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A Computerized Messaging System for Childcare

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Abstract

As technology evolves there are more and more places that it is appropriate to use some sort of technological solution. A daycare center in California requested that a new note collection and communication system be investigated to facilitate instant feedback from caregivers to parents. This project researched methods to computerize a message system without alienating teachers or parents, and without compromising the face-to-face communication that already exists.

Acknowledgements

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1. Problem Statement and Goals

Some of the most valuable aspects of a childcare workers job are the developmental and behavioral notes that they take while observing a child at play. These notes can include any problems or concerns that the childcare worker has regarding a child's interactions or behavior. Observational notes also provide records of a child's developmental progress, which inform curriculum development and programming decisions. Further, these developmental notes build the basis of a child's developmental history in the program and give parents insight into their child's growth and development, as well as how their child is doing when they cannot be with them. They also allow the parents to have a closer partnership with the childcare staff.

In general, these notes (if they are taken at all) are somewhat limited, and are taken on paper, which eventually may be entered in to a computer system or filed in a cabinet, sometimes never to be seen again. Often these are just saved for internal use since, by the time that they are correlated or organized, they are no longer temporally relevant to the parent. The parent instead may get a few highlights from the childcare worker verbally at pickup time, but these can be incomplete and, with all of the other distractions associated with pickup time, often do not receive the parent's full attention.

The purpose of this project was to discover what requirements exist for a parent-caregiver communication system and then to implement a mock-up using a software application. Parents and childcare workers then reviewed this mock-up to see that it fulfills those requirements. Since this application was as much for parents as for caregivers, it had to

incorporate the parental viewpoint so that it worked for parents in terms of privacy, information, and convenience.

One of the ways that I accomplished the task of designing and testing a system to meet all these needs is through an extensive survey of all of the parties concerned in a diverse group of childcare facilities. I also interviewed teachers and administrators to judge the monetary worth of such a system and to review its financial viability. This survey covered many pieces of the specification, from user interface, to privacy and access control. It also gathered more general information such as computer savvy and determined how comfortable the teachers and the parents are with current technology. This covered all technology, but specifically focused on the Internet and personal digital assistants (PDAs) such as Palm Pilots™.

2. Literature Review

2.1. Current Childcare Practices

According to the Child Development journal put out by the U.S. Department of Health, Education, and Welfare, there are many hurdles to parent involvement in the daycare curriculum. (Serving Preschool Children 66) One of those hurdles is the comfort that the parent feels in and around the daycare setting. A large part of familiarizing the parent with the center happens by providing as much communication as possible between the center and the parent. This happens in the form of face-to-face communication, newsletter, daily notes, and periodic reviews.

Day care exists in many different environments and settings, from large centers to family day care to in-home care. There are differences that can be noted across these various settings, but generally the diversity is in the administration of the facility while many of the principles relating to effective parent-caregiver communication still apply.

Justification for taking developmental notes is as follows: "As children grow, their needs and capacities change. Even children of the same chronological age can differ markedly. An effective day care program and staff must be able to adapt to these differences by providing appropriate variation and flexibility in treatment." (A Statement of Principles, Section 7) One of the best ways to adapt to these changes is to make sure that there is a detailed record of how the child is progressing, so that one may design the curriculum around those developmental stages.

It is also important to the parents that they know what state the child is in when they come for pick-up. If the child has had any major accomplishments, issues, interactions, or disappointments, the parent should know when they pick the child up. This is vital as that information will shape the rest of the day for them, and can inform the parent in the best ways to support their child. The caregiver in turn can often give a five-minute synopsis, since he or she has a good idea of how the child is doing at pick-up time. However, with all of the distractions associated with pick-up, it can be hard for the parent to focus on that information exchange. The ideal time to receive this information would be just before the parent comes in to pick the child up. In that case, the parent would

know what mood the child is in when they walk in the room, and can focus on the interaction with the child and caregiver without unnecessary distractions.

"Direct contact between parents and staff members or caregivers is essential to understanding and confidence." (Serving Preschool Children 66) While no system should replace the face-to-face interaction, it may be possible to ease some of the obligation that the caregiver feels to give a complete account of the day. If the parents can find out the details of their child's day on their own time, the interaction between the parent, caregiver, and child during pick-up can be less business-like and more personal.

2.2. Survey Methodology

Surveys were used in this project to clarify and define the interface or interfaces that parents and teachers would want on a computer-based system like this. They also were used to determine what note taking systems they had in place already, and to identify what items are being tracked currently. The surveys were also used to gauge the computer comfort of the prospective audience to see how readily the parents and teachers would accept a computerized solution.

A survey is a system for collecting information to describe, compare, or explain knowledge, attitudes, and behavior. (Fink 1) Surveys are used to determine characteristics of a population. A good survey has specific objectives, straightforward questions, a good choice of sample population, and uses reliable survey instruments and reasonable resources.

Common survey instruments are mailed, taped, or self-administered questionnaires and in-person (face-to-face) or telephone interviews. (Fink 2) The main considerations when choosing a survey instrument are the particular situation, and the information being gathered. Interview type surveys involve more resources per respondent than questionnaire type surveys, but can be clearer and more flexible (Fink 43). They are generally chosen for open-ended questions. Questionnaires are good for closed-ended or multiple choice questions and can be broadly distributed cheaply.

A good sample is a miniature version of the population while the best sample is representative (Fink 27). "Representative" means that important characteristics are distributed evenly in both groups. Selecting a representative sample can be challenging. The first step is identifying the eligibility criteria that will be used. The criteria for inclusion in a survey refer to the characteristics of respondents who are eligible for participation in the survey. (Fink 27) One then needs to determine whether to use a "probability sample", or a "nonprobability sample." A probability sample is one in which anyone in the population has a more or less equal chance of inclusion in the survey, although some may be weighted due to their strata or sub-group. Nonprobability samples do not guarantee that all eligible units have an equal chance of being included in a sample. (Fink 32)

Probability samples can provide a more random selection, which can make them less prone to selection biases, but they are more geared to larger, more impersonal surveys. The main advantage of nonprobability samples is that they are relatively convenient,

economical, and appropriate for many surveys. Their main disadvantage is that they are more vulnerable to selection biases. (Fink 32)

2.3. Software Research

In a fairly extensive search of the Internet and local childcare centers, I found no solutions that are able to provide a portable front-end and a complete back-end (as described in section 2.3.2.) "Front-end," in this case, refers to the interface that the users (parents and caregivers) would use to enter and change information. "Back-end" refers to the underlying data storage and processing mechanism in a system.

There were, however, a few applications available that accomplished some of the same tasks included in this project. These applications did not reduce the total development cost of the mock up (in terms of time and effort) since their cost to integrate was relatively high.

2.3.1. Note Taking Applications

Note taking is essentially the first and primary function of PDAs. As such, it makes sense that these were the main input devices that this project set out to investigate. Other interfaces researched were a simple keyboard interface through a web browser, or a touch-screen.

The most popular note taking application is the basic version that comes standard with the PDA. There are few (if any) replacements and enhancements that have been made, as the initial implementation was designed to be broadly useful (if overly simple.) This

application does not support flexible communication such as was needed to interface with a server and its input was not structured. Due to the free-form strings that it generates, the output does not lend itself to easy parsing for standardized input to a database system. The fact that it was not designed to handle specific input makes it slow because there is no quick way to enter frequently used terms or standard text.

Palm provides a programming interface (API) that allows a fairly straightforward interface to the synchronization mechanism in PalmOS. This synchronization is the method by which the PDA is able to communicate with a larger (host) personal computer. The API allows a relatively flexible channel, which a custom application running on the PDA can use to mate with the host computer. In this way, the PDA can download data from the host computer and send back any new and/or changed data when the user connects the PDA to the host.

2.3.2. Childcare Management Systems

There was a very wide range of childcare management applications available on the market. Within those packages existed broad discrepancies in quality, price, and features. There were minimal packages that were little more than scripts attached to a standard database and distributed as shareware, and there were $1000+ custom applications that covered everything from accounting to standardized forms. Notably missing, however, were record-keeping systems that allowed for observational, developmental records.

The definition of a childcare management system can vary wildly, but the following aspects should exist in a typical and complete system:

- Child or student tracking
    - Name
    - Address
    - Contacts
    - Attendance
    - Medical records
        - Immunization records
        - Allergies
        - Medication
    - Special instructions
        - Restricted physical activities
        - Pickup and/or drop-off limitations or restrictions
- Sponsor and donor tracking
    - Names
    - Contacts
    - Notes on donation
- Accounting and revenue
    - Billing records
    - Invoices
    - Tie-in or export to standardized accounting packages (Quicken)

The following sections will attempt to expound on a few of the most noteworthy pieces of software. These were selected from a list of about thirty applications found through an

Internet search. The included systems were chosen as they most closely matched the criteria listed above. All packages contain all of the above features, except where noted.

2.3.2.1. ChildWatch

http://www.remarkable-systems.com

Remarkable Systems actually provides two related options that offer pieces of the functionality that this project is looking to create. The first piece is a Windows based application that varies in price based on number of students and options from $200 to $1670. They offer a 50% discount for an unsupported version. The second relevant system is essentially the same, but runs through a web interface. It is priced on a subscription basis from $8 to $40 per month.

