LibraryThing for Libraries: How Tag Moderation and Size Limitations Affect Tag Clouds

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Abstract: The aim of this study is to analyse differences between tags on LibraryThing's web page and tag clouds in their "LibraryThing for Libraries" service, and assess if, and how, the LibraryThing tag moderation and limitations to the size of the tag cloud in the library catalogue affect the description of the information resource. An e-mail survey was conducted with personnel at LibraryThing, and the results were compared against tags for twenty different fiction books, collected from two different library catalogues with disparate tag cloud sizes, and LibraryThing's web page. The data were analysed using a modified version of Golder and Huberman's tag categories (2006). The results show that while LibraryThing claims to only remove the inherently personal tags, several other types of tags are found to have been discarded as well. Occasionally a certain type of tag is included in one book, and excluded in another. The comparison between the two tag cloud sizes suggests that the larger tag clouds provide a more pronounced picture regarding the contents of the book but at the cost of an increase in the number of tags with synonymous or redundant information.

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1.0 Introduction

End-user tagging is a popular service of many online information systems, providing users with opportunities for personal and collaborative interactive information organization and retrieval. While advantages such as additional access points representing users' perspectives have been identified in the literature, at the same time absence of policies may prevent successful retrieval. Moreover, the users need to be willing to contribute to the system, a characteristic which has been shown to be lacking in many library catalogues with tagging features.

Importing tags from an external, well-established source such as LibraryThing (https://www.librarything.com), presents a strong candidate for enhancing library catalogues by social tags. This is particularly pertinent to tags for literary fiction for which commonly used subject indexing languages in libraries often do not suffice. LibraryThing offers a library service, "LibraryThing for Libraries" (hereinafter shortened LTFL), which allows data from LibraryThing, such as tags, ratings and comments, to be imported into library catalogues. Tags in LibraryThing undergo a manual control before they are incorporated into LTFL and impose a limitation regarding the size of tag clouds in library catalogues.

In order to better understand the advantages and disadvantages of importing tags from existing tagging services to library catalogues, this study aims to examine how LibraryThing's tag moderation process of tags in LTFL works, to analyse the differences between the tag clouds on LibraryThing's website and tag clouds in LTFL, and investigate impact that LibraryThing's predetermined options for different tag cloud sizes have on library catalogue records. The sample includes data collected from two public library catalogues using LTFL: South Central Library System in Wisconsin, USA (http://www.scls.info/), and Spokane County Library District (https://scld.ent.sirsi.net/) in Washington, USA. Tags assigned to twenty literary fiction books at both libraries were collected from the two library catalogues and from the LibraryThing web site and then compared against one another using a modified version of seven tag categories identified by Golder and Huberman (2006).

The remainder of the paper is structured as follows: Section 2 (Previous research) discusses (dis)advantages of end-user tagging and folksonomies, especially in relation to literary fiction; Section 3 (Methodology) describes the sample and methodology used to conduct the study, including the modified version of Golder and Huberman's categories (2006); Section 4 (Results and analysis) presents and analyses the collected data; and, Section 5 (Conclusion) provides some final thoughts and outlines suggestions for future research.

2.0 Previous research

Research on social tagging and folksonomies (sets of tags resulting from social tagging) started when pioneering services like Delicious (https://del.icio.us) and Flickr (https://flickr.com) emerged, with the majority published in 2006 and onwards (Furner 2010). The discussion on (dis)advantages of social tagging is centred on two major foci. Firstly, unlike professional indexing systems, there are no restrictions or rules on how tags should be designed or applied: different users use different words for the same concept, homonyms are not disambiguated, hierarchical and other relationships between tags are often absent, tags may be written in different forms (singular/plural, spelling variations etc.), they may be unlimited in quantity or may have relevance for personal use only (e.g., "to read") (Furner 2010; Gerolimos 2013; Golder and Huberman 2006; Guy and Tonkin 2006; Kipp et al. 2015; Rolla 2009; Steele 2009). At the same time, they are characterized by the natural everyday language that the users are familiar with and can relate to, especially if compared to more formal and traditional subject indexing languages, which may not always reflect current terms and may contain outdated terms (Adler 2009; Bates and Rowley 2011; Furner 2010; Spiteri 2006). Furthermore, it is the great variation of perspectives represented that makes a folksonomy potentially useful to all people, regardless of subject knowledge and social and cultural backgrounds (Spiteri 2006; Steele 2009). In her recent review of tagging literature, Rafferty (2018, 510) concludes that tagging, being largely dependent on the taggers, may underperform in comparison to established subject indexing systems, they still "complement, enrich, and … enhance conventional retrieval systems."

Over time, as the number of tags from many different users increases, stable patterns and a common frame of reference emerge (Fox 2012; Lin et al. 2006). Users communicate with, and learn from each other, and a general consensus appears regarding which terms match an information resource best (Golder and Huberman 2006). The more users who assign the same tag to an information resource, the greater the likelihood that the tag is relevant; at that point, unique and personal tags become less visible. Still, minority and divergent opinions can coexist with the majority if users are given the possibility to switch between viewing the most popular tags and the full tag collection (Golder and Huberman 2006; Spiteri 2006; Steele 2009).

In order to address the challenges, different approaches have been proposed in the literature. Guy and Tonkin (2006) recommend an introduction of rules and guidelines for tagging, as well as automatic tag suggestions when creating new tags. They also warn that excessive control and regulation of tags could harm the strengths of folksonomies. Several researchers suggest that tags and controlled vocabularies may complement each other well (Adler 2009; Anfinnsen et al. 2011; Fox and Reece 2013; Golub 2016; Kakali 2014; Kipp 2011; Rolla 2009; Spiteri and Pecoskie 2016; Steele 2009). Golub et al. (2014) propose that one way to accomplish this would be to provide users with automatic suggestions of terms from an established vocabulary when they are about to create new tags. Based on a user study of a prototype system, this proved to help produce ideas of which tags to use, to make it easier to find focus for the tagging, to ensure consistency and to increase the number of access points in retrieval. However, the value and usefulness of the suggestions showed to be dependent on the quality of the suggestions, both as to conceptual relevance to the user and as to appropriateness of the terminology.

