Security and Sensibility: RFID in a Theological Library
(Panel Discussion)
Beth M. Sheppard, Jaeyeon Lucy Chung, Portia Kapraun, United Library, Garrett Evangelical Theological Seminary and Seabury-Western Theological Seminary

Introduction

Hello. Welcome to our presentation. For those attending who do not know me, I am Beth Sheppard, the Director of the United Library. During the academic year 2010-11 our library, which serves Garrett Evangelical and Seabury-Western Theological Seminaries in Evanston, Illinois, began a three-year phased-in implementation of a radio fluency identification (RFID) security system. Our objectives during this panel presentation are both to share details from our own experience and also to allow ample opportunity within this time slot for everyone present in the room to engage in dialogue about RFID.

Our own RFID implementation, though it has had its ups and downs to be sure, has been largely successful due to the talents and dedication of our staff. Indeed, we all know that the best librarians are the key to making any new project actually work! We are fortunate that two of them are here today to participate in this panel. Lucy Chung, who currently serves as our Technical Services Librarian, will be kicking off the presentation by providing a brief overview of RFID in general. She will chime in again at the end with comments about some of the patron reactions to the implementation of the system and a few ethical issues. I myself will say a few words about both acquiring and setting up the system and tagging the collection because, to some extent, it provides basic background for understanding some of the points that will be made by the other panelists. The third panelist, Ms. Portia Kapraun, who is our circulation and reserves librarian, will be offering insights related to circulation matters. Lucy, would you please get us started?

A Brief Overview of RFID

New technologies have generally been of much interest to libraries for purposes such as improving the efficiency of library operations and providing patrons with a better quality of service. Radio fluency identification, a wireless identification technology using radio waves to automatically identify people or objects, has drawn attention from some industrial vendors interested in applying a new technology to libraries. Because of its promising features related to theft-detection systems and item-tracking systems, a growing number of libraries are now looking at the potential value of RFID and are implementing RFID-based library systems.

According to Richard Boss, RFID systems essentially employ radio-frequency-based technology combined with microchip technology (2003, 7). The unique identification information is contained on microchips that are embedded in the tags and attached to library materials. The encoded data is read using radio frequency technology, regardless of item orientation or alignment in relation to the scanning device. Although RFID technology may look similar to bar code systems, there is a big difference between the two. While a bar code reader requires line of sight to read the bar code, and only one code can be read at a time, RFID

tags can transmit the data without physical handling and multiple items can be read at once. While old-fashioned bar code systems need to be supplemented by security strips to detect thefts, RFID systems include both identification and theft detection functions in the same tag, offering potential cost savings.

A comprehensive RFID system consists of three major components: RFID tags, readers, and a server (Richard Boss 2003, 10-14). Each RFID tag, also called a transponder, contains an antenna and a tiny chip that is both readable and writable. This chip stores bibliographic data, including a unique accession number, that identifies each item in the collection. An antenna emits radio waves that activate tags as they pass through the activation field. Once a tag is activated, it can send information to or receive information from the reader. The reader, also called the coupler, is the link between RFID tags and the server. It can read information from a tag and send it to the server (read mode), or it can read information from the server and send it to a tag (write mode). The server is the link between the reader and the library automation system. It receives information from the reader and exchanges information with the circulation database. In addition, there are other components in RFID systems that can be selectively implemented, based on the needs of the library. These include security gates, patron self-checkout stations, self-return book drops, sorting stations, and inventory control systems, including a portable RFID reader or inventory wand as well as software that generates inventory reports (Gurwant Singh 2008, 442-443).

What are the key features of RFID in libraries? There are several significant advantages of using RFID in libraries as well as disadvantages, based on research related to RFID (Toni Scire 2003; Diane Ward 2003; Richard Boss 2003; Laura Smart 2004; Syed Shahid 2005; Gurwant Singh 2008). One of the advantages of using RFID in libraries is speedy circulation operations. Information from RFID tags can be read faster than from bar codes, and multiple items can be read simultaneously. In addition to this, RFID can simplify patron self-charging because it does not require a line-of-sight and several items can be charged at a time. Another advantage is high-speed inventory control, location of misshelved items, and identification of cataloging errors. Inventory and shelf-reading, which are time consuming and costly, can be done more frequently and rapidly by scanning books on the shelves with a handheld inventory reader. Improved inventory management can also benefit collection development, since in-house usage is more easily monitored and is available for electronic report generation. With automated sorters, RFID technology can also enable faster, more accurate reshelving, thus reducing staff time and labor. Labor savings may lead to another significant benefit: staff safety and reallocation of the circulation staff to other library functions.

There are disadvantages to be considered when implementing RFID-based library systems, too. The major weakness of RFID technology is its high cost and vulnerability. Although the prices for tags has been coming down, they are still expensive. Obvious tags on items (e.g., tags inside the back cover of the books) can be exposed for removal. The performance of the exit gate sensors may be more problematic, although short-range readers appear to read the tags one hundred percent of the time. There is also a user-privacy concern associated with item-level tagging when RFID chips are also embedded in patron library cards because information contained on the tags can be read by unauthorized tag readers.

