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Term paper

Title: Analysis for information system of a 1000 Book Club Reading Program

1. Introduction and overview of the existing information system for the 1000 Book Club

1.1 Introduction

Implemented across the United States, the 1000 Book Club is a reading program ultimately designed to benefit young and future readers and their families. The program's user group includes children 2 to 6 years old, however it can be of benefit for older children as well. It is a completely free of charge educational program that is open to children no matter their reading abilities. Some use the program as an option to introduce children to reading, others use it as a beginner's book bundle that helps the emerging reader feel more confident by providing him/her with specially selected early reader level books.

1.2 Purpose, objectives and users

The program's main purpose is to create and influence reading habits by providing a wide variety of appropriate for the age group books. The users of the program are both the children, signed up for the program, their siblings and parents/caretakers. The administration of the program includes the school library staff and parent-volunteers/coordinators. Ultimately, both families and administration will be considered user to the new information system, the creation of which is the focus of this paper.

The program is also an excellent opportunity to introduce the future Kindergartners to the school that they will attend in the future and it easies the social aspect of transition from home environment to structured educational environment.

1.3 Organization and structure of the existing ISAR system

As the title of the program proposes, the organizational structure includes 1000+ books, organized in bags of ten, available on display for the main users (children and families) to choose from. These bags are organized and served by the secondary users (the administration). A simple database includes a list of books in each bag, the main users; however have no access to it. A card catalog keeps track of each bag, as a bag "passport" (also called sign-out card) is left in a sign-out box, marking the fact that a bag is in use at the moment. The existing database is used for printing information about the books and it is included as a list in each bag's pocket, however this information quickly becomes obsolete, because books go missing and are returned later,

books are repaired, removed or replaced and the whole process of making this information available to the user is done by hand, on paper. The database has a very limited query retrieval capability; it is mostly used as a "list" of available titles and authors, arranged by bag.

1.4 Problems, limitations, performance criteria

The most important problem is that the 1000 Book Club lacks a clearly defined Information Storage and Retrieval (ISAR) system. Therefore, the purpose of this paper is to suggest one, according the needs and expectations of the users (administrative and program users).

Other issues with the program are the ineffective and not well organized structure of the program, the limited documentation that is kept sporadically, as well as the lack of more focused to the needs of the users documentation. The impossibility for the users (administrative and program users) to search the catalog of bags by subject/interest, reading level, account information etc, as well as the lack of control of the administrative users over the existing system make it extremely time consuming to maintain, ineffective and outdated. Communication between users and administration is difficult, which affects expectations, understanding of users how to properly maintain their account, misinformation and the creation of more manual work for the administrative users of the program.
Privacy is not protected in any way.

1.5 Existing documents and Communications

The existing documents are:

- Database (very simple, list type of database)
- User Account sheet (with personal information and reading log, this also serves the purpose of registration form)
- Check in/Check out instruction charts (explaining the process of signing in and out a bag)
- Sign-Out card (the "passport" of the bag, that is placed and kept in a box when a bag is out, as it is the responsibility of the user to fill it in and place it there, therefore this is very unreliable and useless process)
- Donation flier
- Incentive receiving form (it is the responsibility of the use to fill in this form and hand it to the librarian in order to receive the award for the number of books read. There is no other way for the administrative users to keep track of which user read how many books).
- Binder with user account/registration forms (this binder is on display and searchable by anyone who has access to the school, private information is not protected in any way)
- Donation document
- List of books in a bag (this form is kept in the pocket of the bags)

2. Analysis of the new 1000 Book Club ISAR

2.1 Overview of the new system

As it was already indicated in the previous part of this paper, there is no computerized ISAR system designed for the program and the existing organization is ineffective at the least, therefore I am going to start the analysis by using the "divide-and conquer" approach (Soergel, 1985, p 41) and break it into parts, defined by the different problems that the system will have to resolve.