Related to the findings that automatic suggestions help find focus for tagging and increase the number of access points for retrieval are Munk and Mørk's (2007a, 2007b) studies of the social bookmarking service del.icio.us whereby they have identified that most common are broad tags while more specific ones are rare. They describe (2007b, 16) this as a bias which derives from "a cognitive economizing through a simplification principle in the users' construction of descriptive metadata."

When it comes to incorporating social tags into library catalogues, Kakali's (2014) survey of professional cataloguers shows that they have a positive attitude towards using tags as a complement to traditional subject indexing in the library catalogue. Wu, Xu and Yu (2016) claim that libraries have a unique role to play since they provide both the metadata and the actual literature, something social media are unlikely to overcome. In addition, social tagging services in library catalogues hold the potential to help strengthen the relationship and communication between libraries and its users.

As to the value of tags in relation to established subject indexing in libraries, Rolla (2009) compared tags from LibraryThing with subject headings from the Library of Congress for forty-five books in literary fiction. The results showed that the tags were significantly more numerous than the subject headings; an average of over forty tags per book compared to fewer than four subject headings. The tags were broader and more general than the subject headings and contained several new or current concepts, while the subject headings were superior when it came to specific historical periods, something Rafferty also found in her study of image tagging (2011). Rolla's conclusion was that while tags cannot replace a controlled vocabulary, they do improve access in the library catalogue, the end-user and professional indexing complementing each other. The value of both controlled vocabularies and tags for retrieval was concurred with by Kipp and Campbell (2010) and Golub et al. (2014) who showed that a number of additional access points in retrieval are provided by tags compared to traditionally designed search systems.

LTFL has been studied previously as well. Westcott, Chappell and Lebel (2009) studied use of LTFL at the Claremont University Library and inferred that their experiences with LTFL were mostly positive and of particular benefit for foreign-language publications as well as literary fiction on certain themes. One of the main drawbacks of LTFL for them was that the tags are not searchable via the OPAC search fields, since LTFL operates as an overlay; they are only searchable through the tag browser, which is accessed via library records containing tags, something that Pirmann (2012) concur with in her usability study of LTFL in another online library catalogue. Voorbij (2012) analysed a large sample of catalogue records and LTFL-tags in a Dutch academic library and found that about one third of the records were provided with tags from LTFL. Of those, about half of the tags were already covered by a keyword in the library record, one quarter were broader than a keyword, and another quarter of tags were related, narrower, or new. His estimation was that almost 40% of the library records that contained tags could be considered enriched by LTFL. Both Pirmann and Voorbij concluded that while tags cannot replace traditional subject headings, they do enrich the library catalogue and are useful when searching on topics that the end-user is less familiar with, when gathering ideas for additional keywords, and when exploring related subjects.

3.0 Methodology

3.1 Purpose and aims

Since a relatively large amount of tags is needed in order to create a stable pattern and for a general consensus to emerge regarding the description of an information resource, rather than providing its own tagging service within the library catalogue, it may be advantageous for a library to import tags from an external source, such as LibraryThing. In order to contribute to a better understanding of the implications of tags on retrieval in library catalogues which import tags from existing tagging services, we aim to determine ways in which the selection process of tags in LTFL affects the resulting tag clouds in library catalogues, and whether LibraryThing's predetermined options for tag-cloud sizes result in loss of valuable tags. Specifically, the following three research questions are posed:

1. Why does LibraryThing moderate tags before approving them for LTFL, and how is the selection process of tags in LibraryThing carried out?
2. What are the results of the tag moderation process (tags need to be manually approved in order to be included in LTFL), i.e., what differences can be found between LibraryThing tags in a library catalogue and on LibraryThing website?
3. What consequences do the predetermined options for tag-cloud size limitation in library catalogue records, directed by the receiving library, have on the description of information resources in the library catalogue?

3.2 Data collection

3.2.1 Selection of information services

The well-known online social cataloguing and networking site called LibraryThing was chosen as the source of data for the study. LibraryThing contains bibliographic data collected from libraries and bookstores all over the world. In addition, end users may create an account and add books of their preference, find similar books, participate in discussions, as well as rate, tag and review the books. At the time of writing (October 2018), LibraryThing held metadata for over 129 million books and 146 million tags, with over 2.3 million registered members worldwide (LibraryThing 2018).

Via LibWeb's list of American public libraries (http://www.lib-web.org/united-states/public-libraries/),

Author	Title	Author nationality	Publication year	Number of tags (circa)
Douglas Adams	The ultimate hitchhiker's guide to the galaxy	English	1994	650
Julia Alvarez	How the García girls lost their accents	Dominican-American	1991	750
Margaret Atwood	The handmaid's tale	Canadian	1985	4300
Jane Austen	Pride and prejudice	English	1813	5000
Dan Brown	The lost symbol	American	2009	2000
Catharina Ingelman-Sundberg	The little old lady who broke all the rules	Swedish	2012	170
Kazuo Ishiguro	The buried giant	Japanese-English	2015	800
Jo Nesbø	The bat	Norwegian	1997	700
Orhan Pamuk	A strangeness in my mind	Turkish	2014	180
J. R. R. Tolkien	The fellowship of the ring	English	1954	4700

Table 1. Adult literature included in the study, and approximate amount of tags on the LibraryThing website.

and LibraryThing's "Your Local" service (http://www.librarything.com/local), two libraries were selected by convenience; the first two public libraries found that a) used LibraryThing tags in their catalogue records, and b) do not have the same size limit of the tag clouds for individual records in their library catalogues. Since the LTFL tags are external, all libraries receive the same tags for a specific book; what may differ is the number of tags in the tag clouds, something each library can choose for themselves. The two selected libraries were Spokane County Library District (https://scld.ent.sirsi.net/) in Washington, USA, with a tag cloud limit of twenty-five tags in each library record, and South Central Library System in Wisconsin, USA (http://www.scls.info/), with a tag cloud limit of fifteen tags per library record.