Despite some of the disadvantages of RFID technology, RFID may not be a threat to libraries if best practices and guidelines are developed and thoroughly followed in implementing

a RFID system. As Diane Ward put it well, a critical question to be necessarily asked in the implementation of a RFID system in a library is whether RFID will enable libraries to keep better track of items, better protect the security of items, speed up the check-out and check-in process, and empower the patron to take control of his or her item borrowing (2003, 19).

Acquiring and Setting up the System

Now that you know a bit about what RFID actually is, we wanted to talk about our own experience with putting a system in place. You will hear a bit about everything, from convincing the administration to fund the purchase down to patron reactions once it was installed. I will get things started by talking about the acquisition and setup of the components.

Getting Approval to Implement a System and Timeline for Purchase

Unlike public libraries or state colleges and universities, as a non-profit organization Garrett-Evangelical does not have or require that a formal RFP (Request for Proposals) be issued to vendors. Nor do we have a weighty process for in-house budget requests, so things can move more rapidly at our school than they might at other institutions. Therefore, to begin the project I put together a description of what RFID does and how it could benefit our library and floated it to our United Library Advisory Council during the Spring semester of 2008. At that time, the United Library had two checkout desks: one at Garrett and one at Seabury. The collection was divided between the two schools by LC classification. BX and all of the non-religion call letters, for instance, were housed at Seabury. Since Seabury had very little patron traffic and was staffed for fewer hours, one of the key reasons for implementing RFID was to turn the Seabury facility into a self-check area, saving the staffing salaries while at the same time increasing the hours that the collection would be available. Unfortunately, during the peak of the recession in 2008-9 Seabury completely restructured itself and decided to sell its interest in the library collection to Garrett. At that point, I created a three-year rolling strategic plan for the "new" Garrett collection, which included adding compact shelving to the Garrett library facility to accommodate all of the books that had been housed at Seabury (approximately 90,000 volumes) and the addition of RFID, with the idea that the books at Seabury would be tagged at the point that they were packed for relocation to Garrett. At this point, the primary rationale for using RFID shifted from saving funds via self-checkout to the ability to do regular inventories in the wake of the disruption caused by moving the collection. Additionally, by having the collection finally located together in one building, the ability to implement book security (and perhaps someday have the library open for 24x7 access via self-checkout, as some libraries are already operating in Europe) was attractive and feasible. Prior to the RFID implementation project, the United Library had no book security—not even the magnetic tattletale strips or plain RF tags!

The Facility Committee of the Board of Trustees went ahead and approved RFID as part of the package of buying out Seabury's interest in the collection and the conversion of all standing shelving at the Garrett facility into compact shelving during Summer 2009. Unfortunately, the best laid plans sometimes go awry, as they did when Seabury unexpectedly sold its campus and we were given thirty days' notice by the new owners to relocate the collection. But that is a tale for another time. Suffice it to say, the actual purchase and set up of the RFID system was delayed until after the compact shelving was installed and the books were moved. As a

consequence, the initial components of the RFID system were installed during the 2010-11 academic year.

Selecting a System and Devising a Plan for Implementation of Full System

Let's back up a few steps and talk about selecting a system. My first task was to educate myself about available systems, and to that end, I attended the 2009 summer ALA meeting in Chicago so that I could get a good look at the vendor displays. Basically, I discovered that all the vendors offer the same basic hardware, all of which Lucy has already mentioned. Software varied, but always included:

- Controller and server software to run the gates
- Software to Tag
- Software to arm/disarm at checkout
- Optional software to provide statistics on alarms, or in some cases even the titles of books as they set off alarms at the gates, provided one's OPAC would interface with this feature.

Our basic criteria when shopping for a system was that it had to interface with our Voyager OPAC, be ISO standards compliant so it would be interoperable with anything we might implement from other vendors, and have the ability to "add on" components. After these basic criteria, it would come down to customer service and price.

By this point it was also very clear that with over 500,000 items needing tags, about ten percent of which were still accessible on paper card catalogs and not the OPAC, a phased-in deployment would allow us to get everything into our card catalog.

We set up three phases for implementation:

- Year one: Gates at the main doors, two tagging stations (one on a cart, one at cataloging in technical services), Checkin/out Software, item ID software, and enough tags to get us started—31,000. This is complete as of this presentation.
- Year two: Gates at the new exit created by construction, 250,000 tags (or more, if we could afford them).
- Year three: Tags for the remainder of collection (250,000), Inventory Wand, self checkout kiosk (we figured it was pointless to have the inventory wand or the self checkout station until the entire collection had been tagged).

