Overview

The purpose of this article is to describe the process of selecting and implementing the open-source KOHA ILS at the Deutsche Schule Charlotte (DSC – German School of Charlotte), a German language immersion school in Charlotte, NC. The DSC was established in 1974 (www.dsclt.com) and is the oldest German language Saturday school in the southeastern United States (Belluz, 2015a). Partially funded and fully accredited by the Federal Republic of Germany, the DSC offers a unique educational experience to students. Not only is the curriculum focused on language immersion, but it offers accredited diplomas for the mastery of the German language. Accredited by the AATG (American Association of Teachers of German), these diplomas are somewhat equivalent to mastering German at a college graduate level, and provide one of the most critical components to gaining acceptance to German universities (Belluz, 2015a).

Broadly speaking, the mission of the school is to not only provide German immersion, but to also foster an appreciation of German culture (Belluz, 2015a). Located in Charlotte, NC, the area is home to approximately 100 German companies, 50 additional firms from Switzerland and Austria (Belluz, 2015a). The mission of the DSC considers bilingual education a necessity of living in a global economy (Belluz, 2015a). All of this is provided to students during the three-and-a half hours of operation each week.

As the DSC is a Saturday school only, it does not have a building to house operations. Instead, the premises of the British International School of Charlotte (BISC) are rented for Saturday use. This has been a successful and mutually beneficial partnership; however, not owning a physical space brings a myriad of organizational challenges. This is especially true for the volunteer-run library. The DSC collection shares the space used by the BISC and only has

use of about 10% of the total shelving. In addition, there are no service desks nor any dedicated computers for library volunteers.

An average year brings about 150 students to the school, along with their parents and requisite DSC staff. The total number of patrons who must be served averages around 300 per year, and has to be conducted in spaces limited not only by size, but limited by resources both in terms of collection and equipment. An additional challenge is that the student age groups also vary greatly, as classes are offered to students between the ages of 2-18 (Belluz, 2015b). Library services are further complicated in that library staff need to be bi-lingual, as the school serves both native and non-native speakers.

To put these numbers into perspective, 8-10 classes come through the library each Saturday, teachers require assistance, and then circulation issues must be addressed. This means that conversations about overdue or lost materials must be conducted in two languages. The combination of number of patrons to be served in a 3.5 hour window, the limited physical space, lack of resources in general, and conducting conversations in two languages, slows down the overall check-in and check-out process. Additionally, students need to be monitored in the library and the collection must be maintained.

Prior to the implementation of the KOHA-ILS, the volunteer staff library had difficulties not only finding enough volunteers to help with the card and stamp check-out system, but often had difficulty managing the circulation process in a timely manner.

An additional constraint is that library volunteers only have access to the building and the collection during DSC operation hours. The school is in session from 10:00am-12:00am every Saturday, between September and May. While the teaching faculty generally arrive earlier on Saturday to prep the classroom and meet after school, library volunteers generally arrive early

enough to open the library at 9:15 a.m. The library closes ten minutes prior to dismissal, at 11:50 a.m., to give volunteers time to pack up materials and meet their children at the classroom. Rarely are library volunteers able to arrive early or stay extra hours. When the school is not in session, for example during the summer or winter holidays, no one has access to the BISC building. These realities limit the amount of work that can be completed, and represented significant challenges when attempting to upgrade to an online system.

The Need to Modernize

It was clear to the lead library volunteer (DSC Librarian) that little else could be accomplished during operating hours, other than circulating materials due to the stamp and card method. Additionally, an accurate inventory was not possible because no master materials list existed. Therefore, it was impossible to accurately track material loss. Basic collection management and development was also not possible. Circulation trends could not be determined, and material was weeded solely on condition. Purchase of new materials was based on intuition and usage data. The entire process of managing the library could be extremely frustrating at best and disappointing at worst. Materials were hard to find and nigh impossible, unless the librarian happened to remember a specific item and location. Meeting the needs of library users was limited to providing circulation, as reader advisory was impossible. Instructors were also impacted, as the library was generally unable to fill title or subject requests other than through happenstance of finding an item on the shelf. These were all of the elements considered when weighing the pros and cons of moving to an online system.

Stating the Case for an ILS

When the library volunteers and the DSC administration met, it became clear that the following were critical needs:

- Faster check-in and check-out of materials
- Better inventory control over collection
- Ability to perform collection development beyond weeding on condition
- Ability to provide reader's advisory
- Meet instructor's material requests

It is important to state that while faster checkout and the general modernization of the library was a significant concern for the DSC, the most urgent need expressed by the librarian was accurate inventory control and collection management. The long-term goals, then, were to make it possible to support reader's advisory, with the final goal having a collection fully cataloged by subject and one that had been thoroughly weeded.

To begin the process, a demonstration was given demonstrating the basic functions of an ILS and how it might work in the current setting at the DSC. The basic workflows of check-out, check-in, and cataloging were explained also. The demonstration was of the KOHA Live CD (Vimal0212, 2015), running on a simple laptop. During this presentation the pros and cons of open source software were expressed. System alternatives were also presented, and the willingness of a volunteer team to experiment, select, and implement an ILS.

A presentation was given to demonstrate the power of a modern ILS, its simple interface, and general ease of use. After discussing the library's needs and presenting an ILS, the DSC leadership was easily persuaded to move forward with the project. The next steps were to select the ILS and complete a fully-hosted system install, and develop the best methods for entering

item and patron records. The librarian and one parent volunteer were tasked to work on this. The librarian has the institutional knowledge to help with understanding the DSC Library's needs, whereas the parent volunteer had the professional library and IT background to make this project feasible.

While the project was approved, a few items of importance had to be agreed upon. Despite funding being extremely limited, the implementation of a new ILS would require a small investment. It was therefore agreed that some monies would be set aside for some must-have components such as the purchase of a laptop, monthly budget for server rental, and library supplies. It was clear, however, that the upfront and annual costs of a proprietary system were unaffordable. As with most schools, monies are prioritized for the classroom, all other things are secondary or even tertiary. Because of the high costs of a vendor-supported ILS, the DSC had never considered modernizing the library; however, the DSC was also not aware of open-source solutions nor did it have volunteers experienced enough to make an open-source ILS a possibility. The situation that developed in the Fall of 2013 was the perfect storm of experienced volunteers, willing library volunteers, and an interested administration.

ILS Selection Process

To provide a quick checklist for those who hope to implement an open source ILS, a few staff pre-requisites must be met. There should be staff who have the following experience and abilities:

- Library public service background, especially circulation
- Cataloging

- Advanced computer hardware and software experience (Windows (or MAC) and Linux)
- Advanced experience with Linux operation systems
    - Including heavy command line experience
- Linux server administration
- Basic networking
- Some MYSQL, PHP, and HTML

While this is likely not an exhaustive list, it is a starting point. From the system-setup point of view, KOHA cannot be successfully implemented without the personnel who have the IT skillsets listed above. This is an undertaking not recommended for those libraries who do not have individuals with strong IT and Linux backgrounds. That said, with enough diligence, time, and willingness to learn through trial and error, an open-source ILS can become a reality even at the smallest of libraries with an extremely limited budget.