3.2.2 Book selection

The focus of the study being selection of tags and size of tag clouds, books were chosen that contained the maximum number of tags in their tag clouds in both library catalogues. Since Spokane County Library District has a bigger tag cloud limit than South Central Library System, the former catalogue became the starting point, and the first forty books of literary fiction that were encountered in the catalogues written by different authors and with full tag clouds imported from LibraryThing, were documented. These forty books were then looked up in the South Central Library System, and from the twenty-eight books found in both, a final selection of twenty fictional books was made in the process described below.

Having a heterogeneous sample as a target in order to identify a range of examples, the twenty books were chosen to represent different author nationalities, genres, years of publication, and sizes of the total tag collection on LibraryThing's website. These included books of the different following characteristics:

- Author nationality: American, Canadian, Danish, Dominican-American, English, Finnish-Swedish, Japanese-British, Norwegian, Swedish, and Turkish;
- Genre: ten children and young adults' books, and ten adults' books;
- Original year of publication: from Austen in 1813 to Ishiguro and Pamuk in 2015;
- Tag size: The number of different tags assigned to the books has a wide range; from Thor and Ingelman-Sundberg with just over 150 unique tags, to Austen and Rowling with about 5,000 unique tags each. Tag clouds for each of the twenty books with fifteen and twenty-five tags in the library catalogues were compared to their 100 most popular tags on LibraryThing.

Table 1 displays all the adult books included in the study, including author, title, author's nationality, original publication year of the book, and the approximate amount of tags on LibraryThing's website. Note that the exact number of tags for a book is not presented by LibraryThing, which is why the approximation is based on a symbol search of ")" across the collected data in Microsoft Word for each of the books in the study.

Table 2 displays all the children and young adults' books included in the study, including author, title, author nationality, original year of publication, and the approximate number of tags on LibraryThing's website.

3.2.3 Tags

In the following step, the book tags from both library catalogues and from LibraryThing were documented. The to-

Author	Title	Author nationality	Publication year	Number of tags (circa)
Frances Hodgson Burnett	A little princess	English	1905	2400
Orson Scott Card	Ender's game	American	1985	4200
Roald Dahl	Charlie and the chocolate factory	English	1964	3200
John Green	The fault in our stars	American	2012	2700
Tove Jansson	Tales from Moominvalley	Finnish-Swedish	1962	480
Lene Kaaberbøl	The Shamer's daughter	Danish	2002	170
Astrid Lindgren	Ronia, the robber's daughter	Swedish	1981	760
Mary Pope Osborne	Dinosaurs before dark	American	1992	1400
J. K. Rowling	Harry Potter and the sorcerer's stone	English	1997	5000
Annika Thor	The lily pond	Swedish	1997	160

Table 2. Children and young adults' literature included in the study and approximate amount of tags on the LibraryThing website.

Figure 1. Tag data for the tag "regency." This tag has been used for the book "*Pride and prejudice"* by Jane Austen, which is included in this study.

tal of 100 most popular tags on LibraryThing per book were selected for analysis; LibraryThing ranking is based on the number of different users who add the same tag for the book. Figure 1 shows an example of tag data on LibraryThing's website.

In cases when some tags have been used the same number of times, we have strived to follow the same principle as LTFL and rank them by their overall popularity on LibraryThing (see Section 4.1.3 for more info in ranking in LTFL). Following the assumption that a specific tag used by many different users should theoretically be more useful for other people than a tag used many times but by only one user, the tags in our data collection were ranked first by the number of members who have added the tag, and second by the number of times the tag has been added. The data were downloaded from the website and library catalogues on the same day, 5 November 2017. Since the tag clouds in the library catalogues delivered by LTFL are presenting the most popular tags on LibraryThing for that book (LibraryThing for Libraries 2017), the 100 most popular tags for a book on LibraryThing should theoretically function as a sort of blueprint for the tag clouds in LTFL. This "blueprint" has been used in our study to analyse any deviations and identify tags that have not been included in LTFL.

3.3 Method

The main method used was tag analysis, explained in more detail below. In addition, in order to gain an understanding of the policies and practices related to LTFL's tag moderation, an email survey questionnaire with relevant open-ended questions was sent to the person in charge of LTFL at LibraryThing. The questions concerned the tag moderation process, ways of combining tags to solve problems with synonyms and the like, size limits of the tag clouds, and selection priorities of tags for the tag clouds in LTFL. The responses were received on 4 December 2017.

The tags were compared and analysed based on their content using tag categories that Golder and Huberman identified in the Delicious bookmarking service (2006), which can serve the following functions: 1) identifying what (or who) the object is about; 2) identifying what it is (e.g., book, article, blog); 3) identifying who owns it; 4) refining categories (tags that provide additional information supporting other tags); 5) identifying qualities of characteristics of the object; 6) self-reference (personal tags like mystuff); and, 7) task organizing (for example "toread" or "jobsearch").