Although the system does not have a note passing mechanism explicitly, it does handle tracking of a child's information in a manner accessible to the staff on the system, including medical histories, account information, and attendance tracking. The online system also includes the ability to allow parents to pay their bills online, and receive e-mail notifications.

2.3.2.2. Day Care Web

http://www.daycareweb.com/

Day Care Web provides daycare management via the Internet. It has online management of all tasks, is accessible from any computer, and is a relatively low cost solution. They provide automatic backups and updates, generation of menus, and permission slips. They

also provide meal planning and organization. It is a subscription-based system, and costs $19.95 per month.

2.3.2.3. Childcare Administrator 2000

http://www.childcareadmin.com/

Childcare Administrator is a Windows based product. It handles all of the tasks covered at the beginning of section 2.3.2, as well as menu planning. It ranges in price from $125 for the "at home" version to $195 for the "Full" version. The difference between the two is licensing, as the "at home" version supports up to ten children. They also offer charitable or referral discounts.

2.3.2.4. SchoolLeader

http://www.schoolleader.com/

This was one of the most full-featured packages found. It contains a very thorough contact database and relationship management section, as well as a well-organized, functional interface. They do not appear to support an online interface to the data, but they do have a touch screen interface that is designed to handle attendance tracking. No prices were listed on the website, although the financial package requires a monthly subscription.

3. Procedure

3.1. The Survey

In order to gain insight into the design requirements of a system such as the one that is being proposed, I surveyed a group of childcare centers. This query was conducted

through multiple written surveys and an interview at each childcare location. Different written portions were targeted to teachers and parents. The interview segment was with the program director and/or the teacher in charge of curriculum development (also known as the lead teacher.)

The purpose of this survey was to present the ideas that various sources had contributed to this project to a representative population of parents and teachers so that I could decide what features were going to be useful in the final prototype. It was designed to hone the design criteria and create a design specification while also getting a feel for the end users (parents and teachers.) Since most of the input for this project had come from childcare workers and software engineers, parents concerns were the single most underrepresented input.

The parent survey started with an introductory statement describing the goals of the system, and then asked whether the system described was interesting to the person being polled (see appendix A). I decided to use a numerical scale there so that the results could be averaged to get a mean interest level. The section after the first question was designed to evaluate the computer knowledge and comfort level of the subject. This series of questions included a question about which applications they used in order to evaluate the interfaces that they were already comfortable with to help determine which interface would be more familiar to them. Some questions used nominal (non-numerical) options in order to compile data on the frequency of occurrence for items such as computer

programs, where the person surveyed could choose more than one answer, and some, again, used numerical options so that I could more easily average the data together.

Next, there were a few questions designed to find out how much access the parent had to the Internet. This would be important when it came to determining if an online solution was appropriate. These questions were mostly true-false. The non-numerical options were analyzed using a percentage system instead of a mean. This section also included a question about which information they thought would be useful to have access to (either locally, at the center site, or remotely, from home.) This section completed with questions about how much security they thought would be necessary to keep the information on their children protected from unauthorized viewing, who was allowed to view the data collected, and, given the 'adequate security' that they decided on in the previous question, whether they would like to have access to the data online.

The final questions were whether the subject thought that it made sense to have a computer available to parents at drop-off and pickup times, and whether they would participate in a pilot program if their center decided to evaluate the system described. The last section was just an open-ended area to voice any opinions that did not fit into the check boxes on the form.

The teacher surveys had many elements that were similar to the parent's survey, but also included a special focus on the types of information they track on a per-student basis and the input methods that they would prefer. The reason that more attention was given to

the teachers input was due to the fact that teachers would have to interact with the system on a more frequent basis, and they also are in a position where they generally cannot take ten minutes out of their duties to enter a single note, so the more that could be done to ease note entry for them and to make it faster and more portable, the more likely it is that the system would be used. In order to better organize the input preferences, the survey had the teachers list the input options in order of preference. This allowed for a more informative output than any other technique of choosing the options due to the ability to average by column and determine what the top preferences are. This clarifies which options to pursue in implementation, and clearly delineates how much one system is preferred over others.

3.1.1. Survey Setup

3.1.1.1. Survey Groups

The groups that participated in the survey were: First Friends Daycare Center, Hardwick Cooperative Preschool, and the Cabrillo College Children's Center. These programs constituted a nonprobability sample since they where chosen based on connections that they had with WPI and myself. The characteristics that made them a good sample group were the diversity of education levels and goals, as well as economic backgrounds of the parents and caregivers. They provided a wide spectrum of requirements that I was then able to compile into a prototype specification to work across many different curricula and motivations.

First Friends is a childcare center that is located in First Baptist Church directly near WPI in Worcester, Massachusetts. They cater to many age levels and many WPI faculty members have children who are enrolled there. They are a relatively large non-profit care center with 65 students and five classrooms. They have a total of 12 full-time teachers and 8 additional 'floaters' that can fill in when a classroom needs extra assistance. They care for children from as young as six weeks all the way through preschool age (up to 5 years.)

Hardwick Cooperative is the preschool that my advisor takes her children to. This is a small rural program for pre-school aged children located in Hardwick, Massachusetts. They are a non-profit organization based on a philosophy of strong parent involvement and many of the children have one stay-at-home parent. There are two teachers (out of four total) and twelve children (out of approximately fifteen) present on any given day. As they are strictly a preschool, the age range of the students is from 2 years nine months (2.9 years) through 5 years.

The impetus for this project originated at Cabrillo College, a community college in California. My mother is an instructor in the Early Childhood Education department there, and part of their curriculum involves a practicum-teaching course in their on-campus daycare center. They currently employ a pencil and paper system to take developmental notes, and she is looking for alternatives for her students and the childcare staff. As it is a teaching institution, these notes are part of the students' evaluation, but are currently not shared with the parents.

Cabrillo College Children's Center is an educational program that is affiliated with and managed by the Cabrillo College Early Childhood Education department at Cabrillo, located in Aptos, California. The Children's Center cares for a broad age range of children (from 6 months to 5 years) and are non-profit. Their program is geared toward training Cabrillo College Early Childhood Education students, as well as providing care for students, faculty and staff of Cabrillo.

3.1.1.2. Daycare Evaluation

The first goal of the initial surveys was to determine which systems that the daycare currently used to record day-to-day information, what information they recorded on a per-child basis, and what other functionality these systems provided. Since one goal was to establish patterns of use, the questions included the age ranges of children, and the ratio of children to caregiver. The survey also determined if the program used a primary caregiving system where one caregiver (or two on different shifts) was responsible for the same group of children on an on-going basis.

The second goal of the initial surveys was to help guide the design of the user interface. For this, the surveys included a section that asked about common tasks, as well as common activities, phrases and descriptions. The survey also asked about the computer familiarity of the teachers who would be using the system. This included questions about their comfort and knowledge of PDAs, touch screens, and web-interfaces. They were also asked to rank various input methods in order of preference.

The questions that were directed towards the administration focused on the financial aspects of this system, as well as questions about the layout and operation of the childcare center. This included finding out about any current software that the proposed system might replace, and determining the financial benefits or costs associated with this system. There were also questions about what current subsidies they apply for, and which state applications they must fill out in order to determine what information had to be available in a standardized format for forms. The purpose of questions about forms was to determine if a computerized system that contained the basic information mentioned in section 2.3.2 could automate some of these processes. The survey also asked about the number of children at the center, the number of different classrooms, and the size and age grouping of children.

In the category of preparation for an on-site deployment, I asked about the current computer infrastructure. These questions were to determine if they have a local area network (LAN) and if so, where it stretched, and what computer systems they are using. I also asked how many computers they had and of what type, and how often they upgrade their systems.

3.1.1.3. Parent Evaluation

There were many questions that needed to be asked of the parents who would use this system as well. I anticipated that one of the primary concerns that would be raised is security. The concern was not only about how the information was going to be kept and who would be allowed to view it, but also about the ever-popular question of whether or

not to allow web access. The survey was aimed at determining if the benefits of web-access outweighed the perceived perils.

The main question, however, is the most obvious one. Would parents use this system, and if so how would they access it? Was web access acceptable? Would they prefer a system available in the parent entryway or lounge? Would they like a digest e-mailed to them at a certain time?

An issue that presented itself when thinking about such a computerized system, especially one that will need to be accessible and easy to use for all parties, was that of computer comfort. What was the mean computer skill level? Which applications were parents already familiar with, and how could I incorporate them into the final application to make the learning curve less daunting?

3.1.1.4. Combined Evaluation

There were some questions that applied to both parents and teachers. The primary question is the question of value. Had they ever felt the need for a system that did this, and did they see this as a valuable tool, or just as more busywork that takes up resources?

I also needed to know what kind of Internet access the parents have, and what kind of Internet access the center has. This affected where the server resided, and whether or not I was able to present a web front end for home users. In the two sites that I visited in Massachusetts, they had limited to no Internet access, and minimal networking

infrastructure. Since there really was no strong network, this indicated that a solution based on a single computer made more sense in these environments.

3.1.2. Survey Analysis

Of the 30 teacher and 40 parent surveys distributed, I received 18 teacher and 24 parent surveys back. This equates to a response rate of 60% for both teacher and parents. The real advantage of the surveys was the wealth of comments that they contained. I will review some of the comments in this section, followed by the quantitative results in subsequent sections.

