Children's interests and concerns when using the International Children's Digital Library: A four country case study

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ABSTRACT

This paper presents a case study of 12 children who used the International Children's Digital Library (ICDL) over four years and live in one of four countries: Germany, Honduras, New Zealand, and the United States. By conducting interviews and classroom observations, along with collecting drawings, book reviews, and work samples, this study describes how these children were interested in books, libraries, technology and the world around them. Findings from this study include: these young people increased the variety of books they read online; still preferred physical interactions with books for reading, but appreciated the searching tools online; still valued their physical libraries as spaces for social interaction and reading; showed increased reading motivation; and showed interest in exploring different cultures.

Categories and Subject Descriptors

H.3.7 [**Digital Libraries**]: *User issues*

General Terms

Performance, Design, Human Factors.

Keywords

Children, digital libraries, qualitative case-study.

1. INTRODUCTION

A four-country study was initiated in Spring 2003, by our interdisciplinary research team at the University of Maryland, when we embarked upon developing the International Children's Digital Library (ICDL), a website that we authors and our colleagues built at www.childrenslibrary.org [12][13]. The goal of this digital library work was to excite and inspire the world's children, by making the best in children's literature available online, to help young people (ages 3-13) understand the value of tolerance and respect for diverse cultures, languages and ideas. From the onset, the team believed that this digital library needed to be shaped by an understanding of children as technology users, book readers, and library visitors [11]. However, only in recent years have a growing number of researchers investigated the needs of children and what they can contribute to our understanding new forms of libraries [10][13][27][28]. Today, even fewer researchers have focused on understanding the concerns of children from differing nations and culture [18][19]. Typically, studies focus on just one country's library structures, user experiences, and/or social and technological landscape. However, with today's diverse social, economic, and political structures there is a strong need to better understand various kinds of users, their libraries and information tools. Thanks to the development of online digital collections, such as the ICDL, it is now more easily possible to explore patterns in children's use of identical works in multiple international settings.

Motivated by this context, the team made three visits each over the past four years to Germany, Honduras, New Zealand, and the United States. During this time, we used qualitative case study methods to understand children's interest in books, libraries, technology and the world around them, as they were continual users of the ICDL. We report here on the specific methods we used, our findings, and the implications of this research for librarians, researchers, and future new digital libraries.

2. THE RESEARCH LANDSCAPE

A diverse research landscape contributes to the context of this study. The discussion that follows weaves together three themes in the research literature: the **emerging diversity** of a child's world; **books and libraries** in this world for children; and the **use of technology** by young people.

Preparing children for ethnically and culturally diverse experiences is an important concern [4][34]. The news media regularly report misunderstandings, intolerance, or outright aggression between people from different races and cultures. Children can absorb these stereotypes or misinformation to spur on continuing intolerance [34]. Therefore, it is important to teach children about other cultures at a very young age. This can be

done through reading diverse children's books [1][35] and through the use of technology [20][30]. Regardless of the means, it is important that children have the ability to identify with, empathize, and/or critique real-life people or fictional characters to help young people better understand the world around them and their own identity [5][32]. Developing reading experiences and technology that support multicultural audiences and their awareness of diversity is no small challenge [1].

Studies have shown that children's "sense of self" is constructed through their perceptions of differences from others [18][19]. For example in Holloway and Valentine's research [19], children were asked to email each other to share their ideas about what was different about the others' countries. Then the children were asked to respond to the other children's thoughts, confirming, denying, or elaborating on what was said. They talked about each other's geography, what they looked like, what people did for jobs, what their school day was like. On the other hand, Hengst [18] found that children from affluent countries may regard each other's "same-nesses" as opposed to differences. Hengst interviewed 70 children living in Germany and England. The research highlighted that people were considered the same or different depending first on language, second on physical appearance, dress, what they eat, and the customs they observe. In the survey when children were asked to say what other nationality they would like to belong to, many fell back on vacation experiences. They supplemented with countries they had been exposed to through the media.

Questions concerning the role of books and technology in children's lives have been raised by parents. According to a Kaiser Family Foundation study of over 1,000 U.S. parents, "Reading or being read to remains a constant in most children's lives" [31]. Approximately 80% of children 0-6 years of age read or are read to in a typical day. When books play an important role in young people's lives, children's cognitive, social, and motivational development increases (e.g., [7][15][16]).

However, a growing number of parents feel that there may be trade-offs between "reading books" and "using a computer" that could result in compromising their children's learning experiences [31]. Yet, other research shows that the presence of technology may actually increase the presence of books in people's lives living in the U.S. [2][34]. This same trend was seen in Denmark in the early 1990s when Internet access was made available in Denmark's public libraries and library users increased substantially [34].

Over 20 years ago, the U.S. Congress authorized the Library of Congress Center for the Book to study "the changing role of the book in the future" [8]. A central conclusion of the study focused on the threat, not of technology but of the inability to read and the lack of will to read [8]. Since that time, major initiatives have been developed to inspire children's interest in books and reading, many in the U.S. coming out of the Center for the Book (e.g., book festivals, reading promotion partnerships) (www.loc.gov/loc/cfbook) and the American Library Association (e.g., book awards, lobbying efforts, and library campaigns to promote the value of libraries) (www.ala.org).