Negotiating

With the implementation plan in place, we started soliciting bids. Three vendors were contacted: 3M, ITG, and Bibliotheca (of course, this was before the merger of the last two and after Checkpoint had merged with 3M). At the time, we were not aware that Texas Instruments also offered RFID systems, since they had not displayed at ALA. We quickly found out that EVERYTHING is negotiable from prices on each piece of hardware, to the cost of tags, to service contracts. Here are some tips, if you are looking at saving money:

1) Some vendors will rent tagging carts.
2) If you buy a tagging "station" for the stacks, just get the antenna and software. If you have your own barcode reader (assuming books have already been bar-coded when you put them into your OPAC), laptop, TV cart, and an electric cord long enough to reach outlets in the stacks, you can save a bundle. Plus you can use the

antenna, software, and laptop later as a secondary cataloging station or a second checkout station. We use a metal cart that we had on hand; the antenna sits on a piece of foam on the cart to avoid interference between the signals and the metal. It works like a charm.

3) As far as service contracts, don't waste your money on a hardware contract. We negotiated for a software-upgrade-only contract after phoning the vendor and pressing them for statistics on how many hardware-related service calls they actually make. Generally, there are few problems with hardware after the initial manufacturer's service agreement wears out. Just make certain you are covered during the installation period so the vendor doesn't quibble about service calls.

4) Pay attention to tag pricing. These little devices are where these companies actually make their money, and, if your collection is sizable, will be the majority of your expense related to RIFD. So this is the point where negotiation matters. We were quoted prices as high as $0.42/tag; recently, Portia found tags as low as $0.19/tag. Pricing depends on vendor and number of tags purchased at a time.

5) It is VITAL to lock in pricing. If you get a bid but won't actually make a purchase for a few months, be certain to negotiate the "Bid is good for X days" clause. Vendors want a short time frame. You will want as long a time frame as possible. Don't settle for a mere 30-day price guarantee!

6) Play with gate configuration. If you have multiple entry doors close together, it may be less expensive to buy one gate with multiple aisles that will stretch the width of both doors rather than to buy two smaller-sized gates. Conversely, if you have double doors, it may be less expensive to buy a single aisle gate placed several feet away and use theatre ropes to funnel traffic into the gate. However, it is important to double check on fire codes and building codes as appropriate, because each city may have its own regulations.

7) Investigate inflation caps and bulk pricing. When discussing the tags, you and the vendor need to be clear about price increases, inflation (caps), and pricing for minimum or bulk orders as a part of your negotiations. We now know from our own experience that vendors may offer teaser rates as part of the initial contract but then raise prices to amazing heights for purchases of tags in subsequent years, or for purchases that fall below a certain number. If you think that at the end of a fiscal year you might have a couple thousand left in other lines of your budget to throw at extra tags, be careful you don't get caught in a trap where prices per tag are almost double for buying a quantity less than X or Y! Cover all of your bases. And, failing that, don't be afraid to shop around with other vendors for tags. The entire purpose of purchasing an ISO-compliant, interoperable system is so tags from various manufacturers all work.

Setting up the system

We found that during the bidding phase only one sales rep actually made a visit to our site. If you can get a vendor to actually see your set up, it is extraordinarily helpful. Alternatively, do get the vendor to send you an architect's package for new construction and/or the installation. Both the gates and the checkout station have clearance requirements because metal and solid

objects interfere with their function. Gates cannot be placed too close to metal doors, for instance, or even set on floors where metal, rather than wooden, floor joists and studs are used. Likewise, one must be careful about check-in/out terminals. Check-in/out stations must be several feet away from each other and from the gates. And, checkout antennas cannot be placed on metal counters or desks.

Ultimately, even though we heard that one particular vendor's set up and customer service was terrible, we went with that company because the initial pricing was right and our consortium partner had already used the vendor's RFID product in a branch library in Qatar. This vendor was, coincidentally, the one who made the site visit. But, having an impressive sales unit is a different animal entirely from a company's technical support and set-up unit. Although the tags, tagging station components, and gates all arrived in early August, and we were almost immediately set up to tag, the gate installation took forever. The vendor insisted that there was set up we needed to do relative to the controller. Garrett IT staff said they couldn't set that up until the vendor had completed the recommended gate installation site visit indicated in the architect's package. It was a nightmare that finally required several conference calls to resolve. Ultimately, the gates were up two months after they arrived. But working? No. Twice components in the gates themselves were deemed "bad" after service calls to the subcontractor used by the vendor for installation; they needed to be re-manufactured. The upshot? The gates were not working optimally until second semester. Even then, we have had problems with the stats and status software, which is supposed to record the door counts. Some days it works, some days it doesn't. And, although I've been on sabbatical, I understand the same problem is in play—Garrett IT blames the vendor and the vendor blames Garrett.