2.2 New objectives and purpose for the two categories of users- administrative users and program users

As a parent coordinator to the program for the past 2 years, I have had the opportunity to study the user needs, for extended period of time, based on the use of the program, information provided by both administrative and program users, manually tracking searches and use of the resources, as well personal interviews with both categories of users. All the information that I have about the users' "needs, wants and expectations" (Soergel, 1985, p 98) I have organized in the following structure:

Administrative users (volunteers, library staff)

Question/Problem	Need/ Solution	Current status
To save time in servicing the system	Digital access and database organization	Doesn't exist
To search, retrieve, organize and disseminate information about the status, use, performance of the system	Database to serve these purposes	Doesn't exist
To organize books in bags more efficiently based on the reading level, grade, interests	ISAR and database	Doesn't exist
Control over the information, including privacy policy		

The user needs categories will be as follows:

- Administrative user needs
- To be able to have access to the whole system digitally
- To be able to locate a book/bag
- To be able to create new bags with books
- To be able to add/remove/repair books from the existing bags
- To be able to send reminders to users that are late
- To be able to download statistic data at any time about the use of the system (who checked out bags, how many bags are checked out, how many bags are available for checking out, how many bags are in repair, how many times particular bag was checked out/in, how many books have been donated etc.)

- Program user needs
  Main user (children) needs

- To locate books that are of interest to them
- To locate books that are at their reading level

Secondary user (parents/caregivers) needs

- To locate books that are of interest to their child
- To find out how many bags they have checked out
- To find out how many bags they have checked in
- To find out when their bags are due
- To receive reminders for bags that are due
- To remotely manage their account

2.3 Wireframes of GUI terminal

One of the first things that I wanted to implement in the new system was the option for the users to scan the bags, instead of filling by hand all the information they need in 3 different places, switching cards etc. Human error is the most common problem in manually maintained systems and the existing 1000 Book Club system is not an exception, unfortunately. Due to human error, many books get misplaced, no efficient way of keeping track of the bags that are checked out can be created and as the practice proved that can often lead to unwanted results, like lost bags.
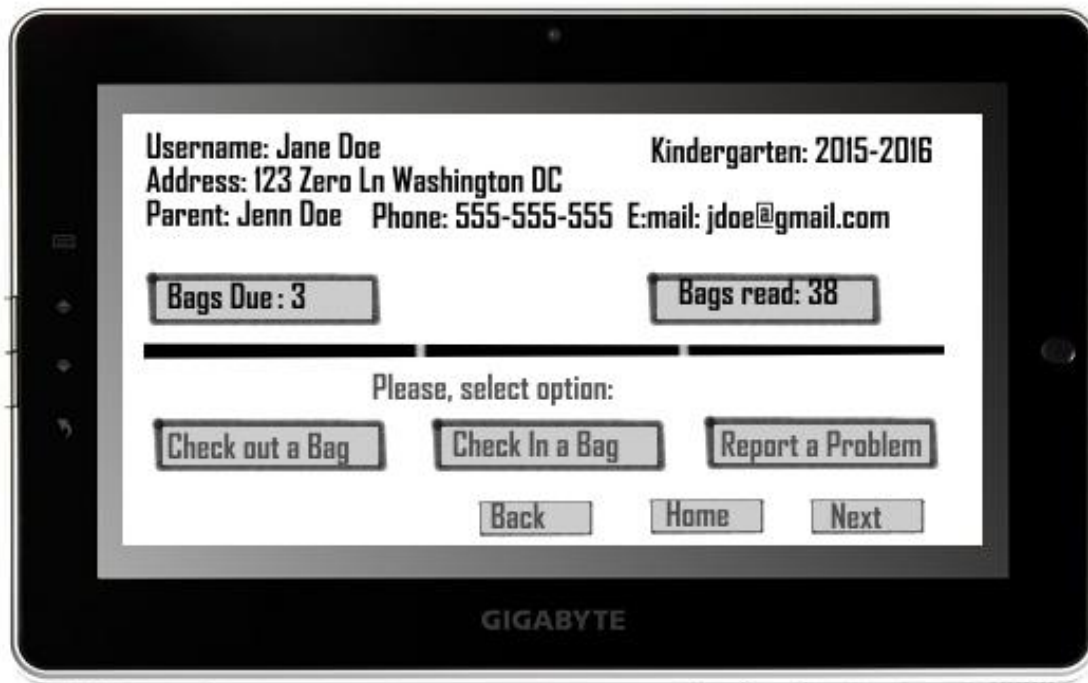
The idea is to use a (any) tablet and create an application to check in/out bags and report problems on the spot in a matter of seconds.