However, thanks to tightening budgets, library services and programs are being cut or are not being developed, and examples of this can be seen throughout the world. For example, researchers found budgets to be so limited in South Africa's school libraries that new services are being developed in public libraries to compensate [17]. Similarly in Croatia, public libraries have been used creatively to supplement needed services. For example, a program of "bibliotherapy" has been established to support children of war-torn experiences with books and art therapy [32].

Yet, despite the lack of financial support, research has shown that school libraries can have a positive effect on student achievement in schools [21][22][23] However, the research does not offer an understanding of children from differing nations and culture and their concerns about books and libraries. Typically these studies focus on just one country's library structures, user experiences, and/or social landscape.

3. METHODS

This section presents the methodology used in this case study research. A discussion of the study settings, participants, the data sources and analysis procedures then are presented.

3.1 Methodological Approach

As Bogdan & Bilken suggest [6], "a qualitative researcher does not put together a puzzle whose picture she already knows; rather she is constructing a picture that takes shape as she collects and examines pieces of data." This has been the path in this research. One critical goal for this research has been to attempt to understand the research topic from the perspective of the study participants. This is novel and essential because few studies take into account the point of view of children, and still fewer consider how children can contribute to the design of future new libraries and information resources [10][28][27].

3.2 The Study Settings and Participants

This study took place in four locations: Munich, Germany; La Ceiba, Honduras; Wellington, New Zealand; and Chicago, IL, USA. The site selection process began when our team identified a range of backgrounds and experiences to study in children (e.g., varying ethnic and economic backgrounds, attending schools with a range of pedagogy, and at an age where the team could follow the children's progress in subsequent studies). We looked to find sites that were distributed throughout the world, yet whose language could be understood by English and Spanish speaking researchers. Based on these criteria, and the interest of the local populations, four sites were selected. It should be noted that these sites were not selected because they necessarily represented their local populations, rather that they offered the study a diversity of participants and settings.

The children that were selected for participation were chosen by one or more of classroom teachers, librarians, and principals. Each location's staff was given a short summary of the research project and the selection criteria. Twelve children were selected: five boys, and seven girls, representing eight ethnic backgrounds. All were eight years-old at the time the study started.

A profile of each study site and its participating children are summarized briefly in Table 1 and selected photos of each site's child participants are included in Figures 1-4.

Table 1: Summary of sites and students selected for study

Country:	Germany	Honduras	New Zealand	U.S.A.
City:	Munich	Le Ceiba	Wellington	Chicago
Public/Private:	Private Int. School	Private School	Public School	Public School
Student Ages:	Pre-K (age 3) to 12th grade (age 18)	1st grade (age 6) to 12th grade (age 18)	Kinder (age 5) to 8th grade (age 14)	Infant (6 months) to 8th grade (age 14)
Student Population:	-600 students -65 nationalities -mid-high income -majority intact families	-300 students -primarily Spanish -middle income -majority intact families	-250 students -22 cultures -low-mid income -majority divorced families	-800 students -African-American -low income -majority single-mother families
School Curriculum:	-International Baccalaureate Program -taught in English & German	-more traditional teacher-driven lessons -taught in English & Spanish	-child-centered constructivist pedagogy -taught in English & Maori	-teacher-centered with focus on discipline -taught in English
Library:	2 libraries with 10,000 books total	1 library with 10,000 books (50% outdated)	1 library with 6,000 books	1 library with 7,000 recently purchased books
Facilities:	-technology-rich -expansive physical space	-partial technology integration - expansive physical space with security	-lack of technology -lack of physical space	-technology-rich -expansive physical space (new building)
Parental Involvement:	-Parent advisory group	-Parent advisory group	-Parent Board of Trustees who hire/fires school staff	-Parent-Teacher Association (PTA)
Child Research Participants:	-1 German -1 German/British -1 British -2 girls & 1 boy -all speak English & German	-all Spanish -2 boys & 1 girl -all speak English & Spanish	-1 Maori (indigenous tribal culture) -1 British/Indian -1 continental New Zealander -2 girls & 1 boy -all speak English & Maori	-all African-American -2 girls & 1 boy -all speak English
Adult Research Participants:	-3 parents -1 teacher -2 librarians -1 principal	-3 parents -1 teacher -1 librarian -1 principal	-3 parents -2 teachers -2 librarians -1 principal	-3 parents -2 teachers -1 librarian -1 principal

3.3 Our Journey as Researchers

As qualitative researchers, we are the research instruments, and the medium in which the data is filtered [3]. Therefore, it is important to present briefly the three researchers who carried out the data collection.

The ICDL research project leader, Allison Druin, has degrees in graphic design, media arts and science, and education. She currently is an Associate Professor in the College of Information Studies and the Director of the Human-Computer Interaction Lab, where she works with children as design partners in understanding what children need in new technologies.

The ICDL collection development director, Ann Weeks, worked at the American Library Association for 14 years, and then at the Chicago Public Schools for four years. She has a strong belief in the importance of school libraries. With a Ph.D. in Library Science, she is now a faculty member at the University of Maryland and a critical part of the education of MLS students for certification.

The team also includes Sheri Massey, a graduate student from the College of Information Studies. She has an MLS in School Library Media and is bilingual in Spanish, She has been at every site collecting data and working on the data analysis.