Since Delicious is different from LibraryThing because it aims at organizing websites rather than books, some

modifications to the categories were necessary for our purposes. While the first category of tags, identifying what (or who) the object is about, works just as well on books as it does on bookmarks, the following two categories, describing what the object is and who owns it, were merged into a single category containing tags that relate to the characteristics of the artefact, such as edition, publisher, and media form, since ownership of the book is irrelevant in a library setting. Category four, refining categories, was removed because no tags of this kind were found, while category five, identifying qualities or characteristics of the object, were left unchanged. Categories six and seven, self-reference and task organizing, were merged into one category of users' personal tags, since no real difference between the two were found on LibraryThing. In addition, two more categories were added; one for bibliographic data, containing information independent of the literary artefact such as author, title and publication year, and one for foreign languages, unknown abbreviations, codes and the like, as Thomas, Caudle and Schmitz did in their study (2009). The resulting six categories of tags used in this study are as follows:

1. Plot: Identifies who (characters, places, groups) or what (time series, concepts, phenomena, events) the literary work is about, for example, "wizards," "regency era," or "Frodo Baggins."
2. Artefact: Identifies manifestations of the particular item that the user has read, for example, edition, owner or publisher of the artefact, such as "e-book," "penguin classics," "signed," "library," "first edition" or "pocket." Tags in this category focus solely on information regarding the particular media or form of the literary artefact; this is information that can vary greatly between different readers even if they are reading the same literary work.
3. Characteristics: genre, opinions or other characteristics, such as "fantasy," "classic," "favourite," "Nobel prize" or "inspiring." The tags in this category focus on the content of the book but are expressed from the user's personal views, perspectives and context, making them both personal and bibliographical at the same time.
4. Personal: user's personal tags, such as "goodreads" or "to be read." This category contain inherently personal tags that would be completely useless to anyone but the one creating them, while opinions such as "fun" have been filed under category three, characteristics, since these could be argued to be of value to others as well (see Section 4.2.3)
5. Bibliographic: bibliographic data, such as year of first publication, author, title, series, target audience and original language. These tags refer to the literary work, regardless of form, edition and other aspects of the artefact, and mostly contain information that could be found in a traditional library record.
6. Unknown: tags written in languages other than Swedish or English (i.e., unknown to the authors), unknown abbreviations, codes and the like. This is a limitation to the study, but the majority of the tags on LibraryThing are in English and only a few percentages of the tags in the study belong to this category.

The delimitations between the categories can be quite fluid in some cases, so a certain measure of subjective assessment has been necessary. Such are, for example, tags referring to language or nationality; e.g., "English" could either mean that the user read the book in English, or that the book was written by an English author. As a third party, it is virtually impossible to determine exactly what purpose the user had with the tag, so when the author's nationality was determined as English, the tag was assigned to category five, bibliographic; in all other cases, it was assigned to category two, artefact.

The following step was to code each tag with one of the appropriate categories from the list above. The tags were always examined in relation to the book they belonged to, and because of this a tag present in more than one tag collection could be assigned different categories depending on the context. Then, the tag categories were analysed and compared as to how they differ between the two library catalogues and LibraryThing, studying the changes across different books and characteristics (such as author nationalities, genres, years of publication, and tag collection sizes), also taking into account the resulting qualitative impact on the description of the information resource in the library catalogue.

4.0 Results and analysis

4.1 Email survey

This section presents the replies received via the email survey related to the policies and practices for tag moderation at LTFL.

4.1.1 The tag moderation process

The tag moderation process is conducted by personnel at LibraryThing, and the goal of the tag moderation process is to remove all personal tags from the tag clouds in the library catalogue. The moderation process involves several considerations. If the tag does not exist in the tag cloud in LTFL already, it is reviewed for inclusion. Only inherently personal tags are excluded, like "left it at mom's house." The receiving library may choose to use a filter to clear out potentially inappropriate terms; however, most libraries

choose not to modify the tag clouds. Since the tag moderation is done manually it usually takes a while (no further details were given in the survey) before the tag is approved. On the other hand, if the proposed tag has been added previously, the system automatically updates the popularity rating. The assumption behind this decision is that the larger the number of users who add the same tag to the book, the larger the chance that the tag is relevant. However, when importing tags into a library catalogue, a new context arises in terms of end users and the catalogue structure, which potentially implies that tags considered valuable in LibraryThing might be useless in the library catalogue, for example "literary fiction" and "tales," since this information is already provided by the library catalogue.

4.1.2 Combining tags in LibraryThing

LibraryThing supports linking tags based on relationships of synonymy. Tag combining can be suggested by any user on LibraryThing, and anyone can participate in the voting process for new combinations, but for a new combination to pass it must receive four times as many positive votes as negative ones, win by at least eight votes and the voting must have been open for at least a week. Tag combining refers to merging synonymous terms under one main tag on a global level, such as, for example, when viewing tags assigned by all users on LibraryThing for a certain book. The tag "WWII," e.g., has more than 800 different aliases, like "ww2" and "second world war," and including all these tags under one main keyword greatly improves the experience of viewing tag clouds and using tags on a global level on LibraryThing. The process does not affect the user's personal tags. However, based on the data collected in this study, several examples of popular tags which are not linked exist, such as "children's literature," and "children's books" that appear in parallel in a tag cloud of a book. Similarly, "fantasy" and "fantasy fiction" tags occur together.

4.1.3 Selection priorities of tags for LTFL

Each library can customize the display of tags, including how many to show. The tag clouds may contain, five, ten, fifteen, twenty, twenty-five or thirty of the most popular tags in a visual display. When selecting tags for LTFL, LibraryThing first ranks the tags based on the number of different users assigning a tag to a specific book, and secondly, tags from the tag cloud that are also most popular overall in LibraryThing are chosen. An example illustrates this: a book has been tagged four times with "friendship," four times with "love" and four times with "magic." If only one more tag is required to complete the tag cloud in LTFL, the system will select the tag from the tag cloud that is also most widely used elsewhere on LibraryThing. In this study we have strived to apply the same principle when ranking the tags for each of the books by using tag data available on LibraryThing's webpage (see 3.2.3).