It is important to reiterate that at the outset of this project, only open-source ILS systems were considered, as the cost for hosted/proprietary managed services was well beyond the financial wherewithal of the DSC. Despite the free-to-use aspect of open-source products, the DSC was keenly aware that implementing the software was not free of charge. It was important to make the distinction to the DSC administration so the clear expectations could be set for the costs that would occur, minimal as they were.

Trial and Error Selection: KOHA or Evergreen?

Prior to testing any of the two ILSs under consideration, a hosting service needed to be identified. After some experimentation with different service providers, an inexpensive solution

was found at Atlantic.net, where a 1 Gb RAM virtual private server would cost roughly $10 per month. While the costs fluctuates based on total usage, default bandwidth allotted with the most inexpensive plan was rarely exceeded. Setting up a server was relatively simple.

The first step is to select a server location (Figure 1), select the desired Linux distribution (Figure 2), and lastly select the needed server size (Figure 3). It is recommended that KOHA be installed on a server with at least 1GB of RAM. The first installation was completed on a server with 500MG of RAM, which seemed slow with three to four library volunteers logged in at the same time. However, if the budget is a severe constraint, KOHA can run on the XS server (Figure 3).

Figure 1.

Figure 2.

Figure 3.

KOHA

As the earliest open-source ILS system (Webster, 2006), KOHA was a natural candidate. First developed in 1999 (Webster, 2006), the software appeared robust at the time of evaluation. Offering an intuitive web interface and a simple circulation module, it would require minimal training. Additionally, a rich online, support community was available during the prolonged period of testing. Thus, along with a myriad of blogs, videos, and other avenues for self-help, the KOHA-ILS provided a solid backdrop for experimentation. Additionally, the administrators of the KOHA-ILS wiki were exceedingly responsive to questions regarding errors in the install documentation, and updated these based on feedback. The free IRC chat group was also

instrumental in troubleshooting issues during the trial and error phase (KOHA Library Software, 2015).

Evergreen

Evergreen, the other strong contender in the open-source ILS market, was also considered. A system developed by the Georgia Public Library was made publicly available for the first time in 2006 (Webster, 2006). Evergreen received equal scrutiny as KOHA, as it was considered a peer platform with KOHA due to its intuitive interface. Interestingly, Evergreen would have made it possible to implement a multi-platform solution. It runs on both Windows and Linux. The server hosting the ILS still required a Linux-based OS, but the staff client was cross platform; however, during the trial and error phase it became evident that Evergreen could not be successfully installed by the DSC volunteers. Therefore, as a successful test environment was never setup, the system could not be adequately tested. This meant that the crucial functionality such as circulation, cataloging, and reports could not be tested. It quickly became evident that KOHA would be the default choice, as the install was successful after only two attempts.

Unlike the experience with the KOHA community, self-guided resources, wiki documentation, and general support for Evergreen appeared to not be as robust as required for the purposes of install. This is also why the test server setup never succeeded. Setup instructions for Debian/Ubuntu servers seemed a bit more confusing, and not as simple and straightforward as KOHA. While this is not indictment against Evergreen, it really represents the limited experience of the volunteers who attempted the test server installs. After testing and re-testing on various hosted server providers, KOHA could be fully examined while Evergreen could not.

Final Decision

That said, the final selection of KOHA over Evergreen obviously hinged on which system could be successfully installed and managed on a Virtual Private Server. Those better versed in the technical aspects of ILS system installation and the Linux/Ubuntu server environment may have chosen a different route. In the end, the DSC was pragmatic in its approach in choosing a viable ILS system. The criteria were:

1. Intuitive interface
2. Adequacy of free online support
3. Ease of system/server installation
4. Cost effective virtual server host able to host system

System Setup

Once installation was completed, the DSC Library had to develop a method for cataloging materials, entering patron records, and in general develop a new library workflow. As no similar cataloging method could be found in the literature, the DSC's existing cataloging scheme had to be integrated with an existing framework. The Dewey Decimal Classification System was the best framework because it seemed more appropriate for a K-12 setting, as all public schools in the area use Dewey.

MARC Records and Cataloging Scheme

Instead of a traditional call number system, the DSC Library uses a simple color scheme and symbology for cataloging items. These identifiers divide materials into broad categories.

Colored stickers for books identify the appropriate age group per items. Materials are further divided into picture and non-fiction books. An additional category exists for chapter books. The colors are as follows (Figure 4):

- Blue – Chapter Books
- Red – Early Readers
- Green – Picture Books
- Yellow – Non-Fiction or books to be ready aloud by parents

Figure 4.

Whereas books use colors, DVDs use symbols to identify age appropriateness. DVDs are organized using the German motion picture rating system, the FSK (Freiwillige Selbstkontrolle der Filmwirtschaft)(See Figure 5 for the German ratings and Figure 6 for the US ratings.)

Figure 5.

Figure 6.

*White: All Ages, Yellow: 6+, Green: 12+, Blue: 16+, 18+

The ratings are very similar to those in the U.S.; however, what is culturally acceptable for children in the Germany may not be so in the US. Therefore, the DSC Library chose to specifically use the German ratings system.

The rating system is as follows (See Figure 7):

- Apple - For all ages

- Smiley Face – Six years and older
- Star – Twelve and older

Figure 7.

These unique aspects of the age group and reading level designation were integrated into the Dewey Decimal System, in the following way:

- First, KOHA requires the cataloger to select the appropriate cataloging framework. These come pre-installed and it is highly recommended that these not be altered (See Figure 8).

Figure 8.

- Koha then presents the cataloger with two auto-completed fields which were left unaltered by the DSC. These are 000 and 008 (Figure 9).

Figure 9.

- The MARC 082a field contains the color or symbol name. For example “Gruen” is for green (Figure 10).

  Figure 10

- Auto-completed fields were left unaltered. These are MARC fields 000 and 008 (Figure 11).

Figure 11.

- The author was entered in the standard 100a field.

Figure 12.

- The title was entered in the standard 245a field.

Figure 13.

- Part of the standard KOHA install is the requirement to select and "Item type" in field 942-2. This is a drop down menu and includes: FictionBooks, Non-FictionBooks, DVD, CD, CD-ROM.

Figure 14.

Once the cataloging scheme was determined, adding item barcodes became relatively simple. The entire cataloging process was completed in about six months, once the server was fully installed and configured. For the first time, the DSC Library had a total collection count and the librarian was surprised to find that the collection consisted of roughly 1500 items.