3.4 Data Gathering

Each year over a four-year period, a diverse set of data was gathered from each of four sites. A portion of the data was collected on-site and the remaining portion was collected remotely by having the local librarian or teacher send the data via email. Of the data collected onsite, three visits were made to each of the sites by at least one of the three data collectors described above. Because of school calendar differences between sites (e.g., the New Zealand school takes its summer break from the end of the December to the beginning of February), it was not always possible to visit each site within the same fall or spring set

Figure 1: Honduras study children: www.childrenslibrary.org/people/kidsteam/laceiba.shtml

Figure 2: Germany study children: http://www.childrenslibrary.org/people/kidsteam/munich.shtml

Figure 3: Chicago study children: http://www.childrenslibrary.org/people/kidsteam/chicago.shtml

Figure 4: New Zealand study children: (http://www.childrenslibrary.org/people/kidsteam/wellington.shtml)

of months. In addition, due to unexpected circumstances (e.g., tornados in Honduras, the tearing down and full replacement of the school library in New Zealand, the replacement of all site coordinators at each location, a missing child in Chicago), research visits or remote data collection had to be periodically delayed. Therefore, our planned three year research study became four years as we discovered the complexities of conducting international research.

The data gathered during this time-period gave snapshots in time of perceptions, attitudes, interests, and/or digital library use by children, parents, teachers, librarians, and principals. Multiple forms of data were collected so that viewpoints could be confirmed or disproved. In addition, thanks to our past research experiences with children, we learned that multiple opportunities for young people to express themselves in diverse forms is critical since not all children are comfortable with interviews or drawing or being observed in their classroom.

This section describes an abbreviated version of the data collection methods used in the study. A complete description of the questions used in the interviews, book review materials, and further sample drawings, etc. are available online [14].

3.4.1 Interviews

All children, at least one parent, teachers, librarians, and principals were interviewed three times over the course of the research. The interviews concerned books, libraries, technology, and a child's world view. These interviews ran between half an hour and one hour in length, were tape-recorded, and in a majority of the time, notes were taken by an additional person (not the interviewer) who then used the recordings to fill in any missed data. If an extra note-taker was not available at the time of the interview, the interviews were later transcribed from tape. All interviews used a question form which included a series of open-ended questions. For example, the children in the study were asked such questions as: If you had a magic wand and could change anything about your school library, what would it be? What do you like best about using a computer? If you could live anywhere in the world, where would it be? Additional questions were asked if the interviewer felt information or explanation was needed. The questions were slightly modified for the third year.

3.4.2 Drawings

Each year, the children were also asked to draw pictures that answered open-ended questions that concerned books, libraries, technology, or a child's world view. In the first year, the children were asked to draw what they do for fun, what their school library looked like, a place in the world they would like to visit. In the second year, children were asked to draw a design of a future new school library, a family trip they took, and a self-portrait (Figure 5). The first and last year of the study the same open-ended questions were used to look for differences over time in the children's responses. In the second year, we asked the children not only to draw their answers to questions, but to ask their classmates to draw answers to questions. For example, the children were asked to have their classmates draw what they thought a future new school library should look like. In the first year, the children were asked to draw their pictures during the site visit. After that, the children were sent questions at least a month before the site visit, so the children could have the materials ready to discuss during their interviews.

3.4.3 Book Reviews

In order to be sure that each of the children in the study would continuously use the ICDL, we asked them to read books in the ICDL and fill out book reviews of the books they read. The ICDL is a collection of fully-digitized children's books from around the world. The digital library includes books that represent 38 languages, with a majority of the books published in English, Farsi, Spanish, and Croatian. The materials include picture books, chapter books, fiction and non-fiction titles, historic and contemporary materials. The books in the collection are appropriate for children ages 3-13 years and were all previously published in print and have since been digitized. For the study, all participating children were provided with Tablet PC computers containing a local version of the ICDL as it existed in the summer of 2003 with 261 books. The local version was made available in case of failures in Internet connectivity. In the years that followed, the children were encouraged to access the online version of the ICDL whenever possible which now includes almost 2,000 books.

The researchers introduced the book review process and form to the children as a pleasurable, recreational activity. The researchers asked the children to review ICDL books the same way a movie critic reviews movies and told them the reviews would be transferred to the 'live' digital library to help other children select books to read (today over 200 of the children's book reviews are available online). The book reviews asked the children to explain what was most important about the book, how the book made them feel (e.g., happy, sad,), to rate the book in stars, and to draw something they read in the book. In the first year the children were asked each month to choose any four ICDL

Figure 5: New Zealand girl presents her second set of drawings to researchers

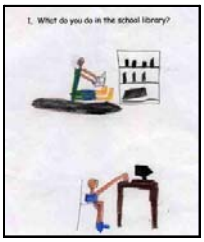

Figure 6 : Year 1 drawing of school library by boy in Honduras

Figure 7: Year 2 drawing of a future new school library by same boy--both drawings show books and computers side-by-side

Figure 8: A school library media center of the future by a New Zealand child. Couches, big pillows and a slide are all suggested places to read and socially interact.

books they were interested in and review them. In the subsequent years, children were asked to read a pre-selected number of books and a few books of their choosing [26].