What I want to achieve is a simplified user interface with intuitive navigation. I have tried to use a chart for simplicity in check in and check out process, but HCI is much more efficient when we have to walk through the user to perform a task exactly as the system will expect and be able to maintain. Imagine what would happen if we had written instructions on how to use a POS terminal in a bank and we could do whatever we wanted with the terminal, including reprogram it. I am pretty sure that there would have been many unhappy customers and support personnel as a result.

The following images represent a very basic routine of functions to use with the GUI terminal/tablet in our case to log in, check in/out a bag and report problems.

Welcome To 1000 Book Club AnyShool!

Log In

Password

New User Registration

GIGABYTE

This image is a simplified version of the user account information from the website (that the user can access online). From here the user can verify that this is indeed their account, how many bags are checked out on his/her name, how many bags of books they have read and checked in already and report a problem with a bag.

Username: Jane Doe   Kindergarten: 2015-2016
Address: 123 Zero Ln Washington DC
Parent: Jenn Doe   Phone: 555-555-555 E:mail: jdoe@gmail.com

Bags Due : 3   Bags read: 38

Please, select option:

Check out a Bag   Check In a Bag   Report a Problem

Back   Home   Next

GIGABYTE

Once the user makes his/her selection, they will scan the barcode available on the bag.

The user "decided" to report a problem and this presents him/her with the options to assign a specific category of alert for the administrative user. The last option allows the user to key in an explanation of a different problem than the ones listed.

Once the administrative user receives the alert, he/she can locate the bag and fix the problem. However, the scanning process will allow the system to "lock" that particular bag's barcode until the problem is resolved, so no other users can check it out in the meantime. This is one of the most common problems at the moment, because the process of reporting a problem with a bag takes far too long and most users just leave the bag on its hanger, even though it has a problem. That of course leads to other users checking out a bag with a problem and the administrative user cannot correct the problem, because the bag is still in circulation. The frustration on both sides (administrative users and program users) can be avoided by implementing the scanning system. It will save time and effort.

2.4 Document templates

One of the big disadvantages of the current system is the lack of communication between the administrative and program user. I have tried to implement the idea of monthly reports by hand before but due to the enormous amount of time that I had to spend tracking each user's activity, I deemed this option impractical and discontinued it.
However, with the design of the new system, I see the opportunity to implement this through a document template for a monthly report to be sent to each user.

Template:

To < name of UserX>, From<name of administrator>, < title of person>
Subject <value="Monthly reading report> <last_month_date> Date <today_date> /*from computer's clockl*/
Body of text
Monthly reading report table [header <value="reading report table"><last_month_date>] [Run query]"monthly reading report" for user "UserX"]
Number of Books read: Bags Due:

The purpose of this document is to help the user manage his/her account better, by providing information on activity. This might be considered redundant, because the user can indeed obtain that information from the system by logging in to his/her account, however, one of the main purposes of the new system will be to save time (both to the administrative and program user). In a manner of speaking, this will be a similar report as bank account statement. We all can obtain information about our activity, but we still receive bank statement each month. This option will be organized as opt-out for the users (they will receive the monthly report unless they decide to unsubscribe).

Here is a n example of a monthly report, based on the template I created:

To: User X				
From: 1000Book Club Coordinator Y				
Subject: Monthly reading report MonthX				
Date: 5/12/10				
Body of text: Dear User X….				
Monthly reading report MonthX:				
	Bag ID	Date	Subject	Reading level
Bags Checked In	#99	4/12/2010	Animals	1, 2
	#61	4/12/2010	Counting	1
Bags Checked out	#45	4/22/2010	Plants	2, 3.1
	#78	4/22/2010	Music	1
	#32	4/22/2010	Animals	1, 2.1
Number of Books read: 130 Bags Due: #45, 78, 32				

2.5 Updated conceptual data schema, Entity- Relationship(ER) modeling

The conceptual data schema is based on the needs of the users (Soergel, 1985, p.138) and there is no better way to decide how to construct it, than to evaluate these needs.