Patron Database

Once the material cataloging was completed, patron records had to be entered. Of biggest concern was data security and privacy of personal information. It was decided to enter the least amount of information per patron necessary. The information was limited to student name and a parent's or guardian's email addresses. Upon record creation, KOHA assigns a patron number to each account, which is the unique identifier for each patron (Figure 15). The card number is a required field, as is library name or location. The category field allows you to select the patron type. KOHA and auto-create several patron types at system install (Figure 16).

Figure 15.

Figure 16.

The rest of the patron data entry is fairly self-explanatory. As is evident from Figure 17, KOHA only requires the surname in the "Patron identity" area of the patron creation form.

Figure 17.

In order to send patron email notices, the email field was required by the DSC library.

Figure 18.

Patrons can also be given OPAC/Staff logins (Figure 19); however, only the DSC librarian, cataloging volunteers, and the KOHA system admin received a login and password for the staff portal. Users can also be assigned permission levels (Figure 20). Only the system admin and the DSC librarian were given superuser status. To control access to the system, most volunteers use a generic login for each computer station.

Figure 19.

Figure 20.

Training

Once the system was established and cataloging underway, a workflow had to be determined and volunteers trained. To assist with training, printed and online materials were made available to all volunteers. These were distributed via email prior to the first day of school, and the printed handouts given during the first week of school. To speed up the check-in and check-out process, two laptops were procured (one purchased and one donated by a parent), a folding table purchased, along with three barcode scanners and a network hub. Three core volunteers were identified and trained in equipment setup and teardown. Opening and closing procedures were also outlined in print and in-person training, and volunteer hours adjusted to allow for adequate setup and break-down time.

Every library volunteer was trained in basic check-out and check-in, along with how to enforce a few core library policies. New for everyone was the process of handling overdue materials and limiting check-out to age-appropriate material. Volunteers had to be instructed in how to search the patron database and library catalog. Video tutorials were added after the initial training to allow for quick refresher sessions.

At go-live, two library volunteers were tasked with managing circulation, while the implementation team was on hand to troubleshoot issues as they arose. A free online tool, Sign-upGenius.com, was used to organize volunteers. Over all, the implementation and use of the KOHA-ILS has been a success at the DSC. While a few glitches arose over time, they have been overcome.

Logistical Overview

As the DSC Library does not have a permanent service desk, there were a set of unique challenges associated with technology. Using a folding table, and pair of laptops, a makeshift service desk is setup each Saturday morning.

Figure 21.

An inexpensive network hub was purchased to provide a direct connection to the wired network, versus the unreliable WiFi. While the small device used is cost effective (around $20) the cabling for multiple computers can create an unattractive knot of cabling.

Figure 22.

Cost Break-Down

The up-front cost for the DSC Library was rather minimal. The numbers given in Table 1 are rounded figures and intended to provide an idea of how inexpensive this type of endeavor can be. The monthly charge for server hosting are usually between $8 and $12, as it depends on the amount of bandwidth that is being used.

Table 1.

What is not captured in this table are the hundreds of hours invested by the volunteers who successfully implemented the system. While this is likely underestimated, two volunteers

each spent roughly 200 hours over 18 months setting up the KOHA-ILS. If $25 per hour were calculated for each volunteer, the DSC Library would have spent $10,000 just in salaries. The cost of equipment and potential salary hours are why open-source (free to use) software always has some costs associated with it. Based on the rough quote received by a third-party vendor who will setup and manage one of the open-source ILS systems, the DSC Library would have paid around $18,000 for a hosted service over three years. The annual renewal cost would have been $3,000. In the end, the DSC saved a significant amount of money through its volunteers which can be applied to classroom needs.

Lessons Learned

One of the first major issues was that of connectivity. Using the network hub and CAT5 cables became a necessity when it was discovered that WiFi was unreliable. Due to the fact that the DSC is in a leased space, tech support WiFi was not possible. This was exacerbated due to the time difference between tech support in London, England and Charlotte, NC. Therefore, connecting through a wired hub provided steady and reliable internet speeds.

The first inventory was attempted and mostly successful, requiring more work than first anticipated. In hindsight, more time needed to be set aside for a follow-up inventory. More training was also need on the inventory process, as was a test run. The inventory module in KOHA is deceptively simple, and the process needed to be specifically laid out.

A feature much sought after, but difficult to implement was that of email notifications. Parents repeatedly request overdue notices. During implementation planning, it was always a goal to have working overdue notices shortly after the system went live; however, significant challenges arose when attempting to bring the notification system online. First, a third-party

email server had to be installed and a generic email configured. While this process is quite simple on Debian systems by using the apt-get command, KOHA had to be configured for notices and the triggers required setup. Documentation on notices and triggers was not as extensive as expected, and it required much trial and error testing to get the notification system up and running. Intermittent issues plagued the system. The Gmail account used for sending notifications would randomly send some and not others. Eventually, the email system stopped working all together once KOHA was upgraded to 3.22. According to the new KOHA system, the Gmail account was no longer secure enough to meet KOHA's standards. Despite numerous attempts to rectify the situation, the Gmail account was abandoned. To bring notifications back online an email account was established through the DSC's webhost, using the @dsclt.com IMAP/POP server. Since the switch over to the new email there have been no issues. It is recommended that anyone intending to send notices avoid free email services, as an email server hosted through a DNS often allows the user more options when configuring the encryption/security of the email account.

While a perennial issue for all libraries, incorrect check-in and check-out have become an issue for the DSC Library as well. As the library uses mostly volunteers with little to no library experience, using an ILS for circulation presented a few unique challenges for the DSC. The less-than-desirable connectivity speeds (despite the direct connection to the LAN) has caused quite a few items to be checked in or out improperly. The items were scanned, the barcode not registered in the system, and so an item still checked out was placed on the shelf. Or an item was checked out to the wrong student. While the connectivity issue is out of the control of the DSC, library volunteers are being regularly asked to check-in slowly and to double check names when

checking out. Additionally, check-in now occurs away from the check-out station to limit distractions from patrons.

Conclusion

Despite a steep learning curve, a few bumps in the implementation road, and the need to move forward in baby steps, the DSC Library has been successfully using the KOHA-ILS since the Spring of 2015. Students have appreciated the extra time for selecting materials, as the check-out process is quick. Parents have repeatedly thanked the library for the various notices. KOHA sends out check-out, pre-overdue, overdue, and check-in notices. The DSC Librarian and administrators are pleased that concise inventory control is now possible, and the fewest number of items ever were missing during the first two inventories.

That said, KOHA is by no means a perfect system. The limitations for notices is a concern. No more than three notices can be generated per item. In addition, if an item is long overdue, no repeat notice is sent. When changes are made to the notification settings for patron accounts, it does not propagate across the database, and a special script must be run server-side to update these records. Despite these difficulties, if the library has the staff willing and able to tackle this type of project, it can be done successfully. The most important experience from this project was to plan in small increments and be willing to go through a trial-and-error phase.