3.4.4 Classroom observations

At each site visit, each child was observed for a minimum of an hour in their classroom. Notes were taken by a researcher, but no video was captured due to the obtrusiveness of the research method. Each researcher tried to capture with their notes the following data: the classroom's physical environment, the research participant's interactions with peers and the teacher, the classroom teaching strategies, the use of books, computers, and other teaching materials.

3.4.5 Student work samples

Reading and writing samples were collected for each child at each on-site visit. These samples were used to confirm the interview data concerning student skill development.

3.5 Data Analysis

The following data sources were analyzed in the course of this case study: 150 interview transcripts and notes; 236 drawings from 12 children and their classmates; 36 Classroom observations of 12 children; 273 Book Reviews from 12 children; and 36 Student work samples.

3.5.1 Interviews

The unit of analysis for the interviews was a "verbal episode" [24]. This meant that no particular length was stipulated for analysis but just that an idea was put forth and was ended when a distinct new topic was presented. The data was coded by "occurrence of category" for each child rather than "frequency of occurrence within categories" [24]. Codes also emerged in the data by "patterns of omission," when none of the participants at a particular site discussed a certain topic which was discussed by other countries' participants [24]. Multiple codes were also used to describe the data. In many cases, interview data from a teacher or parent was used to validate or further detail the interview data from the children. In addition, all direct suggestions for library and technology changes were noted.

The interviews were first read by the lead PI of this research and an initial coding framework was adapted from grounded theory analysis methods of "open coding" [33]. The only limitation placed on code generation was to focus on categories concerning the four areas of interest: books, libraries, technology, and world view. Once these codes were developed, they were then used by two of the research team members to analyze the interview data more deeply. Sample data was used to compare the consistency of coding and the application of codes. Once an agreement on coding was established, the codes were revised and reconciled. This was done until "saturation" [33] and no further refinements were found. The category occurrences were compared over time and between countries to confirm or deny the responses offered in the research participants' drawings, work samples, classroom activities, and book reviews.

3.5.2 Drawings

The unit of analysis for the drawings was the individual drawings. Common themes were found using the open coding process described above. All drawings were analyzed by two of the researchers in the same manner as the interview data. The results were aggregated by country, gender, and task

3.5.3 Book Reviews

While the book review process was primarily used as a means for children to become avid digital library users, content analysis [9] was used to identify patterns in the children's book reviews. This method allowed for systematic examination and evaluation in order to understand underlying meanings or possible effects. The data particularly from question 1: "What is the most important thing to you in this book? Why?" was used to compare and contrast the interview data concerned with books. Our research team also discovered that little research has been done with children from differing countries and culture and therefore special attention was paid to aggregating and comparing the book review data differences between countries

3.5.4 Classroom observations

The unit of analysis for the classroom observations was again the "verbal episode". Common themes were found through the open coding process as described in section 3.5.1. The results of the coding were compared over time and used to confirm the descriptions of activities the research participants explained in their interviews.

3.5.5 Student work samples

The unit of analysis for student work samples was by child per year. These samples were monitored for large changes in academic performance over time. In addition, these samples were used to understand the school context for each child in the study. Again, this was compared to the self-report of interview and drawing data collected.

4. FINDINGS

In this section, a summary of the trends found are presented that expand upon our preliminary report [25]. Trends were identified only when study participants in at least three countries raised the issue in their interviews and this data could be confirmed in at least two other data sources (e.g., children's drawings, book review responses). Children's interests in books, libraries, technology and the world around them were analyzed and the trends for each area of interest were separately examined.

4.1 Books

1. The variety of books the children read increased

In all four countries of the study, the data strongly showed that children greatly appreciated the variety of books they were able to access through the digital library. This finding was confirmed by both parents and librarians in each of the countries. For example, in the U.S., one girl explained, "You can read different kinds of books that you don't see in a library or that other people get. So, it gives you a chance to read about stuff that's different than what other people read." This was confirmed by a girl in New Zealand, "I read so many adventure books and sometimes it's good to have a change of a book. And sometimes you find it quite interesting to read a different book, and try different books out." In Honduras, one boy's mother put it plainly, "[The ICDL] has helped. I'm thinking particularly of [my son]. He is willing to read other things." This was confirmed by this boy in his interview, "First I used to read cartoon books. Now I read long books, short books, funny books, a lot of kinds of books!" The librarian in Honduras further explained the reading opportunities before the ICDL, "There are no bookstores [here] outside of Christian bookstores and what they offer is a very limited selection. So, certainly there is not a culture of reading, so having the ICDL was a great benefit to them because they had book they wouldn't otherwise [have]." This interest in the variety of books was confirmed by the children's drawings and in particular by the kinds of books the children read for the ICDL book review process.

2. Exposure to the ICDL books in many languages was a barrier for these children's reading interest

As Hengst [18] pointed out in his studies, people were considered the "same or different" depending first on language, second on physical appearance. Language is a very deep concern to children and can be seen as a barrier to interest in books from other countries. In the second and third years of the book review experience for the children, we specifically asked the study's children to "read" a book in a language that none of them could speak. We heard very clearly from children that if the book had to be read through its pictures, they found it challenging to interpret and they would rate the book lower in their book reviews. One girl in Germany wrote in her book review, "It was a little confusing and a little boring too just looking at the pictures." This was confirmed by one girl's book review in the U.S., "To really know what this book was about I need to read it in English."