The blame game aside, a crucial ingredient for the advanced software we purchased, which is designed to speak with "Voyager" and display the titles of any items that set off an alarm, is SIP—Session Initiation Protocol. SIP is a configuration involving a server and an IP address in the OPAC. The SIP configuration information from the OPAC is entered into the gate server to allow it to "ping" the OPAC and query the OPAC database to find the title of the book that matches the information (the barcode) programmed on the tag that triggered the alarm on the gate. SIP is also necessary for a self-checkout station to talk with the OPAC (Schaper, 2005, 53-56). If, however, one does not ever plan on having a self-checkout station or the special software that returns titles when the alarm buzzes, then SIP isn't necessary. The gates work perfectly fine as if they were ordinary RF alarm gates with a buzzer sound if any active tag passes through. Really, RFID is just RF's bigger cousin! But, for any security system to actually be effective or a self-checkout station to function, tags must be in place in the books, media, or other items that will be circulating. Let's talk a bit about the "conversion" process.

Conversion/Putting on Tags

The tagging software is fairly self explanatory. It is a simple interface. One starts by using the barcode reader to scan the barcode. The software then displays a message prompting one to "present a tag" by waving it over the antenna. In seconds, the field on the screen in our software turns green to indicate the tag has indeed been programmed with the barcode; at the same time, the tag is automatically set to "secure" or "armed." If one wishes, one may again wave the tag over the antenna at this point to confirm that the tag does have the item ID from the barcode on it. The software then displays a book icon which directs one on tag placement

for top, middle, or bottom of the book. Tag placement is important because if too many tags are put in exactly the same place on books, inventory readers may have difficulty picking up the signals from individual titles when shelves are scanned. Essentially, too many tags "stacked" together will tend to block each other's radio frequency. By staggering the tag placement in individual books, the wand readers—and even the gates themselves—have a better chance of "reading" individual tags. As an aside, it is due to this particular weakness of RFID that we chose not to implement RFID for our DVDs. With pockets already affixed to the cases, there was little option about where and how to place tags. RFID rings where the signals would essentially all be piled one on top of the other were rumored not to work particularly well. In addition, the metallic/plastic combination of the DVD composition itself interferes with radio waves. Instead, we rely on lockable cases (with a magnetic unlocking device at the circulation desk) to provide security for our media.

When it comes to the act of tagging itself, an interesting question relates to "how many tags" can actually get completed in an hour. With our reference room tagging project, we were all learning to use the software and developing techniques and a rhythm, so we assume that we were slower than fully trained taggers might be. According to statistics kept in the tagging software itself, it took us 47 hours of labor, split among everyone who was tagging, to complete 4,052 tags for an average of 86 tags per hour. That average is probably low due to a few factors:

1) We did have to add bar codes to older pre-1978 titles in non-religion call letter ranges which still had not been retroconverted as part of the reference room tagging project.
2) Four of us were taking turns tagging. While this helped to alleviate boredom, at least some of us found that it took awhile to get up to a decent pace. Portia kept a record of her tagging and reached a point where she was able to do 194 tags per hour, but 150 was a more representative amount when having to go up and down steps to reach higher rows, deal with awkwardly sized books, or wrestle with items in phase boxes.
3) We had two tagging stations going. While tagging was quicker at the mobile station, it was sluggish at the circulation desk station where the tagger was interrupted by handling patron questions and answering the phone. The only reason, though, that we chose to use the circulation station was that during the summer patron traffic slows to a mere trickle. We could not use the circulation station for tagging in any systematic way when courses are in session or when books are located on different levels of the library.

With over one half million items to tag and only an initial 31,000 tags, we of course had to make choices about what to tag first. I've already mentioned the reference room tagging project. The items in our reference room were the logical place to start, since those books generally are high demand, represent a larger investment of collection dollars per title, and are the collection in closest proximity to our front door. It was not an infrequent problem for us to find reference books disappearing and reappearing days later. Along with our reference books, we also tagged our reserve items. Prior to the gate installation, patrons had been completely ignoring the "in library use only" rule—even though it was clearly indicated on the book bands on all reserve books; they would take reserve books with them to classes. This was not the most efficient use of the three-hour checkout period. Second on our phased-in tagging project

was our circulating biblical studies collection. This is another area where books frequently go missing, in large part due to demand. The Garrett-Evangelical MDiv curriculum is heavily weighted toward Biblical Studies courses, so our BS call letter range has high circulation. Thirty-one thousand tags were just sufficient to cover our reference room and about two-thirds of our BS call letter range. Being in the midst of a retro-conversion project from paper cards to an OPAC also had a bearing on our decision. The retroconversion on BS had already been completed. We did not want to tag and retroconvert at the same time.

Because the reserve and reference room books do not circulate, or circulate for very short periods in house, we were not faced with difficulties about how to handle books that did not receive tags because they had been checked out. That was not the case with biblical studies. Early on in the project we were reluctant to tag BS books either at point of checkout or at check-in because we were worried about staggering placement for the tags. We preferred to tag as many as possible in sequence on the shelves instead. To this end, we kept a running list of where we were in the tagging process, both at the circulation desk and the cataloging desk, and only tagged returned books if they fell in ranges that had already received tags. Needless to say, this did not work well. Spot checking of return carts showed we were not getting tags on quite a few of the returned books in already tagged ranges. Eventually the number of missed tags on returned items was so great that the decision was made to tag all biblical studies books as they came back, whether or not they were from portions of the call letter range that had been already tagged or not. Tagging new books in the call letter ranges that had been tagged at the point of cataloging never proved to be a problem due to the meticulous nature of those staff members working there.