There were many good points made both in favor and against the proposed system, and many interesting insights into the priorities of the parents and teachers of young children.

The most common objection to the system is the time that it takes away from the children and the possible detriment that it poses to the face-to-face interaction. This is very evident in one comment I received from a parent:

> "Although it sounds like a great idea for parents to be able to 'monitor' their child throughout the day, the downside is that it would take time away from the children.

> "The teacher would have to sit at the computer and enter the information for as many as 20 children in one day. Even if it only takes a few minutes, that's a lot of quality time away from interacting with the kids. (20 * 5 = 100 minutes = approx. 1 ½ hours/day)

> "And is it really a good idea for a parent to know exactly when a problem arises. Let the teacher and child work out the problem and report to parent at end of the day. There should be a resolution to report instead of an incident only.
>
> "Also, focus should be on the child as a whole, not a single incident being reported right before you see your child. This may cause undue stress/anxiousness instead of joy at seeing your child."

This was very important to keep in mind when designing the system so that the amount of time spent in front of the computer is minimized. The second point, regarding instant feedback, is also an interesting point, and it relates more to the habits of the caregivers using the system. I think that it is more likely that the caregiver would wait until the problem is resolved rather than hurrying over to the computer in the middle of a conflict, but it is necessary that the users of the system are aware that in no way should this encroach on the quality and amount of time spent with the children. It should be an extension of care, rather than an imposition.

3.1.2.1. Cabrillo College Children Center

Cabrillo only responded with the teacher surveys since they were on break when the survey arrived. I received 5 of 6 teacher surveys from Cabrillo, and the teachers there seemed very excited about the project; all marked their interest at 4 of 4.

All of the teachers said that they are currently using a pen and paper system to track a variety of information for curriculum development, to identify learning disorders, and for

their own personal information. In addition, they mentioned that there is a requirement known as 'Desired Results' which is a new metric used by the state of California, which requires a fair amount of documentation. They also use that information in their yearly parent reports.

The information tracked by the teachers is as follows. 100% track developmental milestones, 80% watch for behavioral problems, 80% take notes on eating habits, 100% jot down diaper changes. The other information tracked consists of peer interaction, child's interests, and 'information important to parents.'

All of the five respondents care for children in the range of 2 years to 3.5 years. In addition to their classroom, there are three others. There is a classroom for children from 12 to 24 months, and there are two preschool rooms for kids from 3 to 5 years. Cabrillo is also just opening up their brand new infant center starting next year.

The average computer familiarity was 2.2 out of 4, and 100% of instructors had a computer at home. All said that they use a computer at work, although two said that it is less than once a week, while two others said less than three times per week, and one said everyday. The common computer tasks fell under the following categories: 20% said they used computers for games, 80% said they did their word processing on the computer and 40% said that they used their computer knowledge for web surfing. All said that they used e-mail, making that the most popular choice.

In the interface section, the lack of familiarity hurt the PDA and the touch screen. One person had used a Palm Pilot™ before and they ranked it as 'not too bad'; two had touch screen experience, and both of them rated them as 'not too bad' as well. The real blow, however, came in the section where they ordered the interfaces by preference.

In order to tally the order of preference for the five input devices available it was necessary to find a good way to compute the averages. For each input device, the numbers given by each respondent were summed. Then the sum is divided by the total number of non-zero responses for that item. This essentially removes people who had no preference from the average for that item. That number can then be used to rank the items in order of preference with the most preferred item being the closest to 1. Pencil and paper just edged out touch screen with a 2.8, while touch screen had 3.0. Tape recorder came in at 3.4 and web browser wound up at 3.5. The interesting thing is how divided opinions were about input devices and how much closer they were to the average value of 3 than at the other two schools. There is also this caveat presented by one of the respondents:

> "I'd love to have some sort of computerized system in the class. I put the palm pilot at five because I haven't had much experience. I think that would be ideal. I would love an organized concise way to store information about children and their families, also it would be nice to have a way to store and organize info for the 'desired results' tool."

3.1.2.2. First Friends Daycare Center

3.1.2.2.1. Parent Surveys

I received 14 parent surveys from First Friends out of a total 28 distributed. Two of the most interesting factors with this location were the high computer literacy and interest levels. There was a mean computer literacy of 3.71 out 4, and a mean interest of 3.18.

One result that I found very interesting about the parents at First Friends was that they were not very enthusiastic about having a computer available in the lounge during drop off and pick up. Only 4 people out of the 14 (29%) said that it would be a good idea. Most said that they simply did not have the time to spend reading information on a computer that they would rather hear in person from their child and their child's teacher.

100% of those surveyed said that they had a computer and an Internet connection at home and 64% have some sort of high-speed access (either cable modem, Digital Subscriber Line (DSL), or Integrated Services Digital Network (ISDN)), while 79% use a computer every day at work. The most common uses of computers were word processing and e-mail at 100% with web browsing a close second at 93%.

Cognitive and curriculum notes were the most desirable data according to the survey, with 93% of correspondents wishing to have access to them in some form. Class lists were the next most popular item at 57%. 86% of those surveyed said that they would like to be able to access these data over the Internet.

Security is always a hot button issue, and it was no different at First Friends than else where, although there seemed to be a pretty reasonable consensus that a username and password provided nearly enough security. 86% of those surveyed said that they favored a password to protect the information, while 21% said that they would also require a piece of more personal information such as social security number as well. One person declared that there was no way to be adequately safe, and one said that they did not feel the need for any sort of security.

86% felt that they and teachers should have access, while 71% included the director. 43% thought that staff should have access as well. When all was said and done, 86% (12 people) said that they would like to participate if the center was part of a pilot program to evaluate this software.

3.1.2.2.2. Teacher Surveys

I tabulated 10 teacher surveys from First Friends and it was a very different response than the parents. While the parents had a mean interest rating of over three, the teachers came in at 2.2, with a median of 2 (1.5 points off of the median of 3.5 that the parents had.) Again the main concern is that, with a computerized system, there is a danger that the face-to-face interaction that is so important to have with parents will be lost.

70% of teachers said that they are currently using a pen and paper system to track a variety of information. 30% say that they use the information that they jot down for curriculum development, 10% use it to identify learning disorders, 40% use it for their

own personal information, and 40% jot down information to use in the daily reports they put together for parents.

As for what information is actually tracked, 60% of respondents track developmental milestones, 70% track behavioral problems, 60% pay attention to eating habits, 70% keep tabs on diaper changes, 20% say they track injuries and accidents reports, and 10% keeps notes about things that the child needs (such as diapers).

The age range of the children at the center goes from 6 weeks to 5 years. There are 12 full time teachers assigned to the 65 students in 5 classrooms. There are also 8 other instructors who keep part time hours and act as floaters to aid in any classroom that needs them. The breakdown that follows of age ranges taught by the teachers who took the survey will total over 100% due to the fact that some instructors teach more than one age range. 30% teach 6 weeks to 15 months, 50% teach 15 months to 2 years, 40% work with 2 years to 2 years nine months (also known as 2.9 years) 10% work with 2.9 to 4 years, and 30% work with 4 years and up.

The average computer familiarity was 2.2 out of 4, and 60% of instructors had a computer at home. 70% said that they never use a computer at work, and none said they use one more than three times a week. As for what they do with the computer. 30% said they did not use a computer. 40% said they used computers for games. 50% said they did word processing on the computer and 50% said that they used their computer knowledge for e-mail. The most common use at 70% was web surfing.

As far as interfaces go, it looks like the PDA choice is right out. Only one person had used a palm pilot before and they ranked it as 'Awkward' two had touch screen experience, and one rated them as awkward, and the other rated them as easy and intuitive. While this was slightly better than the Palm™, it was still not looking promising.

After tallying up the order of preference for the five input devices available, and accounting for people who did not have any opinion on some items, the final numbers ended up like this. Pencil and paper came out on top with a fairly decisive 1.9. In second place, and kind of a surprise to me initially, is the web browser with a score of 2.86. The tape recorder came in a close third at 3.0, and the PDA and Touch Screen tied for the worst with a score of 4.16.

3.1.2.3. Hardwick Cooperative Preschool

3.1.2.3.1. Parent Surveys

I received 10 parent surveys out of the 12 distributed at Hardwick. The average interest from parents at this center was 2.3 with the median at 2. There was a mean computer literacy of 2.8. Again, people who had more computer experience and more computer literacy were more inclined to be interested in a computerized system, to an extent, but as one can see from the numbers, the overwhelming opinion is that Hardwick has sufficient communication channels, and they are used well. Since this is such a small daycare, and there is such an emphasis on parent involvement, it makes sense that parents feel more

connected. I think also that its rural setting lends itself to longer drop-offs and pickups since there is less chance the parent is hurrying to work.

90% of those surveyed said that they had a computer and an Internet connection at home and 30% have some sort of high-speed access (either cable, DSL, or ISDN). 60% of those polled use a computer at work. The most common use of computers was word processing at 70%. 50% browse the web, while 40% use their computer for accounting or taxes.