This was further confirmed by the interview data and drawings of children in all four countries. As one girl in New Zealand explained, "I like understanding a story not just pictures." It seemed that a "picture walk-thru" was just not satisfying to the children in this study. In Honduras, one boy suggested, "[S]ometimes I …read books about other countries, but I didn't understand the language so I just looked at the pictures…They are too hard to understand."

3. The children showed a change in the kind of books they read and the frequency of reading them

Children in New Zealand, the U.S. and Germany explained that they looked for shorter books to read in the ICDL. This was confirmed by the first year's book review data when chapter books were rarely selected voluntarily. However, the frequency of reading these shorter books seemed to increase. In the interview data, one boy in Honduras explained, "It's fun to read books in the ICDL…you don't know what kind of book you're going to find. So when you find that book you start reading it and you love it! You want to just keep reading it and reading it and reading it." In the U.S. this was clearly the case with one boy who continually re-read books. The librarian suggested that this was "…probably because he got to know it and felt comfortable with it." In the case of both boys, each was a reluctant reader and the boy in the U.S. had significant reading challenges, reading far below grade level. It seemed that the ICDL gave each of these boys a safe place to explore repeatedly.

4. The children still preferred physical interactions with the books for reading, but appreciated the searching tools online

This was a fascinating trend that could be found in all four countries' data. All of the study's children clearly appreciated the books in the ICDL, but when asked if they preferred physical books for reading, they all indicated through their interviews that they still liked reading a physical book. One girl in Germany summed it up with this, "[The ICDL] was okay, but it was not the same as reading a real book. There was more clicking on the ICDL, and it was not as easy to navigate [inside the book]." However, when it came to looking for books, all of the children suggested it was much easier and more enjoyable using the ICDL. In New Zealand, one girl explained, "It's quite cool to be able to go through all of the processes to be able to find a book. I mean, you might not know the title of the book you want, but you just go through all the choosing processes and then find a book that's exactly what you're looking for."

The portable nature of the Tablet PCs the children used were quite appreciated, but they still felt precious to the children and at times they were afraid to take it around the school or home. As one New Zealand girl explained, "It's not heavy, but it's not my paperback book." In the U.S. where the school's surrounding neighborhood was quite urban and economically challenged, this presented difficulties for children concerned with moving the technology freely back and forth between school and home.

5. There was an increase in these children's social interaction with peers and parents

In all of the countries, the study's children each suggested that the ICDL supported their sharing and talking about books. In particular, if the child had a sibling, he/she was likely to share books in the ICDL with them. In the case of the U.S. children, where there was not a strong culture of reading outside of school, one boy explained, "No, I would be embarrassed. Cause they will start spreading rumors around and then all the kids in the neighborhood might know about it. All the kids in the neighborhood will start messing with me…saying 'haha...that's why you are teaching other people to read books' and stuff like that." However, he read books from the ICDL with his sister, "to teach her how to spell and read better and handle fluency."

The children also enjoyed sharing their reading experiences with their parents. In Germany one girl explained, "My mum likes to look at them as well. Sometimes she comes with me and reads some books." There was also sharing among peers particularly among the U.S. children in the study. The librarian pointed out, "When [the children] liked a book they would tell each other about it and the other ones would go and look at that book too. It was kind of neat." Therefore, while in the past there has been concern among parents that children would be more isolated using computer technology; this does not seem to be the case with the children in this study. This increase in social interaction was confirmed by classroom observations and the children's drawings.

4.2 Libraries

1. The children's interest in traditional libraries did not change

"I don't want to split the ICDL up with the library. I like the library, but I like the ICDL, too!" This was the emphatic statement of one of our girls in Germany. This feeling was echoed by children in all four countries. They clearly saw traditional books co-habitating well with computer technology in libraries. The children's interviews, drawings, and classroom observations confirmed this finding. For example, the same boy in Honduras expressed this at the start of the study and continued to feel this as the years went on (Figs 6 & 7). In his drawing of the future new school library, books and computers are included.

2. These children continued to value their libraries as spaces for interaction with others and reading

All four country's children were genuinely positive about physical libraries and the opportunity for social interaction and reading. They emphasized in their interviews and drawings the need to change the "floor space." In the first year of interviews, where each child was asked how they would change their school libraries, one boy in the U.S. suggested, "I would change the floor into grass. I've always wanted to read a book sitting on the grass, but it's not safe." A boy in Germany suggested that he "…would change the floor into a soft place, full of soft things." In New Zealand, two out of the three children suggested a larger "floor space" for reading. In the drawings of new school library media centers of the future, children were consistently concerned with designing spaces that supported comfortable reading and social interaction (Figure 8).

4.3 Technology

1. Almost all of the children showed an increase in technology skills & confidence

The word "confidence" appeared quite frequently when parents, teachers, and librarians in three sites described the change in their children using the ICDL. Interview data in New Zealand, Honduras, and the U.S. all suggested the children had made great gains in their confidence and skills development. One girl in New Zealand self-reported, "I like the fact that since I've used the ICDL, I've become more confident with the computer. Before I used the ICDL I didn't even know how to turn a computer on or even what a computer was! I've become more confident every time I go on the computer." One mother in Honduras also pointed out, "The kids in this research study were able to develop a greater mastery because they had practice at it and they were expected to figure out how to go and access their book…I think there was a sense of pride in being able to do that…and certainly a sense of pride in that the others didn't have it!"

