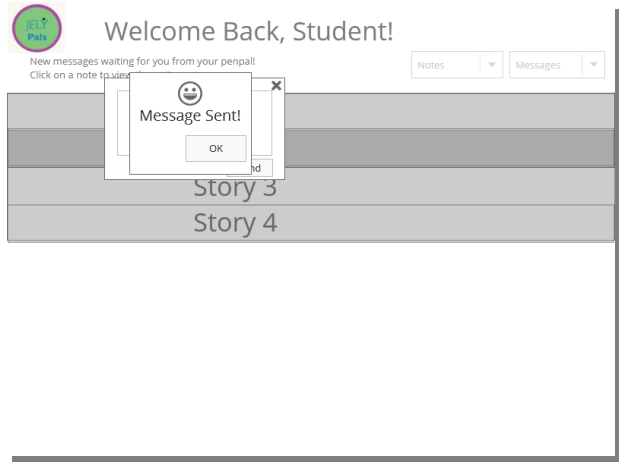[5] Image of Child Referenced In Bibliography.

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*Clicked 'Reply' Link*



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