Cognitive notes were the most desirable data for this group at 70%, and curriculum info and class notes each at 50% filled out the top three. Only 20% of those surveyed said that they would like to be able to access these data over the Internet, with 30% citing privacy concerns, 30% would prefer to talk to a person instead of look up stuff on the computer, and 20% were concerned that the data input would take teacher time away from children.

Another section in which Hardwick differed dramatically from First Friends is in the desire to have a computer in the entryway or parent lounge. While there were still plenty of dissenters (30% said that they would not have time to use it, and 30% said that they would rather check in verbally with the caregiver,) 40% said that they favored the use of a computer in that application.

As far as data collected by the hypothetical system, 90% felt that they should have access, 80% thought that teachers should have access, while 40% thought that staff should have access as well. When all was said and done, 60% (six people) said that they would like to participate if the center was part of a pilot program to evaluate this software.

3.1.2.3.2. Teacher Surveys

There were a total of 3 teacher surveys out of the 4 teachers from Hardwick, and they seemed to agree, generally, with the opinion of their parents, if a bit less interested. The teachers had a mean interest rating of 1, with a median of 1. The main concerns seemed to be the learning curve, and price, as well as the concern about loosing the face-to-face interaction with parents.

All of the teachers said that they are currently using a pen and paper system to track a variety of information. 33% say that they use the information that they jot down for curriculum development, 67% use it to identify learning disorders and 67% use it for the semi-annual parent reports required by the state. All respondents said that they track developmental milestones and behavioral problems. They also track injuries and accidents reports.

The age range of the children is 2.9 to 5 years. There are 12 students and 2 teachers at any given time out of the full staff of 4 that rotates throughout the week.

The average computer familiarity was 2.33 out of 4, and 100% of instructors had a computer at home. 67% said they used their computer for word processing, another 67% do accounting and yet another 67% do web surfing and e-mail.

In the interface section, the computerized methods of input fared poorly. No one had used a palm pilot before and one had touch screen experience, but refrained from listing its ease of use. After tallying up the order of preference for the five input devices available, the final numbers ended up like this. Pencil and paper was the nearly unanimous first place choice at 1.3, with the tape recorder just behind at 1.5. PDAs managed to sneak in at number 3 with and overall ranking of 3, and touch screen followed in fourth with a ranking of four. Bringing up the rear was the web interface at 5.

3.1.3. Survey Results and Discussion

The following subsections compare the results from the previous sections and interpret the numbers in order to detail the design decisions made.

3.1.3.1. Interest

	Cabrillo Teachers	First Friends Parents	First Friends Teachers	Hardwick Parents	Hardwick Teachers	Totals
Mean	4.00	3.18	2.20	2.30	1.00	2.63
Median	4	3.5	2	2	1	3
Mode	4	4	2	2	None	4

Table 1: Survey results on 'interest' using a scale of 0 (not interested) to 4 (very interested)

Interest varied widely in both parents and teachers. Table 1 shows the arithmetic mean, median, and modes organized by survey group, as well as those for everyone surveyed combined. Mean is the average of all of the numbers given, median is the middle number (or the average of the two middle numbers) if the list of responses was ordered from smallest to largest, and the mode shows that answer that occurred most often.

Although the average tended to hover in the middle of the scale, it seemed that many people had reservations about the system. The most common comment was that it distances the teacher and parent since the parent no longer needs to talk to the teacher. This is a very important aspect and should definitely be addressed when any system like this is installed. Although I mentioned earlier that this system was meant to augment normal communications rather than replace them, the danger of a system such as this is that the teacher could feel like they do not need to talk to the parent since all the information is in the system.

3.1.3.2. Computer Literacy

	Cabrillo Teachers	First Friends Parents	First Friends Teachers	Hardwick Parents	Hardwick Teachers	Totals
Mean	2.20	3.71	2.20	2.80	2.33	2.86
Median	2	4	2	2.5	2	3
Mode(s)	2	4	4	2, 4	None	4

Table 2: Results on 'computer comfort' on a scale from 0 (not comfortable) to 4 (very comfortable)

In general people who had more computer experience and more computer literacy were more inclined to be interested in a computerized system and particularly a web-based

system. However, some of the people who were computer literate were critical, citing privacy concerns.

Table 2 shows that parents who returned surveys at First Friends where much more computer literate, on the average, than any other survey group. In fact, none of those respondents marked below 3. There was, however, a lower percentage return there as compared to at Hardwick, and I suspect that it might be that only people who were more computer literate and somewhat interested (either positively or negatively) in the survey topic bothered to return their surveys. This may skew the results slightly towards those with more computer experience. However, I think that the diverse responses I received from the other centers balances them out.

3.1.3.3. Internet Access

90% of parents at Hardwick had a computer with an Internet connection, 100% of those surveyed at First Friends had a computer and Internet access at home. This is significant as it speaks to the proliferation of the Internet, and the accessibility of a web-centric system. Whether the parents want the information online is another question, however. The majority of respondents (58%) said they would indeed like to have access to the information online. The major objection to putting the data in a web-accessible format was security. Of the 14 parents asked about security, 96% said that a password and some personally identifying information (such as a social security number) would be adequate.

3.1.3.4. Information to Track

Secondary questions that were important from a design standpoint were questions about which features were valuable to them, and which were extraneous. Most parents who had some interest in the system said that they would like to have access to the class phone lists and to the developmental and curriculum notes that teachers take during the day.

3.1.3.5. Input Method

	Cabrillo Teachers	First Friends Teachers	Hardwick Teachers	Total
Pencil and Paper	2.80	1.90	1.30	2.11
Tape Recorder	3.40	3.00	1.50	2.75
Web Browser	3.50	2.86	5.00	3.20
Palm Pilot	4.00	4.16	3.00	4.00
Touch Screen	3.00	4.16	4.00	4.14

Table 3: Results on the question about the order of preference for input methods

As is evident from the results in Table 3, pencil and paper is the overall preferred method to enter notes, while the highest rated computer interface is the web browser. This seems to indicate that there really is no computerized method that the teachers are completely comfortable with. Given this, it seems that the best course of action is to implement a simple web-based front-end (which will also allow parent access, as the survey results in section 3.1.2.2.1 indicated was desired) and a comprehensive database back end, that is

highly flexible, so that as soon as teachers are more comfortable with a computerized input device, that could be added on to interface with the database.

3.2. The Design

While an ideal study might design various input systems (PDAs, pencil and paper, touch-screen, etc.) and compare them, the time and resource constraints for this project dictated that I pursue only one input device. While the focus of the project had been on PDAs or other portable electronic devices as input, this study was designed to expose the preferred method of the childcare worker and then design around that.

After tallying the surveys, the results varied widely as to preferred input technique. Since the top two were pencil and paper and web-based, and considering the shortage of sample hardware for a PDA or touch-screen based interface, I decided to implement the trial interface in a web browser environment, but with a flexible underlying database that could be readily adapted to any input method, so that future expansion was possible with minimal interface effort.

3.2.1. System Layers

In designing the system, I propose that for the development of any system to achieve the goals clarified by the survey, there are three levels. These three levels incorporate the different features that have been discussed while thinking about the strengths and shortcomings of the systems in place today. On the first level are tasks that are performed by systems already in place. On the second level are tasks that are natural extensions to tasks in the first level, but that are not currently performed by existing

systems due to limitations of the current technology. In the third level, I put tasks that were previously undefined.

3.2.1.1. Level 1: Tasks That Already Exist

The concept of taking notes in this field is not a new one. As such, there are already many requirements that exist to define what a good system has to accomplish. The requirements in this section were already met at many centers, however they are not necessarily automated, or convenient.

The first and most obvious requirement was that it should provide a means for caregivers to take notes and enter them into a central system. In the past, this central system could have been anything from an Excel spreadsheet to a filing cabinet. The system designed here keeps it in a simple database with links to extras (such as digital photographs) stored in separate files.

This system provides a means to take these data and organize them into yearly, monthly, weekly, and daily reports that the caregivers may use for their own internal evaluation. Although, in other systems, it is rare that reports are compiled more frequently than once a month, or once a semester, a more flexible system allows you to create a report for any time period at any time.

The system also handles minimal contact management, much like the childcare management systems mentioned above. Having all of the child's information available in

an electronic format could speed retrieval in the event of an emergency, just as emergency cards were designed to do.

Up to this point, the system has been portrayed as a one-way channel, through which the caregivers pass information on to the parents. However, one of the most powerful parts of the design is that it is able to take input from parents as notes and pass that information along to caregivers. In the centers that I visited, this was done with a set of forms that the parent may fill out. At drop off, a parent may note that the child slept poorly, or that her uncle is picking her up from school today. This information is taped to the cubby, or some common message board so that the daycare knows what to expect. Using the computerized system, this information is automatically available to all caregivers in charge of that child, and the computer acts as a single point of contact so that caregivers only ever have to look in one place. This would also be the place that re-occurring events would go, such as medication reminders, or special pick-up instructions by day (e.g. on Thursdays, Suzie's grandfather picks her up.)

3.2.1.2. Level 2: Logical Extensions

The next level contained logical extensions to the current tasks. These were tasks that many programs would like to accomplish, but were prohibitively difficult for some reason.