Interestingly enough, the one country's data that did not show this as a strong trend was Germany. We believe this may be due to the already existing mastery of technology skills that pre-existed at this school. In our classroom observations, we found that the children selected for this study in Germany came into the research with perhaps the most exposure to technology than any of the other schools participating in the study. This also makes sense if you consider that the children who came in to the study the most technologically challenged in their schools, had the most instances in their interviews of suggesting improvement.

2. These children showed increased reading motivation

This finding was also consistently found in the interview data of three out of the four study sites. As one mother explained, "The hook of the technology makes them want to at least to look at it whether they actually read the whole book or they even get to the point where they find a book, but to look at it is pretty interesting…it engages them." The librarian in the U.S. also confirmed this, "Kids wanted to come to the library and use the computers--they were motivated to use the ICDL." When one boy in New Zealand was describing his drawing of his school library of the future, he pointed out that, "I put a lot of computers there to get kids to read all the non-fiction books."

However, this motivation was not a finding in the data from Germany. Again, we suggest this may not have been a factor in an already technology-rich environment.

4.4 World Views

These children showed increased interest in exploring different cultures

The strongest finding among any of the trends in the data, was that the ICDL opened up children to new world views. In Honduras, one mother explained, "[My daughter] has expressed interest in other countries and I think it's something she read in the ICDL, or she looks for a book on a certain place and then all of a sudden she talks about a country." In New Zealand, one girl exclaimed, "With all the different languages and stuff in [the ICDL], it sort of dawned on me, like, all the different cultures that are out there and the possibilities that you could read about them." In the U.S. one mother simply said, "Because of the ICDL [my daughter] was able to see that there are other [cultures]…she was able to accept other cultures." This was particularly telling since the children in the U.S. came from a predominantly single-culture school.

5. DISCUSSION

In this longitudinal study, the data showed the greatest change among the children either most academically or economically challenged. In Honduras, one boy, who for the purposes of this paper will be referred to as "Juancarlos" was a reluctant reader and academically indifferent during much of his school day when the study started. According to the classroom observations, interviews with his teachers, parents, and even librarian, he did little experimentation with books. When Juancarlos first began using the ICDL, he limited himself to reading primarily pictorial books. This was consistent with his use of the school library. He regularly would only check out one book repeatedly. He rarely wandered the shelves exploring and browsing the books. As time went on in using the ICDL, his mother explained, "[The ICDL] has helped. …He is willing to read other things."

By the final year of the study, his mother explained, "I think it helped [my son] because while using the ICDL he had to do research and find things out properly. He had to follow a process to do it. It think it helped him to understand that to find anything he had to go through steps." According to Juancarlos, "It's fun to read books in the ICDL…you don't know what kind of book you're going to find. So when you find that book you start reading it and you love it! You want to just keep reading it and reading it and reading it!" Not only did this boy change his reading behaviors, but his attitude and interest in reading.

According to the interview data, classroom observations, and drawings, the one study site group that seemed to change the most, was the children from the U.S. For the purposes of this paper we will refer to them as Chalondra, Dinari and Safara. They attend a public elementary school whose population is currently made up primarily low-income, working-class African American families living in public housing. The children live with their mothers in single family homes. Chalondra and Safara both read above grade level, while Dinari reads at grade level. Although he reads at grade level, Dinari is a reluctant reader. He was new to the school when the study began. He participated in the study in place of a child that left the school at end of the study's first year.

For Chalondra, Dinari and Safara, access to children's literature at home is limited and the children rely on the school library for quality reading materials. The school building is new and the library collection is rich with multicultural materials at various reading levels. The children visit the library once a week with their classes, with flexible scheduling possible for additional visits as a class. The school librarian throughout the study asked repeatedly for assistance from teachers in helping the children with their book reviews, but received little if any response.

When the study began, all the children at all sites were asked, "What children are most different from you?" Safara explained, "Most different from me are at my friend's house in Chicago. They are different people around there. Their cousins even look and act different." When asked to draw where they would live if they could anywhere in the world, the children in the U.S. drew pictures of children in the states, most not outside of Chicago. This was in stark contrast to the study's children in New Zealand, Honduras, and Germany who mentioned such places as Paris, Australia, Disneyworld, Miami, and England.

For children in New Zealand and Germany who went to schools with a great deal of ethnic diversity, cultures were celebrated and a part of the fabric of their school lives. From school-wide plays with songs and dances from indigenous culture, to classroom projects that represent the 65 countries the children come from, these children are surrounded with cultural diversity. Even in Honduras where there was less cultural diversity, there was still an awareness and interest in other cultures and this was seen in the children's interviews where they discussed their perceptions of other cultures. For example, when one girl was asked what children are most like her, she said, "Maybe in California, maybe because they like to read a lot and they speak English."