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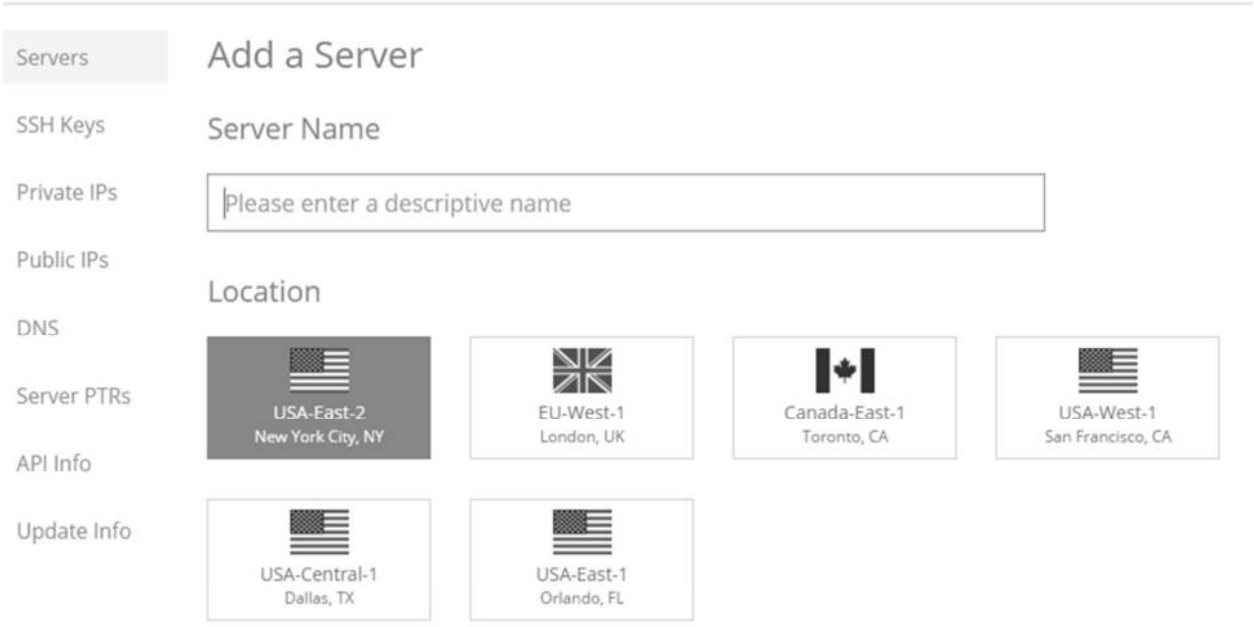
Implementing the Open-Source KOHA-ILS at the Deutsche Schule Charlotte

Figure 1.



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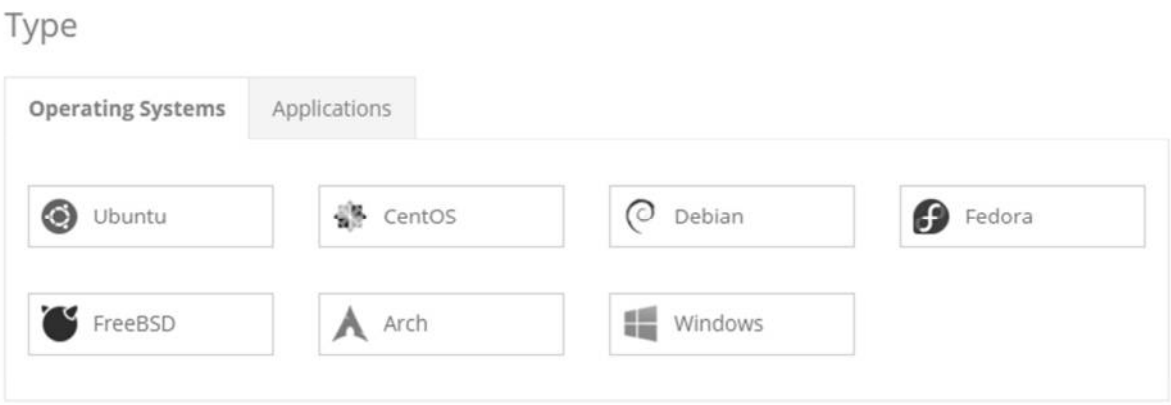

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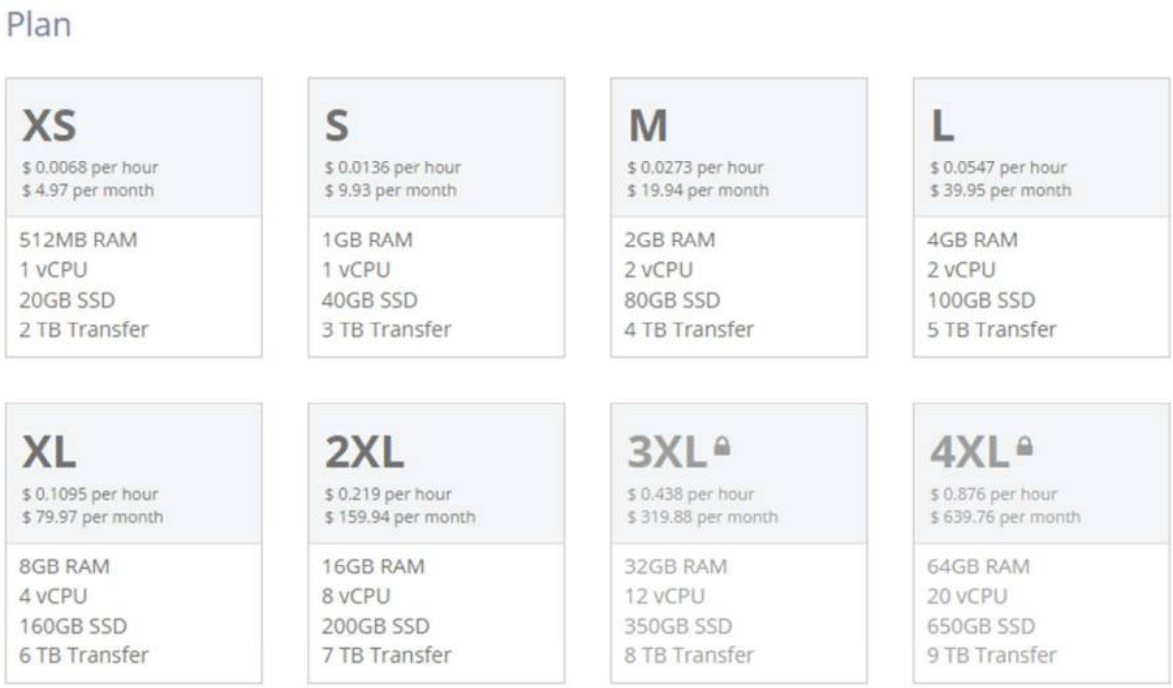

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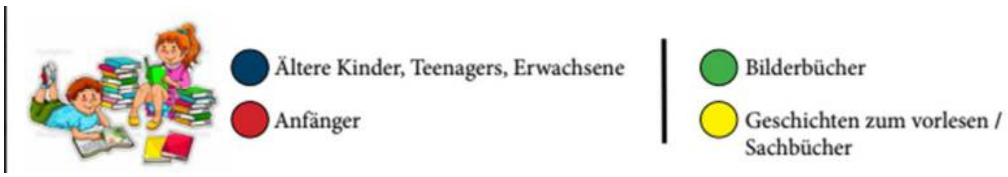


Figure 5.