The first item in this list was the one of the main reasons that this system was proposed. The idea was that parents should have access to information about their child including behavioral and developmental notes the teachers take on a daily basis. This simply

means that the notes that a teacher takes (or at least those that they feel should be shared) are immediately available to the parents. This does not happen in many daycares, and others must copy down notes that they made during the day onto a special form for the parent to take home. The high labor cost of transcribing notes taken using pencil and paper was prohibitive. In the system that I designed, the note passing happens instantaneously without the need to make duplicate forms. This, of course, is a big boon if the information starts out electronically, but it is not as advantageous when the information is written on paper first since there is still a transcribing penalty.

The advantage of the system that has these notes available is that the parent could access these notes prior to pick-up so that the caregiver is free to check in with the parent and mention highlights, instead of feeling like they must give a full account of the child's daily exploits.

The other advantage to these electronic notes is that they can be organized in developmental realms for easy access when it is time to do child assessments or parent conferences. Ultimately, they can be used as examples for standardized assessment tools. The final piece of the system relates to control. From all of the people surveyed, and from my own interactions with people and the Internet, control and security are two very huge hurdles for acceptance. As such, parents have the ability to choose what elements of their child's information they want online and if they even want their info online at all. It also includes an identification system that allows parents to share an account for their family, or have separate accounts for each parent, while still allowing both parents to

access the children's data. This control also extends to choosing whether the child will be included in class phone lists and the ability to update and change information pertaining to reoccurring activities or special notes and requests. (If Suzie's grandfather gets a tennis date on Thursdays, so he will now pick her up on Wednesdays instead, there is a method to change that.)

3.2.1.3. Level 3: Possible New Directions

The final level embodied different requests that had been presented to me when I described the project to interested parties. They were all ideas that had not been considered previously because they depart so much from the set of things that could be accomplished using the previous technology.

The first question that was asked, almost unanimously when I presented this is idea was, "Will I be able to access all of this on the Web?" The World Wide Web has become somewhat ubiquitous and, for many new ideas, the first place that people take them is to the Internet. This is still true today even after some of the hype has died down. As such it seemed that the system would need to minimally support access to all of the parent accessible information above through the Internet. Of course after speaking to parents and teachers many privacy concerns were raised, but 93% of those polled said that a secure connection through Secure Sockets Layer (SSL) and a username and password were acceptable minimum security measures as long as the username and password only allowed access to information about their child and certain community accessible features such as news letters and class lists (for their child's class.)

A website would be a nice check-in tool that the parent could use to track their child's progress remotely, during the day. This would allow them to keep up with how their child is doing so there are no surprises at the pick-up time. This concept is not new, and is the one of the driving forces behind the childcare web cam, but a verbal account would be less intrusive, and much less prone to misinterpretation[1]. The implementation I decided on does use a web browser in combination with a web server on the same machine to provide the front-end interface. This provides a solution that can work over the Internet if the center had a continuous network connection. The major gating item between this system and the Web is the Internet connectivity of the daycare center. If the center is sufficiently well connected, the server could reside there, otherwise, an off-site server would have to be designed to synchronize itself with the local server often enough to keep the data on it current.

Another advantage to the parents knowing the details ahead of time is that then they can ask the caregiver specific questions. This way there is a much clearer communication of facts without cluttering the interaction. In order to make this information freely available before pick-up, there would be an alternative to a Web interface. This would allow those who do not have Web access to benefit from the system. One way that was suggested to

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[1] The problem with any sort of impersonal device like a web-cam (especially if you do not have sound or some other input) is that actions can be grossly misinterpreted without the context of what happened before, after, or off-screen. E.g. it is easy for a parent to see that her child has been crying for twenty minutes, while they may not be able to see the caregiver just off camera comforting, monitoring, and aiding that child.

do this was to setup an area apart from the center where parents may peruse the details before they enter. Although some parents thought that this was a good idea, there was no ideal location at either of the centers I visited, and many parents cited time constraints as a reason that this would not work for them.

Since the system already contains contact information, it makes sense that this information should be available in some limited, controlled fashion. Many centers already publish phone lists so a logical step is to extend these to phone lists online and even add email addresses. In order to mesh with the control ideals expressed earlier, the parents choose whether a child's information is posted in the list.

3.2.2. Feature Specification

The following is a walk through of a representation of the site to demonstrate the features that were incorporated into the design to accommodate the requirements outlined by the surveys. One primary goal was to keep the site as clear and uncluttered as possible, so that the end user could navigate and use the system without trouble.

The first requirement is the username and password. This uniquely identifies the user to the system so that the rest of the pages may be customized to that user. The site has subtly different layouts for teachers, parents, and the site administrator, and these are determined by the login.

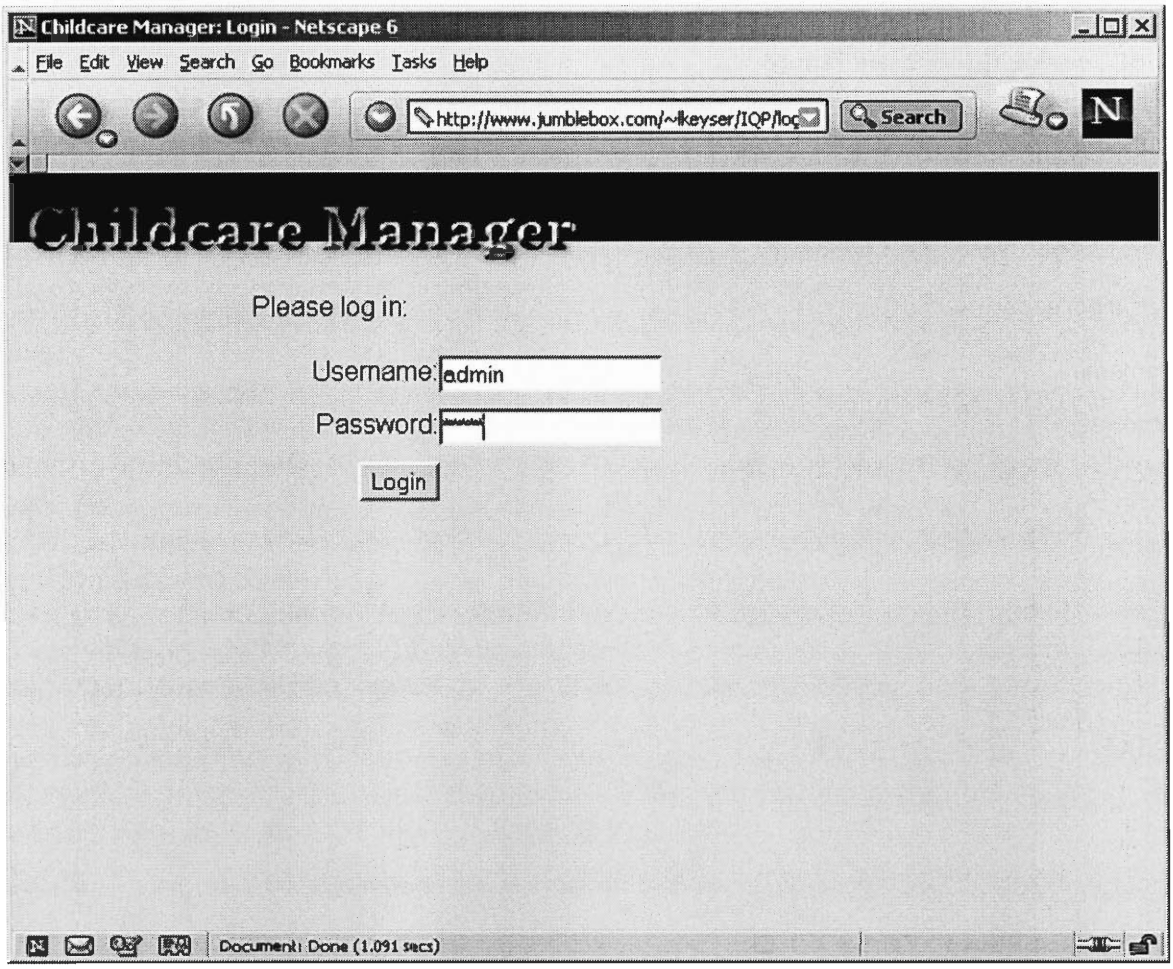

Figure 1: The login screen

Once logged in, the user is given a set of choices based on the login type. For parents and teachers, there is the option of viewing the daily information, including notes, and news items, or the phone lists. The administrator has the additional options of creating or modifying username or person information. Person information is a person's name and address. These are separated so that two parents may have different usernames and passwords, but still be able to access the same information about their kids.

The daily notes section is the most complete section, since the target function of the system is to essentially manage note exchange.