Making certain that tags made it onto books that had been checked out during the conversion process was just one responsibility that our circulation staff faced with the new RFID security system. Portia, our circulation librarian, has insights about some other circulation-related issues that resulted from the RIFD project.

Circulation and Statistics

At the Circulation Desk

Due to the vendor delay with installation of the security gates, circulation staff members were not trained on using the system until well into the school year. With the semester in full swing, it was important that all workers could effectively and quickly check books in and out using the new system. Disparate schedules and availability of staff members made training a challenge, especially with student workers who only worked nights and weekends. To ensure all circulation workers were trained in a timely manner, multiple library staff members were enlisted to train the student workers. Training included understanding how the new system operated, using the antenna to charge/disarm and discharge/arm items, and responding to patron questions and concerns.

Unfortunately, the challenges did not cease once all circulation workers knew how to charge and discharge books. The antenna requires a program separate from the circulation module to arm and disarm the RFID tags, adding a step to the circulation process. The multi-year implementation of the system means that in one transaction some items will be tagged and others will not, causing some confusion when using the antenna and barcode reader. The

antenna is very sensitive and will read RFID tags of items placed nearby. Finally, staff members had varying degrees of comfort when dealing with a patron who had set off the alarm. The staff learned as we went along how to deal with or work around many of these issues.

Before we begin, I want to make some terms clear. When a patron checks an item out from the library, this is generally known as charging the item out, and when it is returned to the library it is discharged. The RFID tags work in a grammatically opposite manner, so that when an item is charged out, the RFID tag is *dis*armed so that it will not set off the alarm when the patron goes through. When the item is returned, it is discharged in the circulation system and the RFID tag is armed to go off should it pass through the security gates.

Although the RFID antenna can be used for checking books in and out through the circulation module, a separate program is needed for the actual process of arming and disarming the RFID tags. The programs operate independently, meaning that even if the antenna reads the tags and the book is checked out, if the RFID program is not set to disarm the book the alarm will still sound when the item goes through the gates. Because of the independent operation, when an item is checked out, the circulation staff member needs to ensure not only that the charge screen is open in the circulation module, as had been the process, but also that the antenna module is set to disarm the tag. While this may not seem like an overwhelming task, it can be quite difficult to remember during busy times when books are coming and going in rapid succession. This inevitably led to false alarms with the gates and items being returned but not rearmed. Fortunately, Dr. Sheppard was able to determine simple keyboard shortcuts that worked simultaneously in both programs. With these new shortcuts, switching both programs between "out" and "in" became a much easier process. Using Ctrl+F for "out" and Ctrl+J for "in" allows the staff member to efficiently use both programs without needing to select the correct process in each program. These shortcuts are not foolproof, however, and the circulation staff members still must make visual confirmation that the proper "out/in" selection has been made in both programs. This ability to quickly switch both programs simultaneously has greatly reduced false alarms from items not properly disarmed.

Even with the two-program situation dealt with, we are still finding that items are not always being rearmed upon check-in. This is one of the unforeseen results of phasing in the implementation of the RFID system. Because only a small portion of the books are currently tagged, we are continuing to use both the barcode reader and the RFID antenna. As all items have barcodes, it is possible to charge an item in or out without arming or disarming the RFID tag. Because of this, circulation workers must remember to look for the RFID tags in the books when charging them out or in. After speaking with some of the staff about this, I found that most find it easier to remember to disarm the books when charging them out because of the consequence of the alarm being triggered if they do not. When items are returned, though, there is no auditory reminder that the tag has not been rearmed and so staff must be even more diligent to look for tags when checking books in. Most staff with whom I spoke felt that they were becoming more aware of the tags in returned items as they became more comfortable with the system. Hopefully, the number of items not rearmed will be reduced as more of the collection is tagged and staff becomes used to using the antenna as the primary tag reader.

The antenna itself has been quite easy to use, allowing the circulation staff to simply hold an item over it for a second. This removes the need to properly align the barcode under the

barcode reader, making check-out faster and easier. Staff members also appreciate the quieter alternative the antenna presents when compared to the barcode scanner that beeps loudly when reading barcodes. Unfortunately, the antenna's greatest strength, the ability to quickly and silently read the tag by just waving a book over it, can also be a weakness due to the antenna's high sensitivity. This sensitivity means that an item unintentionally placed near the circulation station may also be read by the antenna. We have run into the small inconvenience of an item being automatically renewed during check out and the much larger issue of an item being left too near the antenna by one patron while another patron is checking out and subsequently charging the book to the second patron's account without his or her knowledge. This is especially common because our circulation counter is next to the copiers, and patrons often set books on the counter when done with them. We now have to be careful to remove items being checked out far enough from the antenna so that they are not automatically renewed and have also had to create a barrier on the counter around the antenna so that patrons don't set items close enough that the tags inside are read erroneously. As with many things, planning and attentiveness have made this challenge much easier to deal with.