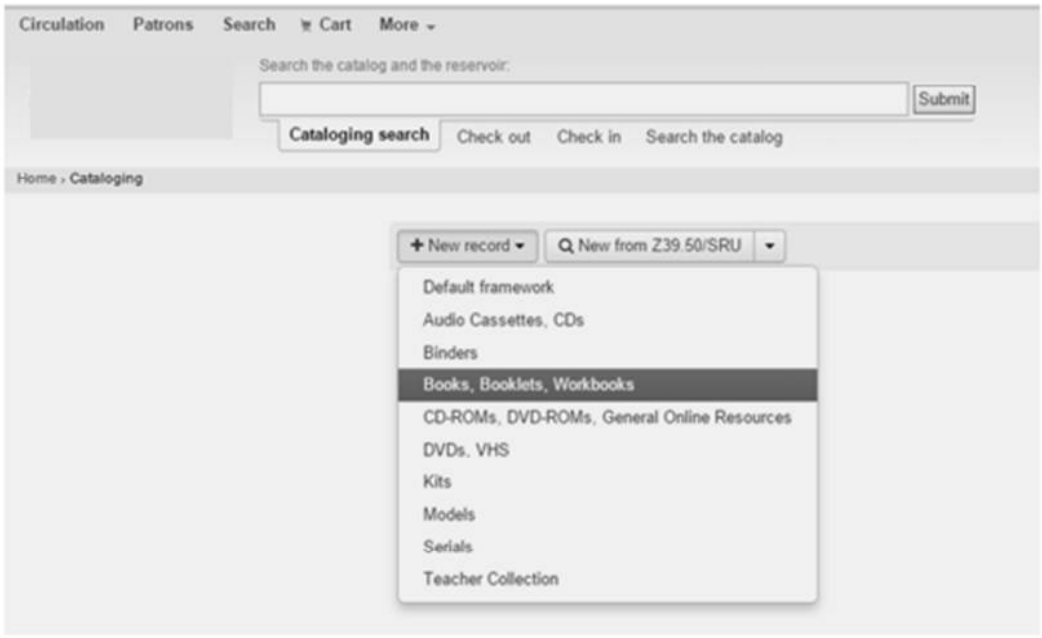
FSK Ab 0 freigegeben	FSK Ab 6 freigegeben	FSK Ab 12 freigegeben	FSK Ab 16 freigegeben	FSK Ab 18

Figure 6.

G- General Audiences	All Ages
PG – Parental Guidance	Some materials may not be appropriate for some children
PG-13	Some materials may not be appropriate for children under 13
R - Restricted	Material not appropriate for children under 17
NC-17	No one under 17 admitted

Figure 7.

Figure 8.



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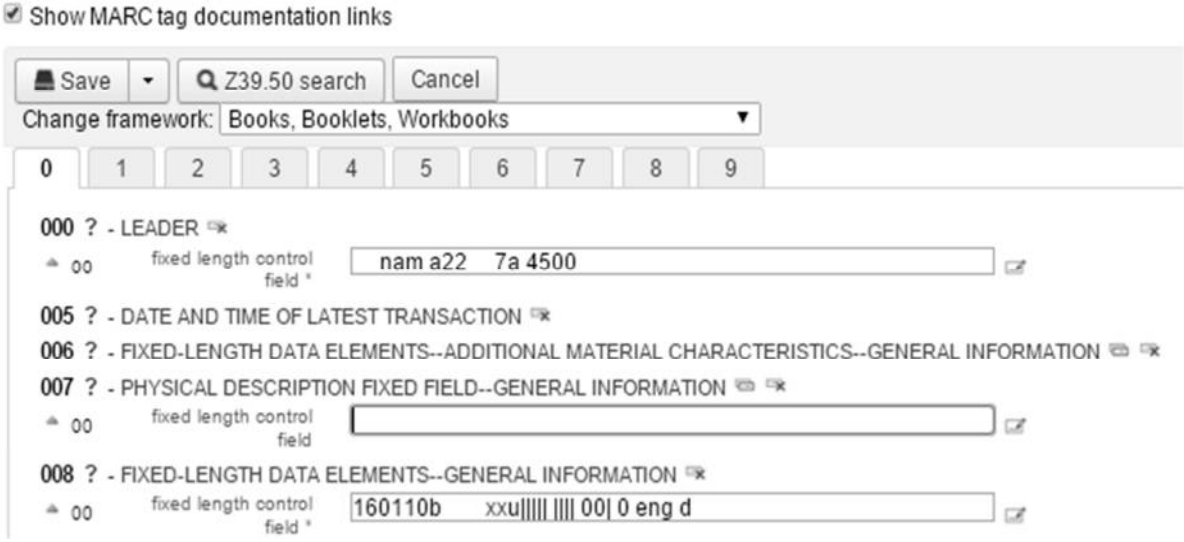