4.2 Tag analysis

This section presents the distribution of tags for adult books, and children and young adults' books respectively, divided into the categories presented in Section 3.3, both for the 100 most popular tags per book and for the two different tag cloud sizes of twenty-five and fifteen tags. Following that is an analysis, category by category, of the differences found between the LFTL-tags in the library catalogue and on LibraryThing's website. Lastly, the consequences of the different size limitations of the tag clouds are explored and evaluated.

4.2.1 Distribution of tags for adult books

Table 3 below shows distribution of the 100 most popular tags (collected from LibraryThing's website) per book for the adult books, divided into the different categories presented in Section 3.3, as well as the distribution of LTFL tags in these categories in the different tag cloud sizes of twenty-five (collected from Spokane County Library District) and fifteen tags (collected from South Central Library System) respectively.

The most popular tags on LibraryThing in books for adults are those found in category one, plot (26.0% in average), followed by category three, characteristics, with 23.0% in average, and then category five, bibliographic (21.3% in average). The distribution of tags for adult books in LTFL is similar. Categories two, four and six, largely contain tags that LibraryThing strives to remove from LTFL, and only one tag from category two, artefact, and none from category four, personal, and category six, unknown, can be found in the library catalogues.

While it is relatively easy to name differences between the 100 most popular tags on LibraryThing and the tag clouds in LTFL in general, it is much harder to describe how the tag clouds with twenty-five and fifteen tags differ from each other. The distribution of tags across the categories seem to be relatively consistent when scaling down from twenty-five to fifteen tags, with minor differences: while the twenty-five-tag clouds contained some tags from category two, four and six, none are present in the tag clouds with fifteen tags. However, the description of the information resource seems to be less defined with smaller tag clouds. A deeper analysis of this can be found in Section 4.2.4.

CATEGORIES																		
1 Plot			2 Artefact			3 Characteristics			4 Personal			5 Bibliographic			6 Unknown		
/100	/25	/15	/100	/25	/15	/100	/25	/15	/100	/25	/15	/100	/25	/15	/100	/25	/15
Douglas Adams – *The ultimate hitchhiker's guide to the galaxy:*																	
21	5	3	10	-	-	32	10	8	13	-	-	24	10	4	-	-	-
Julia Alvarez – *How the García girls lost their accents:*																	
34	15	11	9	-	-	15	2	1	15	-	-	27	8	3	-	-	-
Margaret Atwood – *The handmaid's tale:*																	
26	8	4	10	-	-	32	10	7	13	-	-	19	7	4	-	-	-
Jane Austen – *Pride and prejudice:*																	
25	9	3	10	-	-	27	7	4	13	-	-	25	9	8	-	-	-
Dan Brown – *The lost symbol:*																	
34	16	10	12	-	-	21	8	4	16	-	-	16	1	1	1	-	-
Catharina Ingelman-Sundberg – *The little old lady who broke all the rules:*																	
20	10	8	10	1	-	21	10	5	24	-	-	17	4	2	8	-	-
Kazuo Ishiguro – *The buried giant:*																	
33	13	6	11	-	-	22	6	3	14	-	-	19	6	6	1	-	-
Jo Nesbø – *The bat:*																	
20	9	7	14	-	-	21	12	7	18	-	-	23	4	1	4	-	-
Orhan Pamuk – *A strangeness in my mind:*																	
23	9	8	14	-	-	12	8	3	20	-	-	19	8	4	12	-	-
J.R.R. Tolkien – *The fellowship of the ring:*																	
24	8	7	14	-	-	27	10	6	11	-	-	24	7	2	-	-	-
AVERAGE:																	
26	10.2	6.7	11.4	0.1	-	23	8.3	4.8	15.7	-	-	21.3	6.4	3.5	2.6	-	-
AVERAGE IN PERCENT:																	
26.0%	40.8%	44.7%	11.4%	0.4%	-	23.0%	33.2%	32.0%	15.7%	-	-	21.3%	25.6%	23.3%	2.6%	-	-

Table 3. Adult books: distribution across the six categories of the 100 most popular tags per book on LibraryThing's website, and of the twenty-five and fifteen LTFL tag clouds.

4.2.2 Distribution of tags for children and young adults' books

As seen from Table 4 below, the most popular tags on LibraryThing assigned to books for children and young adults belong to category one, plot, and category five, bibliographical, with almost the same average: 28.7% and 27.2% respectively. Category three, characteristics (15.6%), and category four, personal (14.5%) split the second place in popularity on LibraryThing. The same patterns are found in the LTFL tags, except that category four, personal, does not appear at all. Categories two, four and six, largely contain tags that LibraryThing strives to remove from LTFL, and only one tag from category two, artefact, and none from category four, personal, and category six, unknown, can be found in the library catalogues.

When comparing the two different sizes of tag clouds in LFTL, they are similar to those of the adult books; the distribution of tags across the categories seems to be relatively consistent when scaling down from twenty-five to fifteen tags, but with slightly bigger fluctuations. Just like in the results for the adult books, no tags from category two, four and six are present in the tag clouds with fifteen tags.