From the information in that respect that I have available, I have constructed the following conceptual data schema:

Entity Types	Relationships
Person	**User Account < HasPersons> Person**
Child	**Person<IsRegisteredTo>User Account**
Parent/Caretaker	**Person<Has>Contact Info**
Admin	**Book<IsRegisteredTo>Bag**
User Account	**Bag<Contains>Book**
Contact Info	**Bag<HasSearchTerm>Text**
Book	**Bag<IsCheckedOutTo>User Account**
Bag	**Bag<IsDueOn>Date**

Date	

Note: The system has many attributes to track; therefore I have decided not to list all of them. For example attributes like Person<HasALastName> Text and Address<HasAZipCode>Number are intentionally omitted in the interest of brevity. Details on these relationships have been represented in the tables following.

Table 1 User Account

User Account ID	Username	Password	System Role
UA1332	Jdoe12	Table43	System User
UA4598	Hburns	BHG3&kl1	Admin

Table 2 Person

Person ID	First Name	Last Name	User Account ID	Person Role	Contact Info ID
P123	Jane	Doe	UA1332	Parent	CI44
P456	Rick	Doe	UA1332	Child	CI44
P789	Harry	Burns	UA4598	Admin	CI53

The table above contains the attributes common to all Person subtypes (e.g. Child, Parent). The existence of Parent and Child role are due to the fact that the child alone cannot be registered without the parent and vice versa. However, parent and child have different person ID's, but they do have the same User Account ID and Contact Info ID.

Table 3 Contact Info

Contact Info ID	Address1	Address 2	City	State	ZIP	Phone Number
CI44	45 Bearpaw Ln	Apt 701	Jacksonville	FL	12345	555-556-556
CI53	3 Country RD	N/A	Poughkeepsie	PA	54321	555-557-557

Table 4 Child

Person ID	Birth Date	Grade
P456	10/1/2007	PS 4-5

I have used in the table above Birth Date, instead of age group, because each child is usually a member of the program for more than 2 years, which means that the age group will have to change. The child table contains the additional attributes of the Child entity from the list of entities.

Table 5 Parent

Person ID	Work Phone	E-mail
P123	555-666-777	jdoe@gmail.com

Table 6 Bag

Bag ID	Reading Level	Grade Level	Status ID	Subject	Barcode
B12	Emerging Reader, Beginner Reader	Preschool, Kindergarten	1	Animals, Dogs	BC356890J0
B1	Advanced Reader	Kindergarten	2	Plants	BC9808374

Table 7 Book

Book ID	Title	Author	Bag ID
BI5998	Rainbow fish	Marcus Pfister	B12
BI9904	Yertle the Turtle	Dr.Seuss	B1

Table 8 Reading Log

Bag ID	User Account ID	Check Out Date	Check In Date
B1	UA1332	3/12/2010	N/A
B78	UA1332	1/4/2010	1/22/2010

Table 9 Bag Status

Status ID	Status

1	In
2	Out
3	In repair
4	Missing
5	Lost

Table 10 Bag Problem

Bag ID	Problem description	Status
B56	Missing Book	Fixed
B3	Wrong Book	In repair

All of the above are oversimplified examples with limited number of entries, they do not represent a finished database; the point of these examples is to illustrate the basic structure, many more relationships and entities can be added.

3. 1000 Book club reading level hierarchy

One of the problems that users of the program are experiencing now is to determine which bags with books are appropriate levels for their reader. What I suggest is to create a Reading level hierarchy that will help the users identify the appropriate reading levels according to their needs. Some parents prefer to read to their children, so they might choose a book that is appropriate for the age of the child, but more advanced reading level than the child itself can read. Other parents prefer to encourage their children at reading; therefore they would choose a bag with book at their child's reading level. At this stage for early readers it is vital to choose the appropriate level book; otherwise the child might get discouraged.

3.1 1000 Book club hierarchy diagram

Because the 1000 Book Club reading program is designed for children in Preschool and Kindergarten(2 to 6 years of age respectively), the reading levels will apply according to these two groups. The following hierarchy diagram represents the arrangement by grade and reading level. I believe this arrangement is more appropriate than using standard reading levels by grade, because different children have different reading abilities that sometimes are different than the majority in their age group/grade. The purpose of the program is to encourage reading, no matter the reading level of the child and sometimes parents of even older children with a lower reading level use it. One advantage of the program is that there is no marking of the reading level of bags on the outside of the bag, which makes reluctant readers more apt to use it. It has been discussed in our class of Reference Sources and Services (LIS 518, Dr. Robinson) that creating sections

with books with "appropriate level of reading" might be considered discrimination of the reader and children might try to avoid reading books on their reading level because of peer pressure. By not labeling the bags, it is avoided that, and the only way a user will identify bags by reading level is by using the database I will create.