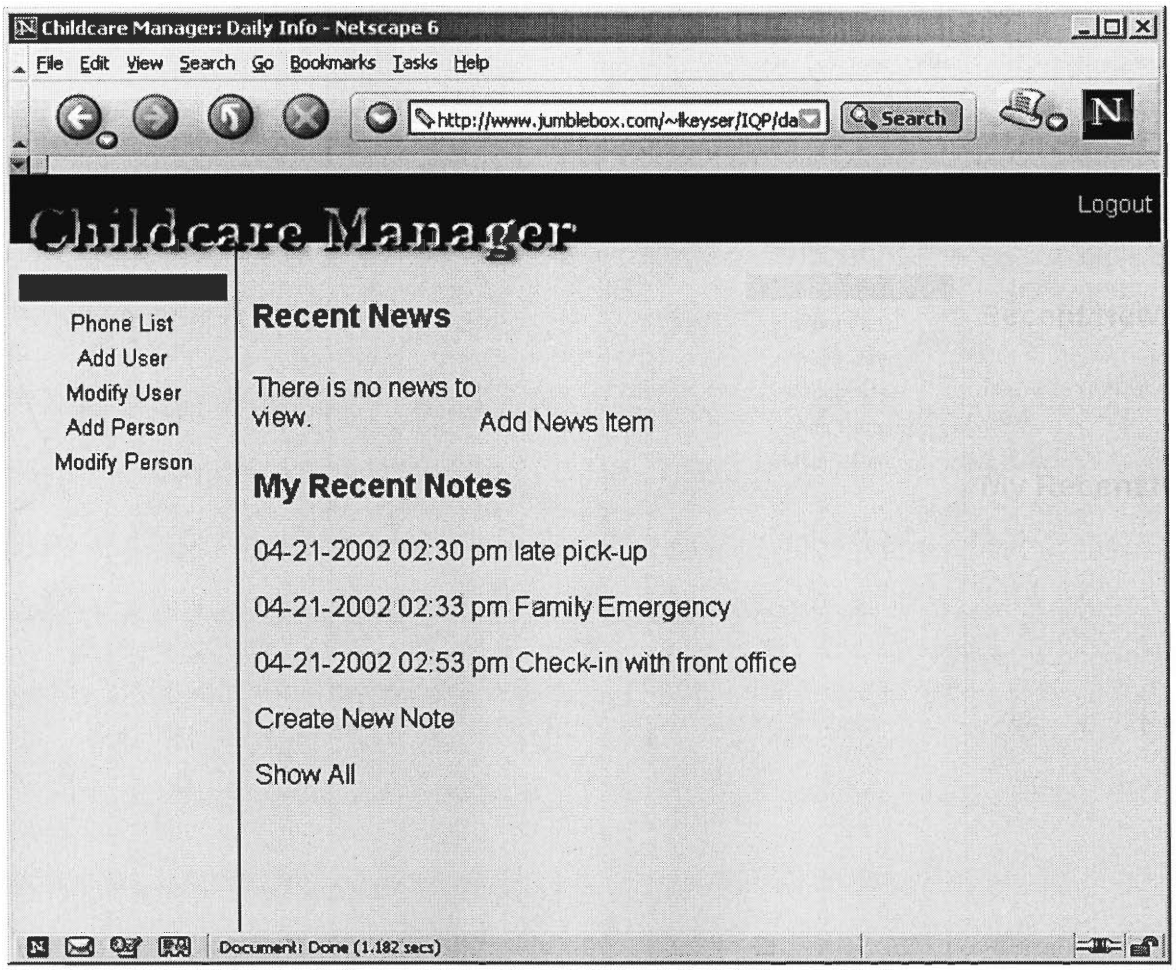

Figure 2: The daily notes section from an administrator's perspective.

The administrator's page contains news items, which can be created by either the teacher or an administrator, and the notes that the administrator has written recently. The definition of 'recent' in this context means within the last 24 hours, but it should be allowed to be variable according to user taste. Any previous notes or news can be seen when the 'Show All' link at the bottom of the page is clicked.

The parent's page additionally has the notes that were written about their children (and their children only.) The teacher's page contains a list of notes written about the children in the teacher's class by their co-teachers and by the parents of their class. This allows

the bi-directional communication that was the crux of the project proposal. It is all separated according to the classes, so that a teacher only has information about their kids, both for clarity, and for security in larger centers.

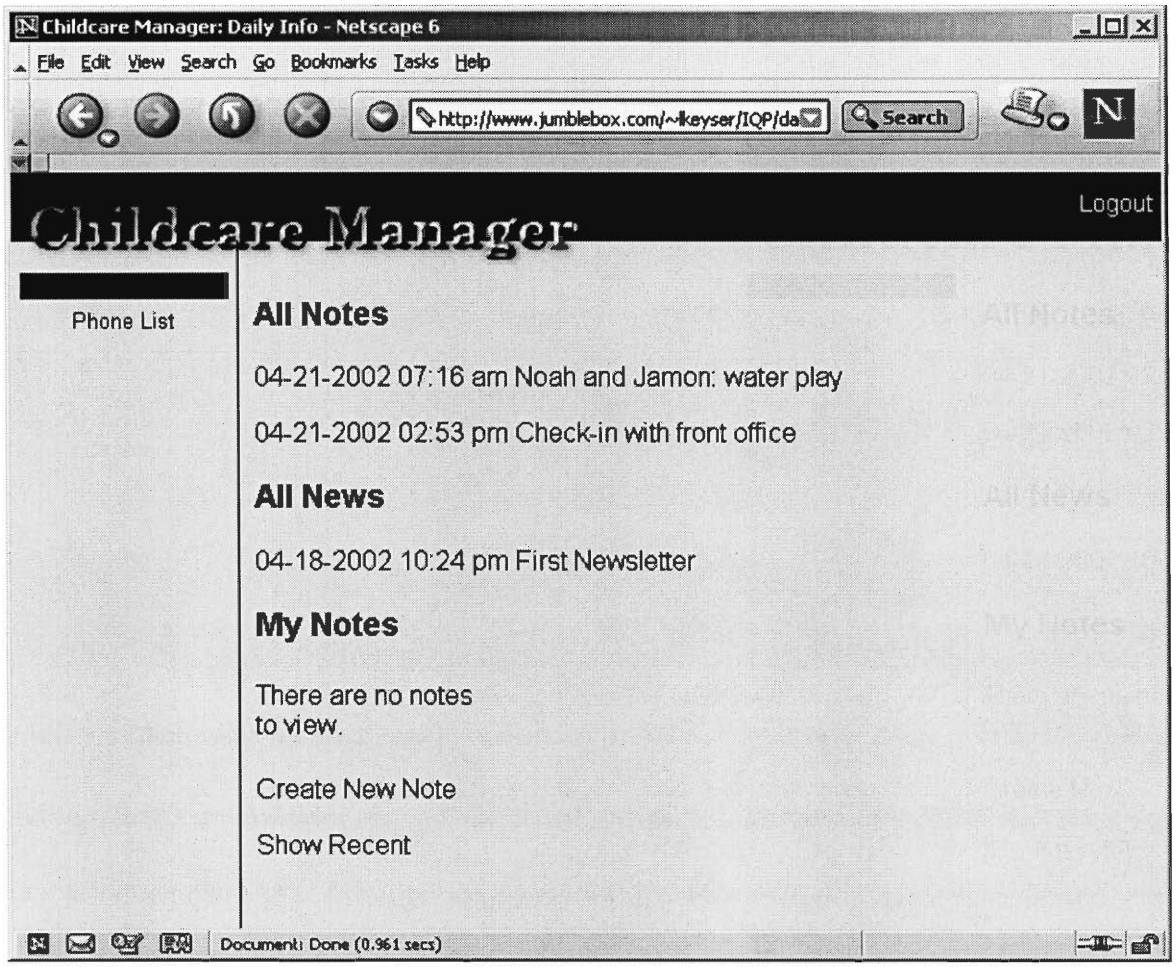

Figure 3: Parent view of 'Daily Info' with 'Show All' selected

The notes page allows the viewing and adding of the note text. The note can have many different attributes. These attributes include keywords that identify the subject matter of the note (allowing categorization for easier searching, and to ease the generation of cognitive development reports,) the author of the note, and the people about whom the note is written.