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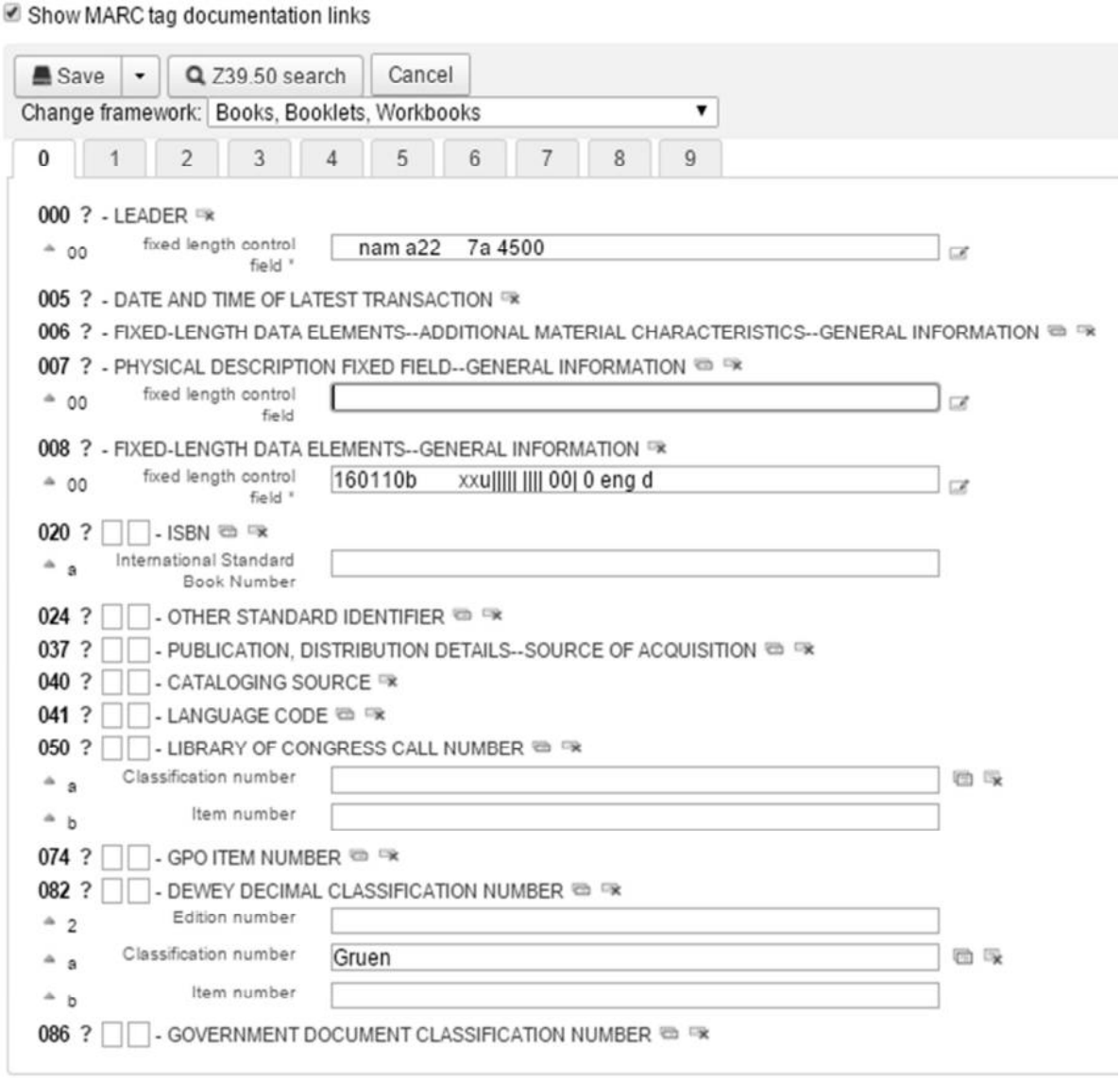

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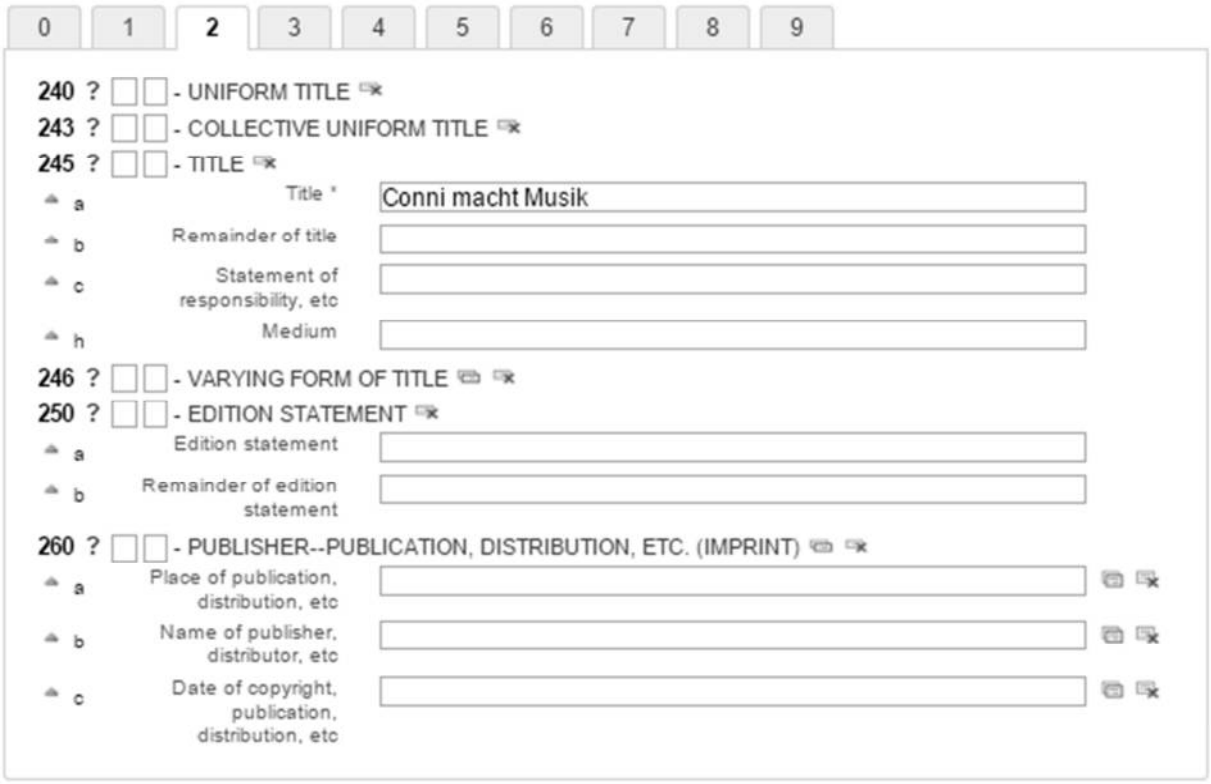

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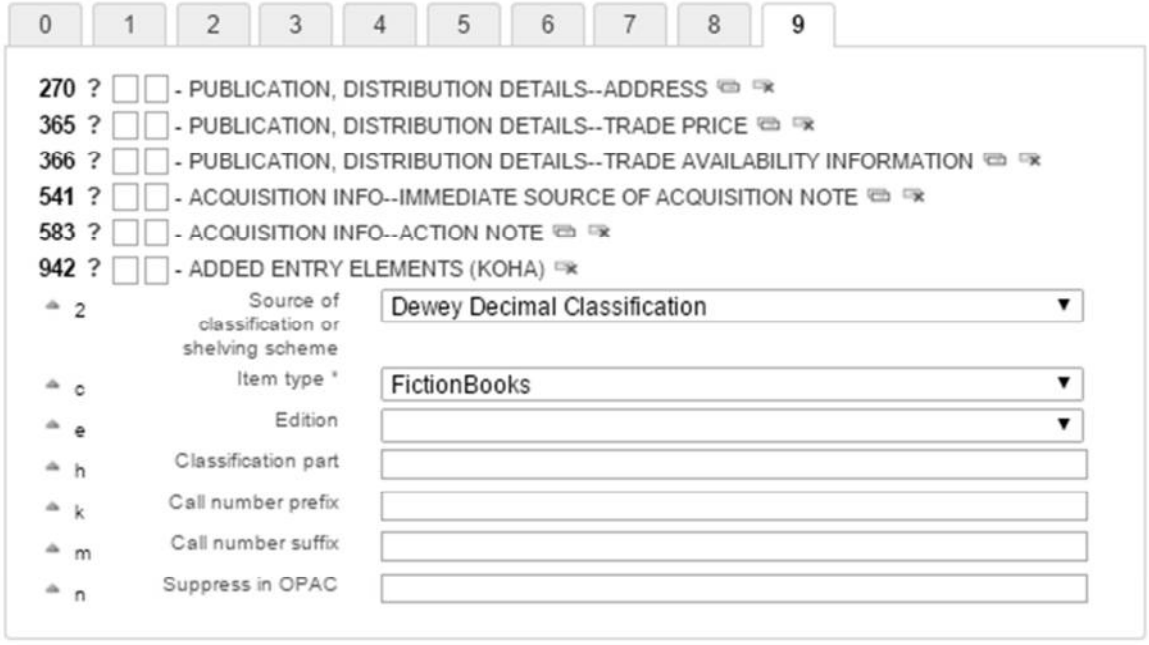