The structure of the hierarchy that will apply in the database will cross-reference the grade (and age group in case of Preschoolers) of the child with the appropriate reading level as shown:
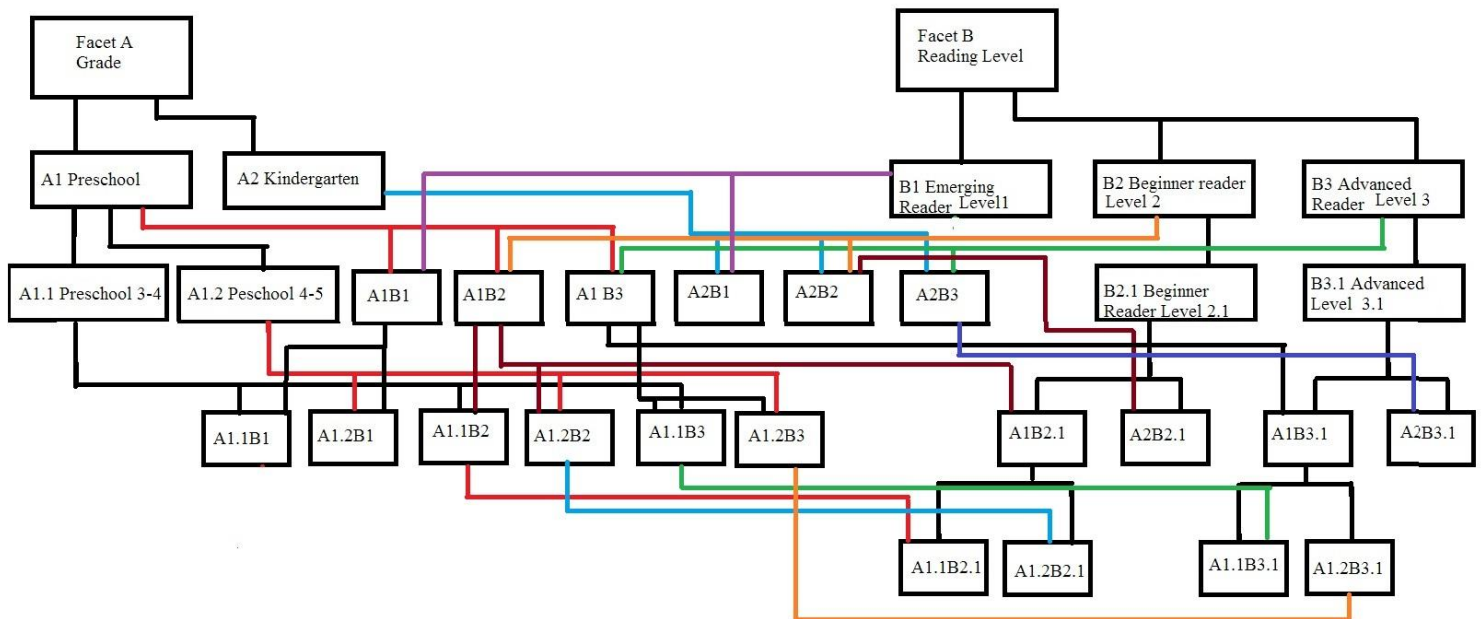
Note: The relationships between the facets have been represented with different colors not because they are different in nature, but for better visual representation. Because the diagram is elaborate, in my opinion it will be difficult to follow the different relationships if they were the same color.

3.2 The 1000 Book Club hierarchy linear arrangement with cross-references

Because the diagram above is elaborate, the full facet names could not be included in it, therefore I include the linear arrangement with cross-references from the diagram above.