The final circulation issue we discovered came not from the software or hardware but from staff members' comfort with confronting patrons when the security gates went off, indicating an armed tag had passed through. Initially we had not set up a strict standard for how to handle alarms at the gates, assuming that patrons would return to the desk on their own to have items checked. The problem was exacerbated when the gates were initially set to such a high level of sensitivity that even disarmed tags often set them off. This happened with such regularity that we began to just wave people through during busy times. Staff members began to assume that every alarm was a false alarm, and patrons got used to ignoring the alarm if it went off. When the gate sensitivity was finally corrected, staff and patrons alike had to adjust and start taking note when the alarm sounded. After becoming accustomed to allowing patrons to walk through, it was more difficult for staff members to feel comfortable asking patrons to return to the desk if the alarm sounded. Some felt that they were accusing patrons, oftentimes friends or acquaintances, of attempting to steal from the library. Without this important step, though, the security system would not be working up to its full potential as security device. After discussions with staff, it was determined that we needed a good way to ensure that items were not being taken without being properly checked out while not being overly accusatory toward the patron. This is often accomplished by saying, "It looks like we missed checking out a book. Would you mind bringing them back so we can just double check?" As most items that aren't checked out are taken out of the library due to forgetfulness rather than malice, phrasing the request in this manner allows the patron to properly check out items without feeling like a criminal. It also allows our staff to feel comfortable, practicing due diligence without acting as security guards.

Statistics

Unfortunately, we have had considerable trouble with the statistical software that should supply us with useful statistics on patron and alarm counts by day and by hour. The software's ability to record data seems to come and go randomly, and patron counts have not been recorded consistently since late February. With such inconsistency, we are unable to derive much useful data from the statistics that we have.

During the brief period of time that the patron count software was working properly, we were able to determine when our busiest and slowest hours were for each day of the week. With an average of less than ten circulation transactions per hour, we normally only have one staff member at the circulation desk at any given time. This person also assists patrons with finding items, reserve requests, and using the printers and copiers. Determining the busiest hours during the day, most consistently between noon and three p.m., allowed other staff members to make this time available to assist patrons, easing the burden on the circulation worker and providing greater service to our students and faculty.

As this is still a very new endeavor for us, we do not have any long-term statistics on loss prevention. In an unscientific survey earlier this month, it was discovered that 12 out of 217, or just under 6 percent, of the items needed for summer course reserves were available but could not be found on the shelf. This is consistent with Kohl's (1986) typical overall loss rate of 4 to 8 percent. In the future, we hope to see our loss rates go down as a result of the new security system and the ability to more easily find books that have been misshelved, reducing the need to repurchase items.

Patron Reactions to Implementation and Other Challenges

It is true that good intentions can be misunderstood unless they are communicated clearly. Although the United Library decided to implement a RFID technology to enhance the level of patron service, it was clear that our good intentions might be misinterpreted when the security gates were finally installed. With the installation of gates, which visibly changed the look of the library, we as library staff thought that it was critical to inform the entire Garrett community of the installation of new gates and their functions. Not only seminary administrators but also faculty members had been already aware of the RFID installation since the library director had a chance to make a presentation of the project in the faculty meetings. Library staff believed, however, that further efforts to communicate and promote the purposes behind our RFID implementation and the advantages RFID could bring were crucial to ease the discomfort of patrons.

Three methods were selected to communicate with the entire Garrett community as well as Seabury: e-mail, library newsletter, and training circulation workers. On October 7, 2010, the library director sent the whole Garrett/Seabury community, including faculty and students, a lengthy e-mail message announcing the installation of new access gates. The message began with an announcement of the three-year RIFD project and information about how it would benefit library patrons. The message included some of the critical points such as explaining the reasons for putting the RFID system in place and asking for understanding from patrons. The message particularly focused on the RFID system as a means for tracking the misshelved books, counting the number of visitors, and moving toward ultimate library freedom for patrons with the future installation of self-checkout kiosks. Concerned that patrons might be intimidated by or uncomfortable with the gates, we made sure the message addressed how library gates were different from the gates found in retail stores and asked patrons for their understanding and patience about possible false beeps as the library staff were still learning to use the new technology.

Another communication route that the library used was the library newsletter. This communication piece is published biannually and sent to the Board of Trustees members,

alumni, donors, and others. The Fall 2010 issue of the newsletter included the article titled "Library to Install RFID Security System" with photos of the gates and of a staff member tagging the books. The article emphasized that RFID technology would accomplish more tasks than merely serve as a security measure, including tracking, inventorying, and counting.