By the final year of the study, the data on the children in New Zealand, Germany, and Honduras had not changed much when it came to world views. They continued to embrace diversity and be interested in others' cultures. However, the data in the U.S. showed enormous change. One mother explained, "Because of the ICDL [my daughter] was able to see that there are other [cultures]…she was able to accept other cultures." But in addition to a change in their world views, these children also showed motivation when it came to books, libraries and technology. One mother shared with us, "[Chalondra] is starting to discuss the books, so I know she is interested. Before it was hard to get her to read." Safara explained her interest as, "[The ICDL] is better than trying to fight over a book in the library." And the librarian said "[the] kids want to come to the library and use the computers--they were motivated to use the ICDL."

5.1 Implications for Librarians

Many in the library community have been concerned with the impact that technology might have on future libraries [29]. But this concern is not shared by the children in this study. These young people see computers side-by-side with books in their libraries. A number of children in their drawings of libraries drew both books and computers. In some sense, these children suggested there is a place for both books and computers in their definition of a library. The implication of this for parents, teachers, and librarians is that we need not fear that technology will diminish the importance of books or libraries in children's eyes. In fact, the children in this study still clearly preferred their physical interactions with books for reading, but appreciated the searching tools on the computer. They continually suggested how easy it was to find a book. Part of this may be due to the non-traditional cataloguing structures in the ICDL. Librarians may want to consider how search interfaces such as the ICDL's could be used for their physical libraries. Cataloging materials under the *color of the cover*, how the book *makes you feel* or even *where the book is from*, may better help serve children's search goals.

On the other hand, the motivation that technology generates in children should not be overlooked. If technology can support more reading experiences for children, then appropriate digital materials on computers should be offered with traditional books.

Lessons may also be learned from the international collection of materials the ICDL offers. Not only were the children in this study quite interested in the variety of books, but this variety increased their exploration and understanding of different cultures. For some, it was the first time they considered cultures outside of their own. This suggests that collection development specialists in children's libraries should consider acquiring more

materials representing more cultures. However care should be taken to find books that do not create a language barrier.

5.2 Implications for Digital Libraries

In this study, we saw that technology could be a bridge to books. Therefore developers must consider creating the most appropriate software interface solutions that can enable children to search and read digital books. As developers of the ICDL, our research team has already begun focusing on better book reading solutions. Our past research has shown that children have their own unique needs that must be served with technologies uniquely developed for them [13]. This case study confirms there is still much work yet to be done, particularly in the book reading area. Technology solutions must also be considered to lower the barrier created by multiple languages. Children are clearly interested in other cultures, but they need software interfaces that can translate books that they want to read.

This research also suggests that better new hardware solutions should also be developed that consider children's active mobile lives. More lightweight yet rugged solutions should be developed that support children in rapidly changing contexts. From home to school, from outdoor play to quiet focused work, the new technologies we develop in the future should be able to offer children anytime, anywhere access and use. In addition, there is a need to consider how best to support children in their social experiences surrounding reading. The children in this study were clearly interested in developing library contexts that considered the social experiences of sharing books and discussing ideas behind the books.

5.3 Implications for Researchers

Some may question whether seeing the world through the lens of a child is valid. To answer this concern it should be noted that when we interviewed the children in this study, their points were easily confirmed by their parents, teachers or librarians. At no time did the children describe something that could not be validated by adults. Most often, the adults interviewed would elaborate on a point made by a child. We found that the children saw their world quite clearly, and knew what they wanted changed. This suggests expanding researcher methods to create more participatory roles for children to play in the research process.

Since few other researchers have focused their efforts on international studies concerning libraries with children, the methods of this research study were by necessity exploratory and qualitative. However, this research now suggests performing more focused and generalizable studies. For example, looking deeper into some of the more interesting findings of this work could offer deeper insights into the impact digital libraries might have in economically challenged settings or on reluctant readers. Specific focus on children's cultural awareness and technology motivation should be considered for further study.

6. FUTURE DIRECTIONS

New research efforts have already been initiated by our team that will leverage the lessons learned from this research. For example, partnerships have been established with the World Bank and the One Laptop Per Child Foundation to bring the ICDL to developing countries such as Mongolia, Thailand, Brazil, and Nigeria. In addition, the graduate student that led the research efforts reported here has begun to shape her dissertation research to focus on teachers' use of the ICDL in urban U.S. schools. Together, we hope that these research efforts will lead to a more informed understanding of what is possible in supporting children of all cultures in rich reading experiences for the future.

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8. REFERENCES

[1] Agosto, D. E., Hughes-Hassell, S., & Gilmore-Clough, C. (Dec 2003). The all-white world of middle-school genre fiction: Surveying the field of multicultural protagonists. *Children's Literature in Education, 34* (4), 257-275.

[2] *American Libraries (Dec 2003).* Bill Gates: Why he did it. 34(11), 48-56.

[3] Banks, J. (1998). The lives and values of researchers, implications for educating citizens in a multicultural society. *Educational Researcher, 29* (7), 4-17.

[4] Bakken, L. & Louise, D. S. (1996). Developing anti-bias identities: *Early childhood, adolescence, and young adulthood. Multicultural Education, 4(*2), 20-22.

[5] Bettelheim, B. (1976). *The uses of enchantment: The meaning and importance of fairy tales.* New York: Knopf.

[6] Bogdan, R., C. & Bilken,S., K. (1998). *Qualitative research for education: An introduction to theory and methods.* MA: Allyn & Bacon.

[7] Cass, J. (1967). Literature and the young child. London: Longmans, Green & Co.