Facet A Grade
. **A1** Preschool
. . . **A1B1** Preschool Emerging Reader **NT A1.1B1, NT A1.2B1 BT B1**

. . . A1B2 Preschool Beginner Reader **NT A1.1B2, NTA1.2B2   BT B2**
. . . . . A1B2.1 Preschool Beginner Reader Level 2.1 **NT A1.1B2.1, NT A1.2B2.1   BT A1B2**
. . . A1B3 Preschool Advanced Reader **NT A1.1B3, NT A1.2B3   BT B3**
. . . . . A1B3.1 Preschool Advanced Reader 3.1 **NT A1.1B3.1, NT A1.2B3.1   BT A1B3**
.   . A1.1 Preschool 2-3
. . . . A1.1B1 Preschool 2-3 Emerging Reader   **BT A1B1**
. . . . A1.1B2 Preschool 2-3 Beginner Reader   **BT A1B2**
. . . . . A1.1B2.1 Preschool 2-3 Beginner Reader Level 2.1 **BT A1B2.1**
. . . . A1.1B3 Preschool 2-3 Advanced Reader   **BT A1B3**
. . . . . A1.1B3.1 Preschool 2-3 Advanced Reader Level 3.1   **BT A1B3.1**
.   . A1.2 Preschool 4-5
. . . . A1.2B1 Preschool 4-5 Emerging reader   **BT A1B1**
. . . . A1.2B2 Preschool 4-5 Beginner Reader   **BT A1B2**
. . . . . A1.2B2.1 Preschool 4-5 Beginner Reader Level 2.1   **BT A1B2.1**
. . . . A1.2B3 Preschool 4-5 Advanced Reader   **BT A1B3**
. . . . . A1.2B3.1 Preschool 4-5 Advanced Reader Level 3.1   **BT A1B3.1**
. A2 Kindergarten
. . A2B1 Kindergarten Emerging Reader **BT B1**
. . A2B2 Kindergarten Beginner Reader **BT B2**
. . . . A2B2.1 Kindergarten Beginner Reader Level 2.1 **BT A2B2**
. . A2B3 Kindergarten Advanced Reader   **BT B3**
. . . . A2B3.1 Kindergarten Advanced Reader Level 3.1 **BT A2B3**

Facet B Reading Level
. B1 Emerging Reader **NT A1B1, NT A2B1**
.   B2 Beginner Reader **NT A1B2, NT A2B2**
. . . B2.1 Beginner Reader Level 2.1
. B3 Advanced Reader **NT A1B3, NT A2B3**
. . . B3.1 Advanced Reader Level 3.1

Note: The cross-references exclude the ones obvious from the hierarchy structure.

4. Design of a webpage for the 1000 Book Club program

By designing a separate from the school webpage for the 1000 Book club I believe we will serve better the users of the program. In the current situation, the webpage that exists for the 1000 Book Club program is virtually a single "image" page that provides the contact information for the program, but the parents, teachers and administration cannot use any interactive links through there. All of the communication is done by e-mail and all the information for reports, reminders etc., is collected manually through a very laborious process. It is even more difficult to advertise the program and as the information about events etc., is being communicated from person-to-person and through a once a year mass letter, addressed to parents with children in the appropriate age.

The purpose of the new webpage will be to create a community and to ease communication between the users and administrators of the program, as well as allow better account management on the side of the users and administrators of the program. The control over that information will be vital to the successful continuation of the program. In the past, a large amount of books and bags were missing and could not be tracked because of the lack of effective information retrieval system. Although some of these books/bags were recovered successfully, the process took more than a year, and there is still a large amount of books/bags with no hope of potential recovery. This is not only a financial loss for the program, but also impedes the effective use of the program.

When I designed the website of the program my intention was to follow simple and obvious to the user structure, to provide some of the more important information in more than one place and to ensure I have used existing color scheme of the program (red, white, black).

This is the template that I developed, using Bamboo drawing tablet and CorelPainter Essentials software.

Note: The image used in s template is personally taken by me. No copyrighted images are used in this paper.

I decided to follow the traditional menu layout (on the left side), but I also included a top-row menu, to emphasize the importance of these options as well. The Log In information as one of the most important parts of the website is presented in 2 different places- on the left hand side many and on the right top part of the page, also emphasized by color, to attract the attention of the user. The contact information is also listed in two places- on the top row menu and at the right bottom corner of the page.

Additional functions that I believe are a nice addition to the layout are the listing of events, the current members number and the advertisement of a current bag, which the administrators might have found out to have a long circulation loop (data collected through the database). Part of the program is receiving of incentives from the children for their reading accomplishments (for 250 books, for 500 books, for 750 books and for 1000 books), therefore a list of the children with higher reading accomplishments might be used to motivate the other children to participate in the program.