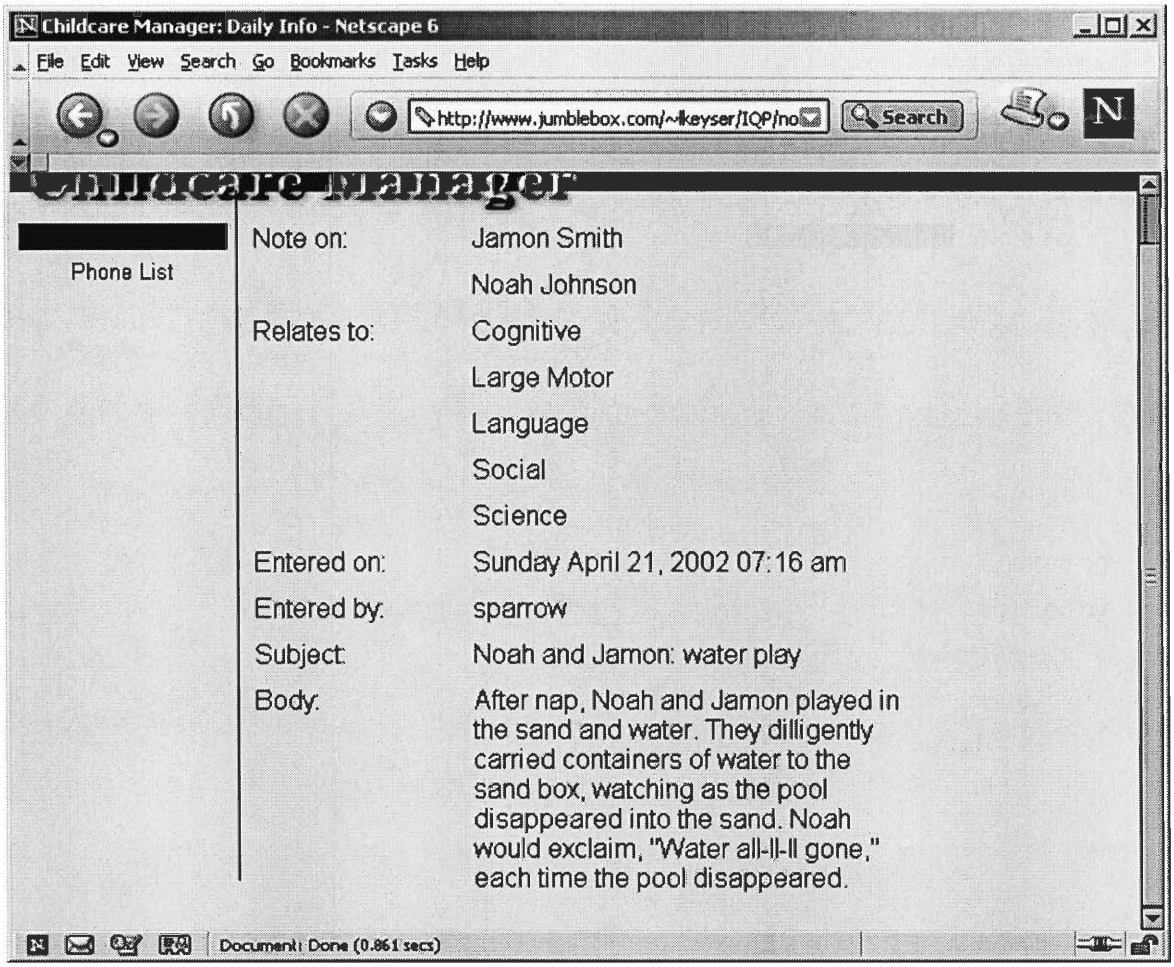

Figure 4: A sample note illustrating the various note fields.

The note entry mechanism is also specialized for the person using it. Just as the teacher can view notes on any child in their class, and the parents have access to notes about their own children, so can they write about them. The child selection box is populated from the database with the list of children that you may write about, and then you can select any number of them to be the inspiration for the message. Then the message is entered and posted so that all appropriate parties may view it instantly. This feature allows you to send the same observation to two different families, if two children were involved in play.

The phone list is the other feature that got incorporated into the sample design. This page allows the user to select the classes that they have an interest in (for teachers, these are the classrooms in which they teach, and for parents they are the classes that their children attend.) This then links them to the class list. In the case of the list created for parents, the contact info may be hidden if the child's parents have chosen to hide it. For teachers and administrators, the information is always visible, as they should have access to that information anyway.

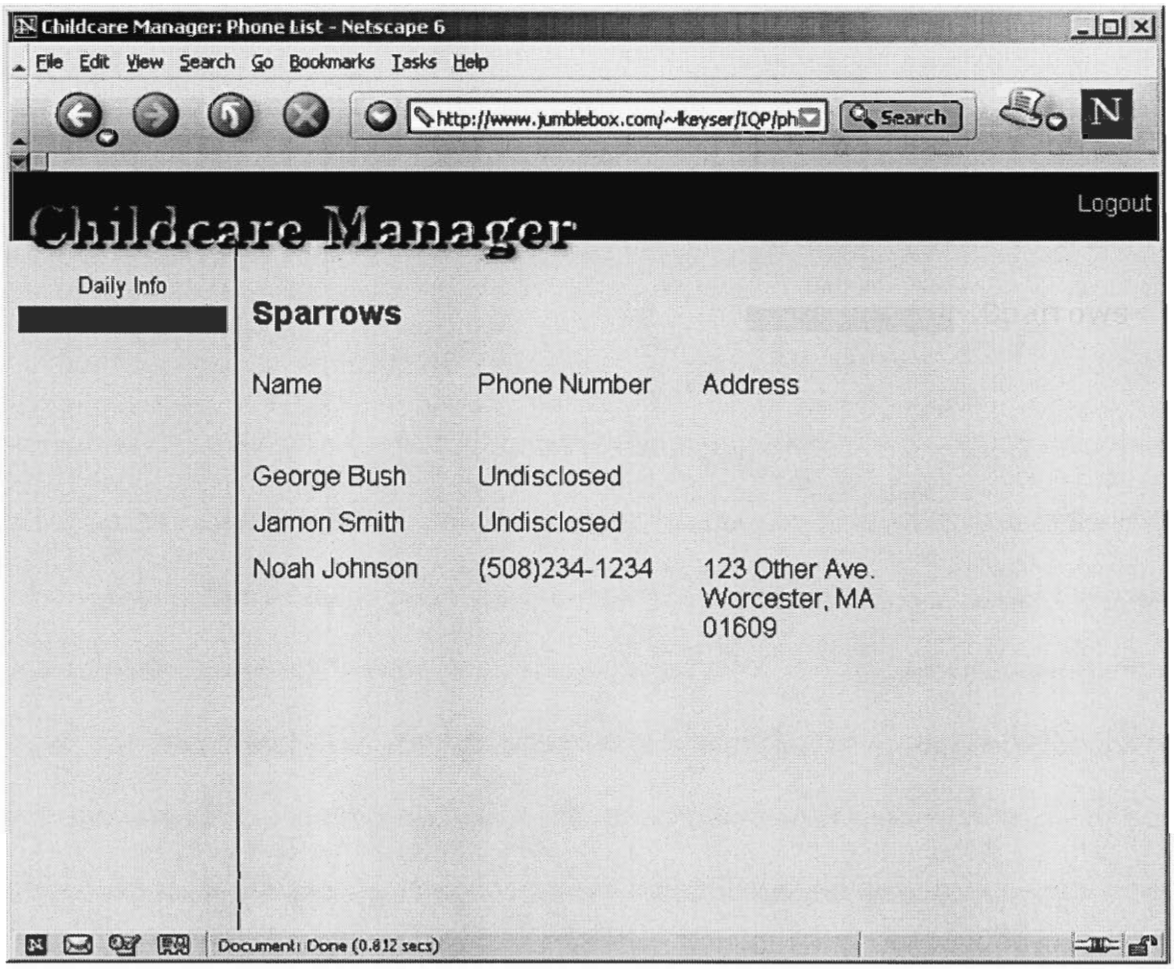

Figure 5: The phone list page from a parent's perspective.

3.2.3. Platform Dependencies and Implementation Decisions

I decided to develop the system under Linux, a Unix based operating system, because of the fact that it is inexpensive, robust, and can handle a server load. The choice of operating system, however, turned out to but somewhat moot, since I decided to use PHP and MySQL to implement the actual code, and both run on most popular hardware and software platforms.

PHP is a recursive algorithm that stands for PHP Hypertext Parser. It is a system that allows a designer to write code that is interpreted when the page is requested. In this manner, the page can perform various different actions and modify itself based upon what is asked of it. I chose PHP for the ease with which it combines a database with the web presentation, which is what this project required.

Another implementation decision was to go with cascading style sheets (CSS) for the structure and layout. The idea behind CSS is that it enables you to separate the layout from the content which I found ideal since I wanted to make the system as flexible as possible. This means that at a later point in time, you could completely change the location of the menus, the colors of the site, and even the fonts for all of the pages by making a few changes to just one file. This turned out to make the job harder than anticipated due to the spotty support in modern web browsers, but I think it was worth the extra effort for the added flexibility. I was able to completely reorganize the look and feel of the site late in the project without having to change the underlying html.

The final software decision that I made was to use MySQL to run the database. MySQL is far and away the most popular database to use with the PHP engine, and the fact that it is free made the choice to go with it over a commercial database server easy. It is also robust, and complete, and well documented, and has a special library to allow it to interface with PHP.

3.3. Testing Results

In order to get feedback on the final design, I made the web site available to two of the daycare centers (the third one was on break at the time of the evaluation) and recorded their comments. Specifically, I requested feedback on the design and functionality from teachers who participated in the initial survey to determine if their expectations were met with the final sample design.

I received very positive responses about the intuitiveness of the interface from the Cabrillo College Children's Center. With no instruction other than the logins for the administrator, teachers, and families, they were able to use the system to submit and review notes between parents, teachers, and an administrator.

They had several suggestions to improve the overall flow and clarity of layout. Many of these focused on the presentation of notes and the organization of responses. They suggested that there be a method to post messages from the administrator or one of the teachers to the other teachers or an administrator without copies going to parents. They suggested breaking up the notes section so that it was clearer about whom the notes were written. They also suggested some features which were in the original design, but which

were not available at the time of the demonstration, such as note modification ability and category keywords that can be chosen on the note creation screen.

The people I demonstrated the system to at First Friends had a number of positive comments, and particularly liked the note screen that showed how the communication might work. They suggested adding the ability to send out class-wide announcements as well as the site wide news.

They were in favor of having the system exist on the web, but were concerned about accessibility of the system to parents. They also were concerned about the timeliness of the announcements. They said that until the parent incorporated checking the site into their daily routine, they would be hesitant to use it as their only communication channel. Interestingly enough, during the time I was visiting and demonstrating the system, there were about three separate events that occurred around the office that prompted the director to state that she should just enter them into the system (these events included a message they wanted to send to a parent, a child behavior note, and a note about a child's lunch.)