In addition to formal communication methods via e-mail and newsletter, circulation student workers were trained to respond to the patrons who might ask questions or express their thoughts or emotions, either positive or negative, toward the security gates. Topics covered in training included being aware of the unique atmosphere of a theological library whose patrons expect trust and honesty; the library's moral obligation to safeguard books while making the collections available to the public; the gates as the initial step toward the future self-checkout system which will allow patrons more freedom; and tracking the misshelved books or the books considered as lost, which will greatly benefit patrons.

For the past eight months since the installation of the security gates, the library has not received many negative reactions from the patrons, except in one or two cases. At first, there was a certain level of discomfort shared among the patrons who were not familiar with the gates and their occasional beeping sounds. There were false alarms due to tags from clothes or missed/forgotten deactivations of the tags in the books. Most patrons, though, were patient enough as the gates were being settled and the library workers were learning to properly operate the RFID system. Their responses expressed interest and curiosity more than dismay, and most patrons understood why the library needed to install the security gates and how the RFID system could eventually improve library service, probably because of the proactive marketing efforts of the library. One negative reaction that the library received was from a student patron, who said that he could not believe the library did not trust students.

When the circulation student workers were asked to share what changes they have observed since the implementation of a RFID technology, some commented that reserve items have been policed more. While there was no way to make sure that reserve items remained in the library prior to the installation of the gates, the newer technology ensures reserve items don't leave the premises. It seems that patrons cannot just walk out with the reserve items any longer. It may possibly indicate that other regularly circulated items with RFID tags have also been more securely policed, although no statistical report is available yet.

In addition to reserve items being strictly kept in the library, another student worker expressed a sense of relief, stating that fewer books would wander off. As library patrons, how many times have you been frustrated because you could not find the books on the shelf, which OPAC clearly indicates "not checked out"? As circulation workers, how many times have you fruitlessly looked for the missing items for your patrons and asked them to fill in missing book report forms? As a frustrated patron once said, "The good books are always missing." Dealing with misshelved or lost books has been a long-lasting issue. With the implementation of the RFID system, detecting and locating library items will be easier and more effective.

One concern voiced by the circulation student workers was the possibility of reducing the circulation staff. With the implementation of a new RFID technology, which enables speedy check in and checkout and fast, accurate inventorying as well as the patron self-checkout in the future, there was a worry that the library might reduce the number of student circulation workers. Considering the present situation, in which circulation workers perform other projects such as retro-con, as well as charging and discharging the library materials, however,

student workers could be assigned to other duties if students were no longer needed at the circulation counter as a result of using the RFID system.

In relation to the implementation of a RFID technology in general, there are other significant challenges to be discussed: the issue of privacy and confidentiality and the ethical responsibility of the library, even though none of our patrons addressed them. Privacy is essential to the freedom of intellectual inquiry, which is embodied in the First Amendment. The likelihood of a breach in library RFID security remains unknown, and yet it is critical to be aware of potential privacy issues that could result from the use of RFID and to develop best practices. In a word, libraries—not simply on behalf of library patrons and librarians, but also for society at large—have the responsibility to present an ethical approach to RFID and other similar technologies by developing a framework for how to do this and advocating privacy in an increasingly non-private world.

Interestingly enough, the characteristics that make RFID tags so useful for circulation and collection management in libraries—the ability to uniquely identify a single item and transmit those data wirelessly when interrogated by a reader—are precisely the characteristics that raise significant privacy and security concerns about the use of RFID in libraries (Deborah Caldwell-Stone 2010, 39-40). In theory, any data on a tag could be read by an unauthorized reader, enabling a patron's information and activities to be identified, tracked, and compiled without her/his knowledge. As J. Douglas Archer well summarizes, the privacy concerns specific to RFID generally fall into four categories: 1) the actual data contained on tags, 2) the transmission of those data from the reader to the library's data management system, 3) the security of RFID-generated data, and 4) patron perceptions of library privacy policies and practices (2007, 22).

As a response to the privacy concerns arising from the use of RFID, the American Library Association's (ALA) Intellectual Freedom Committee (IFC) has developed a set of guidelines. Included in their documents are a series of best practices which will support individual libraries in their efforts to fully benefit from RFID technology while advocating for the privacy of their patrons. (For more information read the Book Industry Study Group's policy statement on Radio Frequency Identification [2004], ALA's Resolution on Radio Frequency Identification (RFID) Technology and Privacy Principles [2005], and ALA's RFID in Libraries: Privacy and Confidentiality Guidelines [2006], all of which are accessible via ALA's website [www.ala.org].)

RFID technology, with its potential for compromising library users' privacy, presents a crucial ethical challenge for libraries. It does not mean, however, that libraries need to abandon new technologies. Rather, it requires libraries to seek out information about new technology, to understand its benefits and risks, and to develop a policy for best practices. When libraries are aware of those potential problems and take an ethical responsibility to preserve users' right to privacy and to prevent any unauthorized use of personally identifiable information, they will be able to enjoy the full benefit of the use of RFID and provide their patrons with the better quality of service while continuously gaining the trust from patrons.