CATEGORIES																		
1 Plot			2 Artefact			3 Characteristics			4 Personal			5 Bibliographic			6 Unknown			
/100	/25	/15	/100	/25	/15	/100	/25	/15	/100	/25	/15	/100	/25	/15	/100	/25	/15	
Frances Hodgson Burnett – *A little princess:*																		
31	11	5	9	-	-	18	3	3	13	-	-	28	11	7	1	-	-	
Orson Scott Card – *Ender's game:*																		
30	10	6	10	-	-	22	10	5	17	-	-	21	5	4	-	-	-	
Roald Dahl – *Charlie and the chocolate factory:*																		
21	5	3	8	-	-	19	5	4	13	-	-	33	15	8	6	-	-	
John Green – *The fault in our stars:*																		
37	13	9	11	-	-	14	5	2	17	-	-	20	7	4	1	-	-	
Tove Jansson – *Tales from Moominvalley:*																		
15	5	2	11	-	-	13	4	1	10	-	-	43	16	12	8	-	-	
Lene Kaaberbøl – *The Shamer's daughter:*																		
38	13	8	6	-	-	12	4	2	19	-	-	22	8	5	3	-	-	
Astrid Lindgren – *Ronia, the robber's daughter:*																		
27	8	4	9	1	-	17	3	2	11	-	-	26	13	9	10	-	-	
Mary Pope Osborne – *Dinosaurs before dark:*																		
17	9	6	5	-	-	13	7	4	22	-	-	26	9	5	17	-	-	
J. K. Rowling – *Harry Potter and the sorcerer's stone:*																		
30	9	7	10	-	-	18	3	1	9	-	-	33	13	7	-	-	-	
Annika Thor – *The lily pond:*																		
41	16	9	2	-	-	10	4	2	14	-	-	20	5	4	13	-	-	
AVERAGE:																		
28.7	9.9	5.9	8.1	0.1	-	15.6	4.8	2.6	14.5	-	-	27.2	10.2	6.5	5.9	-	-	
AVERAGE IN PERCENT:																		
28.7%	39.6%	39.3%	8.1%	0.4%	-	15.6%	19.2%	17.3%	14.5%	-	-	27.2%	40.8%	43.3%	5.9%	-	-	

Table 4. Children and young adults' books: distribution across the six categories of the 100 most popular tags per book on LibraryThing's website, and of the twenty-five and fifteen LTFL tag clouds.

The difference between the distribution of tag categories in adult books and books for children and young adults may be explained by the large number of tags that allude to the target audience found among the tags for the children and young adults' books, such as "children's," "children's literature," "children's books," "children's fiction," "juvenile," "juvenile fiction," "YA," "young adult," "young adult literature," and "kids," a type of tag that is rarely found in adult books.

4.2.3 Analysis of tag distributions

This section analyses the data presented in the above tables, category by category, and compares similarities and differences between the tags on LibraryThing with the tag clouds in LTFL collected from the library catalogues.

All of the tags belonging to category one, plot, focus on the content of the book and are, therefore, of value to end-users other than the tag creator (Golder and Huberman 2006). Furthermore, since the tags in this category, for example "marriage" or "wizards," contain information that appears for literary fiction in a very limited number of

subject headings in the library catalogues, and since literary fiction can be quite subjective and multifaceted, these tags may be considered a valuable addition to the library catalogue. By comparing the 100 most popular tags on LibraryThing with the tags in LTFL, it seems that a few tags from category one, plot, have been excluded from LTFL in the tag moderation process; among these are "journey," "treehouse," and "Ender" (main character in "*Ender's game*," by Orson Scott Card). According to LibraryThing's policies on tag moderation and the tags popularity ranking these should be present in LTFL. Why this is not the case could simply be about the human factor since the tag moderation process is performed manually.

Category two, artefact, contains tags referring to a specific edition, copy, or media form, and this category exists due to the fact that a tag cloud for a book on LibraryThing is completely independent of the copy. This causes users to assign tags to describe the physical properties of the copy. The library catalogue, however, specifies edition and form in the library catalogue record, so the fact that LibraryThing removes these tags from LTFL should be viewed as positive since they would otherwise give misleading and/or redundant information to the library catalogue visitor. Only two tags from this category appear in our LTFL tag collection: the tag "foreign" for *The Little Old Lady Who Broke All the Rules,* and "German" for *Ronia, the Robber's Daughter*. The problem of language and nationality mentioned above (Section 3.3) relates to tags that could refer to both the written language of the book and/or the author's nationality. For example, if a Swedish library used LTFL, the tag "foreign" for *Ronia, the Robber's Daughter*, could give misleading information, because the author and original language of the book is Swedish.

The tags in category three, characteristics, focus on the content of the book but are expressed from the user's personal purposes, views, perspective and context. These are considered by Golder and Huberman (2006) to be primarily useful to the person who created them, while Rolla (2009) argued that personal tags could be of potential use to other people as well. A number of tags belonging to this category have been excluded from LTFL in the moderation process, such as "favourites," "children's classics," "1001 books," "badass" and "memorable." While some of these tags might be less useful in a library catalogue, e.g., "badass," certain tags may be valuable; for example, a third party may want to know that 307 people thought *Harry Potter and the Sorcerer's Stone* was so good that it became one of their favourites, and that *Pride and Prejudice* is one of the books that got the status "1001 books you have to read before you die." Genre tags, which are also included in this category, usually pass the tag moderation for LTFL. They can, in theory, be valuable in the library catalogue since they can provide a more extensive description than traditional subject indexing systems, mainly because they are not limited to a few keywords. Even if the tag cloud were to contain duplicates of the subject headings in the library catalogue, they still provide the possibility of a more nuanced and detailed description of the contents of the information resource. At the same time, some tag clouds in LTFL contain one or more synonymous genre tags, such as "fantasy" and "fantasy fiction," producing unnecessary and redundant information in LTFL.

Category four, personal, is not included at all in LTFL, which is positive since tags in this category are entirely created for the user's personal use. Tags such as "own," "read in 2015" and "at home" are completely irrelevant to other people and have no function in a library catalogue (Golder and Huberman 2006). A very small ratio of personal tags is ranked among the top thirty most popular tags on LibraryThing in our sample; only the books with small tag collections have a lot of personal tags among the top-ranking tags. Given the fact that libraries often have large varied collections, which include books, that have both large and small tag clouds on LibraryThing, the tag moderation process for this category improves the quality of the resulting tag clouds.