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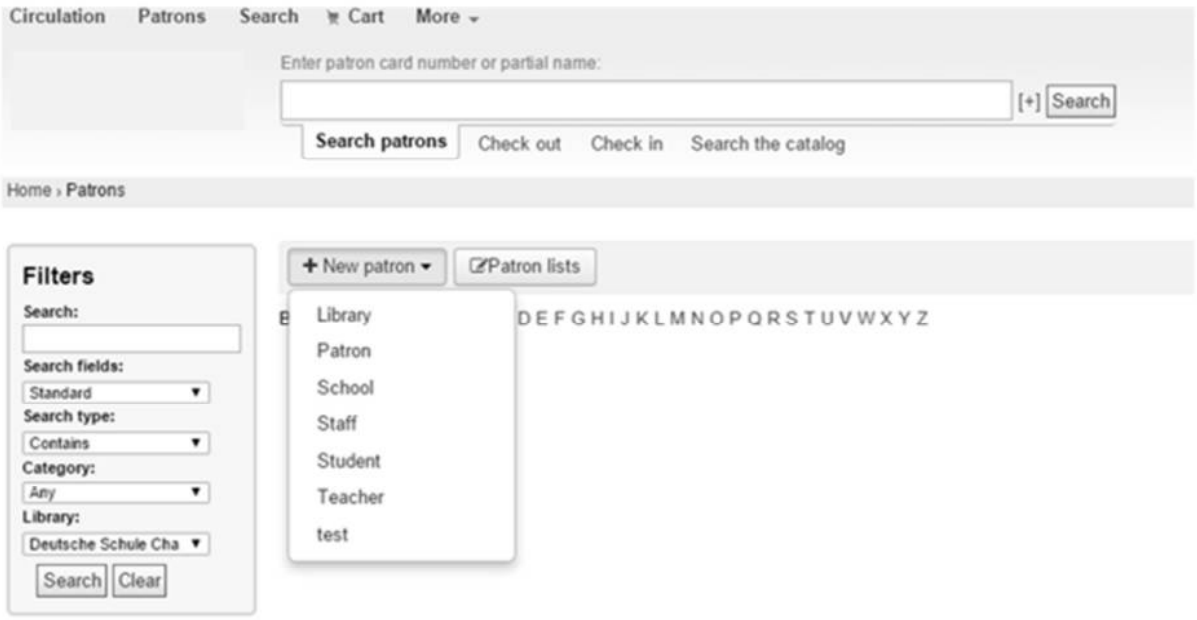

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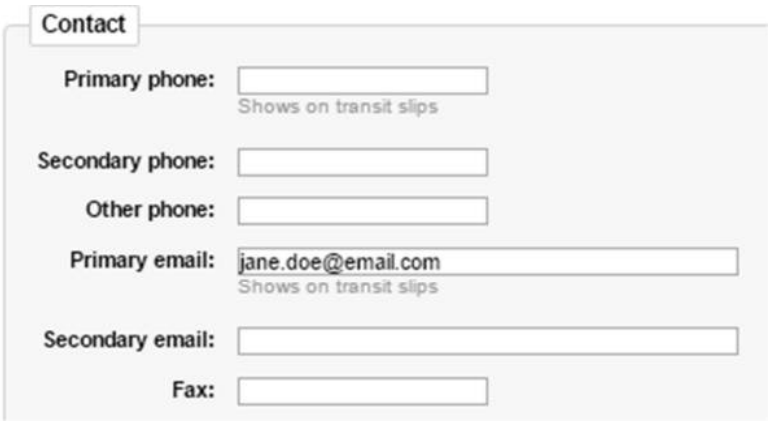

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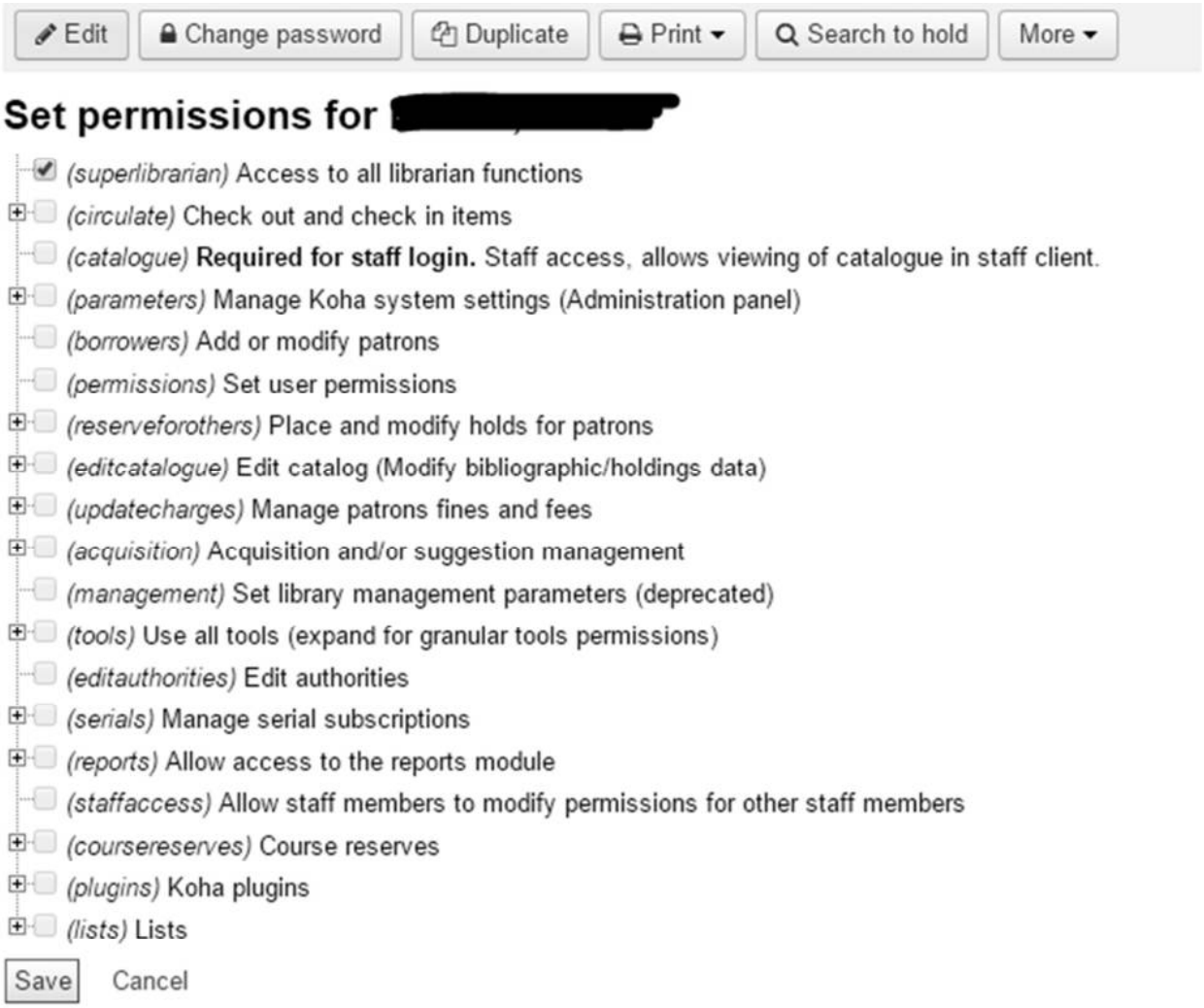