Because the whole program is served by volunteers and is sustained by donations, these two important options are front and center in the top row menu, reminding to the people who are registered or are potential users that for this program to exist, we need their help.

I have used the original colors scheme of the 1000 Book Club, because I find that these colors create good contrast and the graphics are easy to see (Soergel, 2012 Final review package, p.5). The colors are bright and appealing, I am confident that children as well as adults will find it pleasant to navigate.

One thing that I didn't include on the front page is the search box. I have thought about it and I believe that the place for the search box is in the "our library" and the separate user accounts pages. My reasoning was connected to the fact that users cannot actually choose the books in particular bags, but they can choose bags that are with certain subject/theme orientation of reading level. Both of these searches will be performed though navigation (some might include query formulations), therefore the "search" function as such, will be different than the regular search performed on a website. I believe that including it in these two separate sections will benefit the user in understanding how better to choose the bags/books they are checking out.

The program serves minors and includes personal information, so password protection of these accounts plus high degree of privacy options are extremely important. No social security information is ever requested. The personal information the website will collect is the same as the information that is collected at the moment – First name, Last name (child), First name, Last name(parent), address, Kindergarten year, e-mail, phone number. As a matter of fact, the current system is with much bigger privacy liability, because all of this information is available for search by anyone who enters the school, because it is on display in a binder, listing all the registered users. In reality, every person that opens that binder can find information on the child and parents, as well as the account activity.

5. **Navigation, Index language and Search**

Because the system will serve a very small group of users (the children participating in the program and their parents), it is more cost effective to use controlled vocabulary, instead of common language search. My idea is for an index to be created, listing all the index terms that will help with cataloging the bags. Each bag can be catalogued with unlimited number of terms from the ones available in the index, and respectively, if you look up a term, more than one bag will be available in the results.

Example 1:

Index

Animals – Bag #13, Bag #56, Bag #78
        Dogs- Bag #78
        Cats- Bag #13

Etc.

Example 2:

The user is looking for books on dogs that are at Emerging Reader Level 1

From the menu the user chooses:

Emerging Reader Level 1 AND dog

Query results:

Bag #15- Emerging Reader Level 1- Dog, puppy, animals

Bag #78

Bag #33

Etc.

The navigation will be available through User Account's page and Our Library from the main menu. The search will be performed by category- Reading Level, Age, Grade Level and Subject (the subject category is the list of index terms).

Based on the user selection (see example above), recommendations for particular bags will be available for the user to choose from. Each bag can have more than one reading level, grade, age and subject. The user can perform a search with more than one reading level, age, grade; however he/she can choose only one subject term at a time from the list. In the query results, each bag will be listed with the unlimited number of subject terms.

6. **Parallel between the new and old ISAR system**
Before I start comparing both systems, I would like to present the main differences in both systems in the following table:

Old system	New system
Manual work	Digitalized
Low level of control of information	Higher level of control of information
Erratically organized information on analog carriers	Organized information on digital carriers
Time consuming, high level of effort in maintenance and use, high level of workload	Time efficient, low to medium level of effort in maintenance, low level of effort in use, low level of workload
Costs virtually nothing	Medium expense level
High level of error and loss	Low level of error and loss

Overall, the only downside that the new system will have is the short (initial) term cost. However, the cost vs. effectiveness factor is a major thing to consider. True, the new system will cost money to be developed (compared to the existing that doesn't cost anything), but considering the loss of books and their financial value from the past, this will be a much cost effective move. Also, as a parent coordinator I have volunteered my time in the program and if I can find out a way to make that time more efficient, it will be of benefit for everyone. One option that was discussed is to find a local business to sponsor the equipment (tablet and scanning machine) or to have a PTO fundraiser for that purpose, and to create a group of parents with appropriate set of skills to create the system and implement it, which will be much more cost effective than hiring a professional.

7. Conclusion

The 1000 Book Club is a wonderful and much needed program in the promotion of literacy and reading motivation. I have seen time and again the difference this program makes locally even in the condition that it is in, which leads me to think that with the right improvements, this program has unlimited potential. Considering that the old system was not only not efficient, but actually counterproductive to use, the new system is a much needed improvement to the 1000 Book Club program. If the decision is to involve parent volunteers to create the system (there are enough parent professionals that could be involved in the project), the cost for the actual devices will be well justified and for the benefit of the many children, that will use it.

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