The tags in category five, bibliographic, mainly contain information that is already present in the catalogue. However, some of the tags could complement the library catalogue, for example, information about author's nationality. Furthermore, we have discovered that this category contains some tags that, according to the LibraryThing tag moderation process, should have been included in LTFL but have instead been removed. Publishing years, such as "2009" have not been included at all in LTFL but occur frequently on LibraryTing's website, one may speculate that the reason for this is that for a third party it is impossible to determine what the purpose the user had with a certain tag. Other examples of discrepancies have been found in LTFL regarding several popular concepts, which have been included in the tag clouds for some books and excluded for others. For example, some authors' surnames such as "Tolkien" and "Rowling" have been excluded from LTFL while "Austen" and "Atwood" are included. Names of book series are another inconsistency; e.g., "Harry Potter series" has been included in LTFL while "Lord of the Rings" (the name of the fantasy series by J.R.R. Tolkien) was removed. Nationality is yet another variable: for example, "Finnish" has been discarded from *Tales from Moominvalley* in the library catalogue, while "Turkish" is included in *A Strangeness in My Mind.*

Category six, unknown, includes all tags in languages other than Swedish or English, unknown abbreviations, codes and the like. The number of tags in category six, unknown, is relatively small, 2.6% for the adult books and 5.9% for the children and young adult books, and they are rarely found among the most popular tags.

4.2.4 Tag clouds in LTFL with fifteen and twenty-five tags

The fifteen and twenty-five tag clouds can contain many similarities and differences regarding the content and description of the book. The following three examples illustrate how limitations of the tag clouds, and the total size of the tag collection, can affect the description of the book:

- A book with a very large tag collection on LibraryThing: *Pride and Prejudice* by Jane Austen;
- A book with a moderate tag collection on LibraryThing: *The Fault in Our Stars* by John Green; and,
- A book with a small tag collection on LibraryThing: *The Little Old Lady Who Broke All the Rules* by Catharina Ingelman-Sundberg.

4.2.4.1 *Pride and Prejudice* by Jane Austen

The English writer Jane Austen's most famous novel *Pride and Prejudice* was first published in 1813 and has over 2,000 different tags on LibraryThing. As seen from Figure 2, the fifteen-tag cloud shows that this is English literature written by Jane Austen in the 19th century and the regency era. It is seen as a classic and the only tags that give any information about the book topics are "England," "love" and "romance."

As seen from Figure 3 and the twenty-five-tag cloud, when another ten tags are added, the picture of the content is enriched. The book's plot is described as a Victorian historical romance with humour, that takes place in England, where women, marriage and family, especially sisters, play a major role, and one of the characters is Mr. Darcy. Thus, the twenty-five-tag cloud gives a clearer description of the contents of the book.

When it comes to tag category distribution, both tag clouds comprise four tags that refer to the British/English origins of the book (category five, bibliographic), three tags describe it as a classic (category three, characteristics), and two tags denote the author's name (category five, bibliographic). The twenty-five-tag cloud additionally contains two tags regarding both the 19th century (category five, bibliographic) and the historical literature (category three, characteristics).

4.2.4.2 *The Fault in Our Stars* by John Green

American author John Green published the book *The Fault in Our Stars* in 2012. The book is aimed primarily at young adults and has just under 1000 different tags on LibraryThing. As seen from Figure 4, the fifteen-tag cloud informs the visitor that the book is a realistic fiction story aimed at young adults. It is set in the present time and addresses topics of cancer, death, friendship, sadness, illness, love, relationships and possibly involves Amsterdam. When another ten tags are added to the tag cloud (Figure 5), the content and character of the plot become more specified and imply a love story where one person is sick and dying of cancer. Death seems to be a major theme alongside those of family, love, humour and aging; two contemporary places are important to the story, namely Amsterdam and Indiana. However, at the same time, the larger tag cloud contains more problematic tags, including synonyms and bibliographic information already in the library catalogue, such as four different tags denoting the target audience (category five, bibliographic), and two tags describing the book as contemporary (category three, characteristics).

4.2.4.3 *The Little Old Lady Who Broke All the Rules* by Catharina Ingelman-Sundberg

This easy-going crime comedy is written by a Swedish author, Catharina Ingelman-Sundberg, and was published in Swedish for the first time in 2012. It was translated into English in 2014 and has almost 200 different tags on LibraryThing.

The fifteen-tag cloud shown in Figure 6 implies a humorous crime-fiction written by a Swedish author. The plot is denoted as taking place in contemporary Sweden and seems to include adventure, mystery, older people and some kind of a robbery. The tag cloud with twenty-five tags (Figure 7) clarifies the plot somewhat, but not to the same extent as in the previous two examples. Instead, the tag cloud is filled with synonymous and closely related terms, for example "elderly," "old age," "old people," "retirement," "senior citizens," and "seniors" (category one, plot), "humor" and "humorous" (category three, characteristics), "Swedish author," "Swedish literature" and "Swedish" (category five, bibliographic).

In summary, the three examples seem to illustrate that the larger the tag cloud, the more developed and defined the content of the book seems to become. However, at the same time, larger tag clouds tend to lead to more redundant tags that are essentially synonymous.

4.2.4.4 Tag clouds in LTFL with fifteen and twenty-five tags

The ultimate mission of LibraryThing is to provide users with a personal catalogue, a reading list or an overview of their home library (LibraryThing 2017). Their users each have their own individual purposes, goals, perspectives, vocabularies, methods and contexts. They have often read the book they assign tags to, and the LibraryThing system allows a high degree of personal freedom. This leads in the end to each person's LibraryThing catalogue being a

Figure 2. Tag cloud with fifteen tags for *Pride and Prejudice*.