Acknowledgements

Before we end, I just wanted to take the liberty of making a few comments. First, I want to thank our panelists. Lucy and Portia are first-time ATLA attendees, and I hope that you take the time to make their acquaintance and welcome them to the Association.

Second, this RFID project was also made possible by library staff who were not part of our panel today. We could not have done it without our cataloger, Loren Hagen, our reference librarian and resident technology guru, Kathleen Kordesh, Newland Smith, who is currently acting as interim director while I am on sabbatical, Beth Neal who assisted in circulation, and Ms. Dianne Robinson, who retired this past fall after 25 years of service to the United Library. Their work is truly appreciated.

We appreciate your patience and attentiveness during the presentation as well. Thank you.

Bibliography

ALA Council. Resolution on Radio Frequency Identification (RFID) Technology and Privacy Principles. 2005. http://www.ala.org/ala/aboutala/offices/oif/statementspols/ifresolutions/rfidresolution.cfm (accessed May 23, 2011).

ALA Intellectual Freedom Committee. 2006. RFID in Libraries: Privacy and Confidentiality Guidelines. http://www.ala.org/ala/aboutala/offices/oif/statementspols/otherpolicies/rfidguidelines.cfm (accessed May 23, 2011).

Archer, J. Douglas. 2007. "An RFID Primer and Intellectual Freedom Caution," *Indiana Libraries 26,* no. 1: 21-26. http://web.ebscohost.com.ezproxy.dom.edu/ehost/pdfviewer/pdfviewer?vid=5&hid=126&sid=15a07203-21e0-41c5-89d3-1e6bc2da68f5%40sessionmgr110 (accessed May 23, 2011).

Book Industry Study Group. 2004. BISG Policy Statement POL-002 Radio Frequency Identification. http://www.bisg.org/docs/BISG_Policy_002.pdf (accessed May 23, 2011).

Boss, Richard W. 2003. "RFID Technology for Libraries," *Library Technology Reports 39*, no. 6. http://alatechsource.metapress.com/content/l7p862581706/?p=6f32e36c56be47b0b972b4e410203070&pi=51 (accessed May 23, 2011).

Caldwell-Stone, Deborah. 2010. "RFID in Libraries," *Library Technology Reports 46*, no. 8: 38-44. http://alatechsource.metapress.com/content/vj7058288g2w/?p=1ed40ea7b0eb43ffa6130e927f9bee4a&pi=3 (accessed May 23, 2011).

Kohl, David F. 1986. *Circulation, Interlibrary Loan, Patron Use, and Collection Management: A Handbook for Library Management.* Santa Barbara, CA: ABC-CLIO.

Scire, Toni. 2003. "What's Next for the Radio Frequency Library," *Library & Archival Security 18,* no. 2: 51-58. http://web.ebscohost.com.ezproxy.dom.edu/ehost/pdfviewer/pdfviewer?vid=3&hid=126&sid=b65703b5-9ed0-49a4-aefa-2c99019f3125%40sessionmgr104 (accessed May 23, 2011).

Shahid, Syed Md. 2005. "Use of RFID Technology in Libraries: A New Approach to Circulation, Tracking, Inventorying, and Security of Library Materials," *Library Philosophy and Practice 8*, no. 1. http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1069&context=libphilprac (accessed May 23, 2011).

Schaper, Louise Levy. "How a Spark of Innovation in Fayetteville Changed the RFID and Self-Check Paradigm." *Computers in Libraries*. January 2005, pp 6-8 and 53-56.

Singh, Gurwant, and Madhu Midha. 2008. "RFID: A New Technology in Library Management Systems." *Journal of Interlibrary Loan, Document Delivery & Electronic Reserve 18*, no. 4: 439-447. http://web.ebscohost.com.ezproxy.dom. edu/ehost/pdfviewer/pdfviewer?vid=3&hid=126&sid=6d8d5a19-aafc-4da3-aeaa-89531cd32ebf%40sessionmgr111 (accessed May 23, 2011).

Smart, Linda. 2004. "Making Sense of RFID," *Library Journal 129* (Oct. 16): 4-14. http://web.ebscohost.com.ezproxy.dom.edu/ehost/pdfviewer/pdfviewer?vid=4&hid=126&sid=b4de1a6f-237b-4d29-8f68-5494012b564e%40sessionmgr114 (accessed May 23, 2011).

Ward, Diane. 2003. "Radio Frequency Identification Systems for Libraries and Archives: An Introduction," *Library & Archival Security 18*, no. 2: 7-21. http://web.ebscohost. com.ezproxy.dom.edu/ehost/pdfviewer/pdfviewer?vid=3&hid=126&sid=b65703b5-9ed0-49a4-aefa-2c99019f3125%40sessionmgr104 (accessed May 23, 2011).