[8] Cole, J. Y. (Spring 2003). Promoting books and reading in the electronic age: The Center for the Book at 25. *Publishing Research Quarterly, 19*(1), 3-10.

[9] Dale, D. C. (1989). Content Analysis: A research methodology for school library media specialists. *School Library Media Quarterly, 18*(1), 45-48.

[10] Dresang, E. T., Gross, M., & Holt, L. E. (2003). Project CATE: Using outcome measures to assess school-age children's use of technology in urban public libraries. *Library & Information Science, 25*(1): 19-42.

[11] Druin, A. (2002). The role of children in the design of new technology. *Behaviour and Information Technology 2*1(1): 1-25.

[12] Druin, A., Bederson, B.B., Weeks, A., Farber, A., Grosjean, J., Guha, M. L., Hourcade, J. P., Lee, J., Liao, S., Reuter, K., Rose, A., Takayama, Y., & Zhang, L. (2003). The

International Children's Digital Library: Description and analysis of first use. *First Monday, 8*(5).

[13] Druin, A. (2005). What children can teach us: Developing digital libraries for children. *Library Qrterly, 75*(1): 20-41.

[14] Druin, A., Weeks, A., Massey, S., & Bederson, B.B. (2007) Final Report on IMLS Funded Grant #LG02020026-02 APPENDICES, Univ. of Maryland, HCIL Tech Report #HCIL-2007-01. *www.cs.umd.edu/hcil*.

[15] Ellis, G. & Brewster, J. (1991). *The storytelling handbook for primary teachers.* England: Penguin Books.

[16] Grugeon, E. & Gardner, P. (2000). *The art of storytelling for teachers and pupils.* London: David Fulton Publishers.

[17] Hart, G. (2003). Public libraries stepping into the gap? A study of learners' use of libraries in a disadvantaged community in Cape Town, South Africa. In Proceedings of *IASL School Libraries Breaking Down Barriers*, Durban, South Africa, 7-11 July, 71-82.

[18] Hengst, H. (1997). Negotiating 'Us' and 'Them': Children's constructions of collective identity. *Childhood, 4*(1): 43-62.

[19] Holloway, S. L., & Valentine, G. (2000). Corked Hats and Coronation Street: British and New Zealand children's imaginative geographies of the other. *Chldhood, 7*, 335-357.

[20] Howe, N. & Strauss, W. (2000). *Millennials Rising: The next generations.* NY: Vintage Books.

[21] Ireland, L. H. (2001). The impact of school library services on student achievement: An annotated bibliography, 5th edition. *ERIC Document* Number ED 450 807.

[22] Lance, K. C., Rodney, M. J. & Hamilton-Pennell, C. (2000). How school libraries help kids achieve standards: The second Colorado study. *Colorado Department of Education Report.* Denver, CO: Department of Education.

[23] Lance, K. C. (June 2002). What research can tell us about the importance of school libraries. *White House Conference on School Libraries.* Accessed December 28, 2003.

[24] LeCompte, M. D. & Schensul, J. J. (1999). *Ethnographer's toolkit: Analyzing and interpreting ethnographic data.* London, UK: AltaMira Press.

[25] Massey, S. A., Weeks, A. C., & Druin, A. (2005). Initial findings from a three-year international case study exploring children's responses to literature in a digital library. *Library Trends, 54*(3), 245-265.

[26] Massey, S., Druin, A., & Weeks, A. (In Press) Emotion, response, and recommendation: The role of affect in children's reviews of books in a digital library. In D. Nahle (Ed.) *Information and emotions.* Medford, NJ: ASIST Monograph Series.

[27] McIntyre, M. H. (2002). *Start with the children: The needs and motivation of young people,* Accessed July 17, 2003: *www.resource.gov.uk/documents/re179rep.pdf.*

[28] Meyer, E. (1999). The coolness factor: Ten libraries listen to youth. American Libraries,, 30(10), Accessed July 23, 2003: *www.urbanlibraries.org/coolnessfactor.html*.

[29] OCLC (2003). OCLC Environmental Scan: Pattern Recognition, Accessed March 17, 2004: *www.oclc.org/membership/escan/introduction/default.htm.*

[30] Raseroka, K. (2003). Libraries for lifelong literacy: IFLA presidential theme 2003-2005. *IFLA Jrnal, 29*(2): 109-112.

[31] Rideout, V. J. & Wartella, E. A. (October, 2003). *Zero to Six: Electronic media in the lives of infants, toddlers, and preschoolers.* Accessed October 30, 2003: *www.kff.org/entmedia/loader.cfm?url=/commonspot/security/getfile.cfm&PageID=22754.*

[32] Sabljak, L. (2003). Bringing libraries and books closer to children during war—UNICEF projects in Croatia. *IFLA Journal, 29*(4), 313-316.

[33] Strauss, A. & Corbin, J. (1990). Basics of qualitative research: Grounded theory procedures and techniques. Newbury Park, CA: Sage.

[34] Thorhauge, J. (2003). Danish strategies in public library services to ethnic minorities. *IFLA Journal, 29*(4), 308-312.

[35] Webb, M. (1990). Multicultural education in elementary and secondary schools. *ERIC digest number 67,* ERIC Clearinghouse. Accessed October 27, 2002: *www.ed.gov/databases/ERIC_Digests/ed327613.html*