3.4. Testing Interpretation

It appeared overall that the day care centers viewed this a good first step towards a system that they would be willing to use. They seemed to really enjoy the concept as it was presented and had more layout and feature suggestions than system criticism. Although it was obvious that the current system is just a mock-up and not a complete

user-ready application, it seemed that the next iteration of this design could be a useable system.

4. Conclusion

The childcare community is ready for some new system, but how well does the system outlined in this report fit that profile? First it is necessary to review the requirements and determine what the ideal system would be, and then it will be easy to compare and contrast the system that was created.

An ideal system has to meet a number of specifications. The interface has to be useable, the information that is stored and transmitted must be useful, and the security must be adequate.

The interface is the first challenge. The general request by the parents was for a web-based front end. This was reflected in the desire for web-accessible information. The teachers, on the other hand were looking for something more portable and convenient as demonstrated by the preference of pencil and paper as the ideal interface. While I am not yet aware of a pencil interface to a computer system, the point is well taken. In order to accommodate this interface there must be a place where the data can be transferred into the system from the notepad. This could really be any computer interface, so the logical choice would be to choose the highest rated computerized interface, so that they can transfer the notes in. It also makes sense to allow the database to reference random pieces of media, so that instead, the notes could actually just be scanned in and stored as a picture that later could be pulled up and read.

Next there is the question of information exchanged. What information do parents request, and what information are caregivers keeping track of? My survey says that parents want to know what their child is doing and what the school is planning for curriculum. Teachers say that they are keeping track of what children do for the end of year reports, and how the children's play affects curriculum.

The final issue is the security of the system. The feedback that I received from parents condenses to the following concept: if sensitive information is to be available, then the parents must have control over the distribution of all such information. This could include whether or not they wish to participate in the phone lists and what information they wish to have access to on the web.

How closely does the actual system match the ideal? It implements the web interface and has provisions in the database to support external files such as pictures or recordings, so that the notes can provide a more rich report than text alone can provide. The survey was used to decide what information the system tracks, so there is complete overlap with the information that the parents and teachers requested. Finally, in order to accommodate the security needs that the parents have, there are explicit database elements that add permissions to all sensitive information, which the parent can modify.

In conclusion, this was a good first step into the field, but there is much more work to be done before the system is ready to be fully integrated. One of the major pieces of a

complete, and useful solution, is user acceptance. As with any system that changes current paradigms there are many changes that the users must undergo before they can accept and use the new systems. It is exciting to see that in this study there are already many parents willing to make the shift, and it can be expected that as computers become more a part of our lives, that this acceptance will grow. We must keep in mind, however, that we have a responsibility to not eradicate the human element of the interaction. Although this system allows a much more constant contact with the care center, it is not a human contact, and when it comes right down to it, it is very important to have a human connection to the people who take care of our children.

5. Future Work

Future work on the note system could include a mechanism to schedule the reports to be generated at a standard time.

The question of Web presence brought up other Web-related ideas. The first of these ideas was parent forums. This would provide a Web location that parents could request and proffer advice. The center could also define an expert for the day, week, or month from its staff on a rotating basis to answer questions. This however begins to stray from the heart of the system, and would be more of an add-on than part of a core system.

The final step would be to globally integrate this system amongst many centers and create shared databases. This could include immunization databases (extending to be county-wide or the like) or whatever parents are comfortable with. This is where the

extensibility of this system is very valuable, but some choices must be made between security and convenience.

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Appendix A

Teacher Survey

Some of the most valuable aspects of a childcare workers job are the developmental and behavioral notes that they take while observing a child at play. These notes give the parent insight into what their child is doing when they can't be with them, and they allow the parents to have a closer relationship with the childcare curriculum.

These notes (if they are taken at all) are limited, and rarely computerized. I am exploring a computer-based note taking system that could make it easier to take notes and would facilitate a more comprehensive report that the parent could access at the end of the day. The use of person data assistants (such as Palm Pilots) or other highly portable computers could speed data entry and allow a complete report to be available that day.

1. Does a system such as this sound interesting and/or useful? (Circle one)

   Not at all – 0 1 2 3 4 – Very

2. Do you have a system (computer based or otherwise) to take notes?

   __ Yes

   __ No

3. If so, what methods do you use to jot them down?

4. What do you use these notes for? (Check all that apply.)

__ Curriculum development

__ To identify learning disorders

__ Personal information

__ Other _____

5. What information do you currently keep track of on a per-child basis? (Check all that apply.)

__ None

__ Developmental milestones

__ Behavioral problems

__ Eating habits

__ Diaper changes

__ Other _____

6. What are the age ranges of the children you work with? (Check all that apply)

__ 6 weeks to 15 months

__ 15 months to 2 years

__ 2 years to 2.9 years

__ 2.9 years to 4 years

__ 4 years and up

7. How would you rate your familiarity with computers?

   Not at all familiar – 0 1 2 3 4 – Very comfortable

8. Do you have a computer at home?

   __ Yes

   __ No

9. Do you use a computer at work? (Choose one)

   __ Never

   __ Less than once a week

   __ Up to three days a week

   __ More than three days a week (but not everyday)

   __ Everyday

10. What types of tasks do you use computers for? (Check all that apply)

    __ None, I don't have/use a computer

    __ Games

    __ Word processing

    __ Accounting/Taxes

    __ Web surfing

    __ E-mail

    __ Other _____

11. Have you used a Palm Pilot or similar device before?

__ Yes

__ No

12. If so, please rate it's ease of use.

__ 0 – Unreasonably difficult

__ 1 – Awkward, but usable

__ 2 – Not too bad

__ 3 – Easy and intuitive

13. Have you used a touch screen before?

__ Yes

__ No

14. If so, please rate it's ease of use.

__ 0 – Unreasonably difficult

__ 1 – Awkward, but usable

__ 2 – Not too bad

__ 3 – Easy and intuitive

15. Please rank the following input devices in order of preference for note entry from 1 to 5, where 1 is the most preferred and 5 is the least. Use 0 if you have no preference for that device, or if you are not familiar with it.

__ Touch screen

__ Web Browser

__ Palm Pilot

__ Pencil and paper

__ Tape recorder

16. Are there any other comments or concerns that you have about this system?

Parent Survey

You drop your children off at daycare, and you pick them up at the end of the day, and between these two events, they have a full day away from you where they grow and develop and learn and play and cry. There is a whole part of their life that you have only limited access to. What if there was a system that could bring you just a little closer to your children in the time that you can't be with them?

As a student at WPI, I'm studying how a system might be developed that takes advantage of the notes that childcare workers already take and allows parents to access them throughout the day, as they are entered. In this way, at pick-up time, a parent might know whether a child has had any tantrums or achievements and could respond appropriately.

This survey is designed to determine what features you would like as parents in order to guide the design of such a system.

1. Would a system such as this interest you? (Circle one)

   Not at all – 0 1 2 3 4 – Very much

2. How would you rate your familiarity with computers?

   Not at all familiar – 0 1 2 3 4 – Very comfortable

3. Do you have a computer at home?

__ Yes

__ No

4. Do you use a computer at work? (Choose one)

__ Never

__ Less than once a week

__ Up to three days a week

__ More than three days a week (but not everyday)

__ Everyday

5. What types of tasks do you use computers for? (Check all that apply)

__ None, I don't have/use a computer

__ Games

__ Word processing

__ Accounting/Taxes

__ Web surfing

__ E-mail

__ Other _____

6. What type of connection do you have to the Internet at home?

__ 0 – None or unsure

__ 1 – Modem/dialup

__ 2 – Cable/ISDN/DSL

__ 3 – Other _____

7. Where do you have access to the Internet? (Check all that apply)

__ At home

__ At work

__ At school

__ Other _____

8. What information would you like to be able to access?

__ Developmental and behavioral notes

__ Meal plan

__ Activity or curriculum notes

__ Class lists and phone numbers

__ Other _____

9. What would you consider adequate security for sensitive information such as the communications that this system would gather? (Check all that apply.)

__ No password

__ A password that only I know

__ Personal information (Social security number, mother's maiden name, etc.)

__ There is no amount of security that would I feel comfortable with.

__ Other _____

10. Given adequate security, would you like to have access to your child's information on the Internet?

__ Yes

__ No

If not, why not?

11. Would you appreciate having a computer available to parents outside of the pick-up area where a parent could have access to the information before picking up a child?

__ Yes

__ No

If not, why not?

12. Who should have access to your child's information? (Check all that apply.)

__ Teachers

__ Childcare center staff

__ You

__ Other parents

13. Would you be interested in testing this system if your childcare center decided to participate in a pilot program?

__ Yes

__ No

14. Are there any other comments or concerns that you have?

Appendix B

Source Code

This appendix is located on the attached CD under the directory labeled 'IQP'. This source code was tested using PHP 4.1.2 with MySQL support.

Database Schema

This appendix is located on the attached CD with the filename 'IQPdb.scm'. This includes the database and some sample data. This database schema contains all of the information (including the grant tables) to run under MySQL. It was tested using MySQL 3.23.49a.