Figure 3. Tag cloud with twenty-five tags for *Pride and Prejudice*.

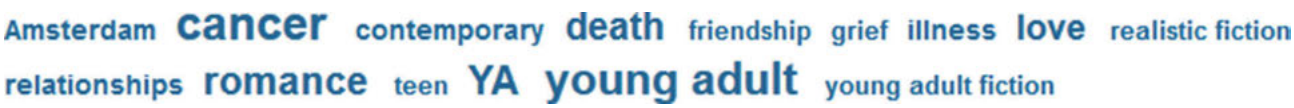

Figure 4. Tag cloud with fifteen tags for *The Fault in Our Stars*.

Figure 5. Tag cloud with twenty-five tags for *The Fault in Our Stars*.

Figure 6. Tag cloud with fifteen tags for *The Little Old Lady Who Broke All the Rules*.

Figure 7. Tag cloud with twenty-five tags for *The Little Old Lady Who Broke All the Rules*.

unique system. Furthermore, LibraryThing is a social platform whereby seeing the complete tag cloud of the book as well as the ability to merge tags with the same meaning, allows a single tag to be used by thousands of users. On the other hand, in the library catalogue each book is uniquely described with systematic and detailed bibliographic information, with the system being specifically structured to offer library services and access to its collections. Therefore, moving the tags from LibraryThing context to that of a library catalogue is not a straightforward endeavour.

The identified problems of multiple synonymous tags and tags denoting already existing bibliographic information are hard to avoid. However, based on the above analysis, it seems that tags are adding valuable information to the library catalogue. Category one, plot, focuses on the content of the book; since this type of information typically appears in a rather limited number of general subject headings, and since literary fiction can be quite subjective and multifaceted, tags such as "marriage" and "wizards" are a valuable addition. Tags in category three, characteristics, describe the contents of the book from the user's own perspective, and while they are personal in nature, they can still be valuable to other people, for example, "children's classics" and "favourites." Category five, bibliographic, contains a lot of information that is already in the library catalogue, but also some valuable complements, such as "Swedish author" and "British." The remaining three categories (two, artefact; four, personal, and six, unknown) are not suited to the library context, as described above in Section 4.2.3; however, these have been largely removed from LTFL in the tag moderation process.

When it comes to size limitations, as seen above, the larger size of the tag clouds in LTFL seems to contribute to a clearer and more comprehensive description of the book, but at the same time the number of redundant tags also increases. One consequence of LTFL tag cloud size limitation in each individual record in the library catalogue is that minorities and divergent perspectives are ruled out, particularly for books with larger tag clouds, since only the most popular tags are included. One possible solution to this limitation is to create the same function in LTFL that already exists on LibraryThing's website, where users have the option to view the complete tag cloud by choosing an option to expand the view of the tags, something also mention by Pirmann (2012). This would provide visitors of the library catalogue an opportunity to investigate the book's properties and content more closely, regardless of the size limitation their library has chosen for the tag clouds.

5.0 Conclusion

Since a relatively large amount of tags is needed in order to create a stable pattern and to reach a general consensus regarding the description of an information resource, it might be advantageous for a library catalogue to import tags from an external source, such as LibraryThing, rather than to provide its own service. We aimed to determine how the tag moderation process of LibraryThing and tag cloud sizes of its LTFL service affect the representation of an information resource, and which differences there are between the tag clouds on LibraryThing and those imported to libraries.

According to LibraryThing, only inherently personal tags are excluded in the tag moderation process, for example "left it at mom's house." Results show that while LibraryThing claim to only remove the inherently personal tags, this seems to be only partly true since some other tags are absent in the library catalogue as well. In addition, inconsistencies have been identified where a certain type of tag, for example author, have been removed from some books in LTFL but included in others. Furthermore, some tags could be valuable to other people despite their personal nature, such as tags describing opinions or attributes of an information resource, for example, "favourite" and "1001 books;" however, these have often been removed by LibraryThing.

The tag clouds in LTFL mainly consist of tags belonging to category one, plot, category three, characteristics, and five, bibliographic. According to LibraryThing, only inherently personal tags are removed in the tag moderation process; however, the sample in this study reveals that some other tags have been excluded from LTFL as well. Examples can be found in category one, plot, where "journey," "treehouse" and "Ender" where absent in the tag clouds in LTFL, and in category five, bibliographic, where "fiction," "novel" and "series" did not get approved for LTFL. Interestingly, some types of tags have been approved in LTFL for some books, while they are absent in other books' tag clouds in LTFL. For example, some authors' surnames such as "Tolkien" and "Rowling" have been excluded from LTFL while "Austen" and "Atwood" are included.

The size of the tag clouds seems to affect the representation of the contents of an information resource, where a larger tag cloud seems to give a more extensive description of the resource, yet this also increases the number of tags with synonymous or redundant information due to the differences in context between the tags original purpose on LibraryThing, and the library catalogue. LibraryThing has tried to lessen the problem of synonymous tags by allowing their users to connect tags with the same meaning under one main keyword; however, the sample data in this study still contain a lot of synonyms and closely related terms.

While this study has been limited to twenty books of literary fiction with tags collected from two libraries, planned future research would include larger samples and comparison across different genres and topics. Another topic of interest would be to study the merging of synonymous tags, and how this affects the library catalogue. Redundant tags are impossible to avoid when tags are moved from their original context (on LibraryThing); however, it would be interesting to study whether and how these can be minimized in future. Furthermore, a comparison against existing subject headings systems used in libraries would better illustrate the benefits of end-user tagging. Finally, all of this should

be put in a larger context of how imported tags affect information retrieval in library catalogues, to determine their actual value in a real-life context.

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