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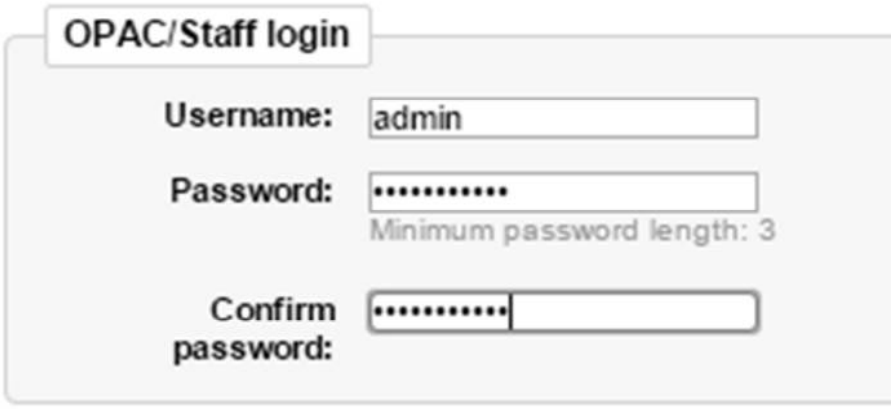

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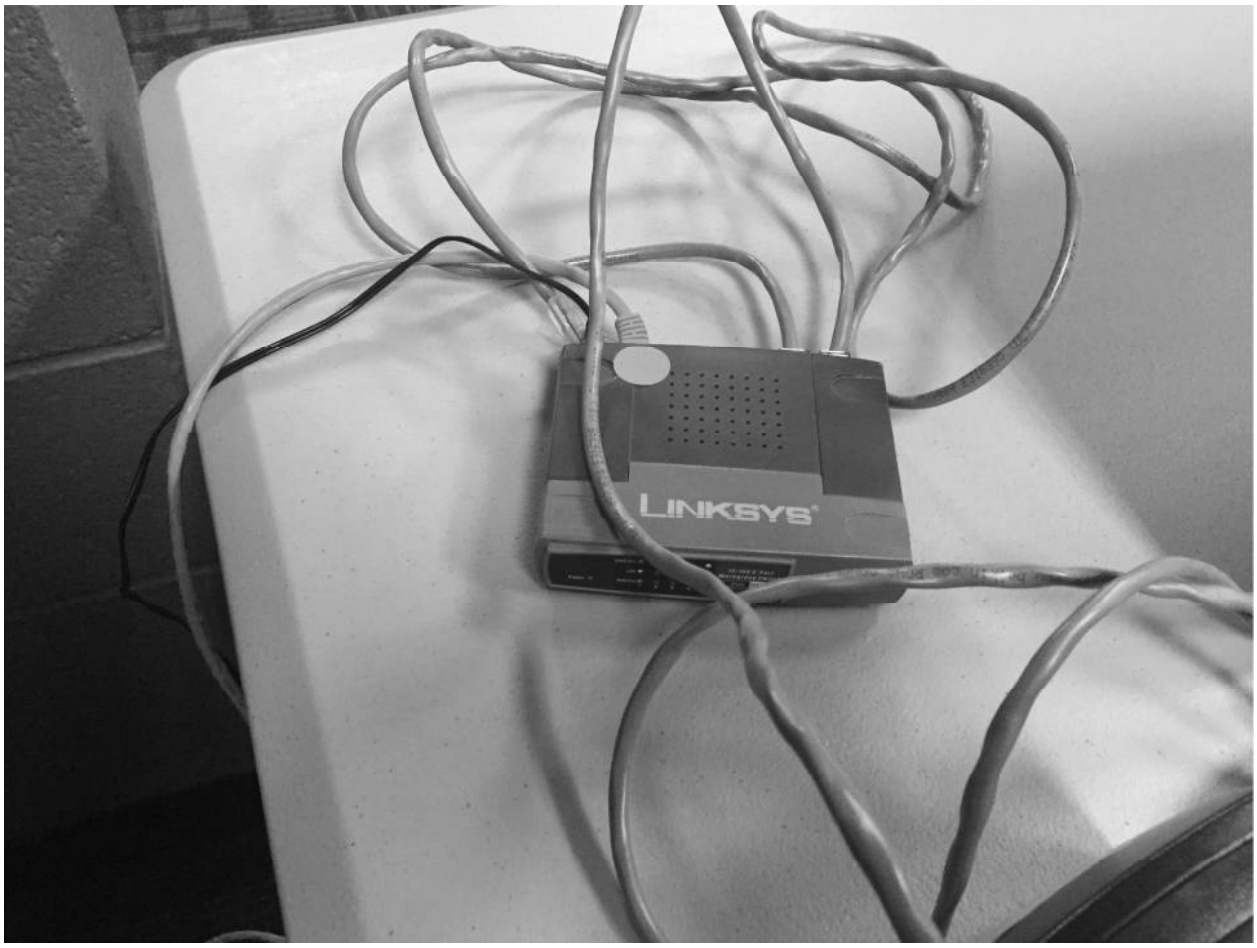

Table 1.

Item	Cost
KOHA ILS	Free
Toshiba laptop	$500
Donated HP laptop	Free
3 barcode scanners	$150
Wireless mice	$40
6ft power strip	$25
Virtual private server hosting	$10
Total	$760