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Multilingual Linked Data: Users' perceptions and understanding of the metadata elements on Linked Data in multilingual contexts

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Abstract

This study examined users' perceptions and understanding of the metadata elements of linked data (LD) in multilingual contexts. In total, 119 subjects in the United States and Korea participated in this survey and provided their perceptions and understandings regarding: 'meaningful', 'confusing', 'least interesting' and 'most interesting' metadata elements in an example LD record. The largest differences were found in bf:mainTitle, dctersm:title, dc: creator, dbo:WikiPageLength, dbp:gross, dbp:hanja, dbp:language, bibo:isbn and bf:Extent. Participants also cited lack of knowledge of LD and cost of switching as barriers to entry. This study contributes to understanding similarities and differences in users' understanding of metadata elements in a multilingual context.

1. Introduction

Linked Data (LD) provides best practices for publishing and hyperlinking machine-readable datasets to each other to connect, expose and share data in the web environment [1]. Some of the world's major national and academic libraries have released their bibliographic data (i.e., metadata) as LD, which is an essential step for the adoption of LD in libraries. Challenges around multilingualism in LD include that standards do not emphasize reaching multilingual audiences as default but rather the emphasis is on English [2]. Semantic diversity, language-specific nuances, variable quality of metadata, cross-lingual entity linking, consistency, and up-to-date are challenges and opportunities to create multilingual linked data systems. Existing linked data systems usually handle LD within one language, and there are limited numbers of studies on multilingual linked data although this is of great importance for the future of linked data. The researchers argue that linguistic differences play essential roles in linked data.

- RQ1: How differently and similarly do Americans and Koreans perceive and understand the metadata elements in current linked data?

2. Methodology

The population of this study included students and employees of academic institutions who are native speakers of English in the United States of America and native speakers of Korean in South Korea. The researchers assume that the linguistic differences between East Asian and Western thought, communication, and interaction might influence the use of linked data. Working with this assumption, the researchers sampled Americans for Westerners and Koreans for Asians. Researchers selected these nationalities for several reasons. Firstly, Korea and America have distinct history. Secondly, the dominant languages in America and Korea (English and Korean) are very different.

Poster

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The researchers chose (1) an international classic book titled Pride and Prejudice which was written by Jane Austen and (2) a Korean movie titled Parasite which achieved international recognition. Regarding Pride and Prejudice, the researchers collected metadata elements on linked data from the Library of Congress (LC) and the National Library of Korea (NLK) to analyze and compare linked data practices across distinct languages. Regarding Parasite, the researchers collected metadata elements from the DBpedia. The former (i.e., Pride and Prejudice) is consumed world-widely and is heavily influenced by Western cultures, thus is potentially of interest to users in all regions who like classic books in general. The latter (i.e., Parasite) features distinct cultural origin, thus can be attractive to users who do not have a Korean background but are curious about Korean or East Asian culture. The researchers asked respondents to review the metadata elements and evaluate their usefulness and familiarity. Researchers obtained approvals from Institutional Review Board (IRB)s at both universities, one in the United States and the other in South Korea. The researchers recruited voluntary participants from two linguistic groups by using Qualtrics. Both universities are public universities, and the enrollments of both universities are similar.

3. Results

The survey received 119 valid responses after removing 10 invalid responses such as incomplete survey responses. Table 1 displays participants' responses on their perceptions and understanding on metadata elements on linked data depending on their native language, especially for 'meaningful', 'confusing', 'most interesting' and 'least interesting' metadata elements. Between English and Korean native speakers, the largest differences in meaningful elements were in bf:mainTitle and dbp:hangul, dbp:hanja. dc:creator and dctersm:title were the most meaningful metadata elements for English-speakers(62.16%) while 0% for Korean-speakers. Regarding confusing metadata elements, the largest differences were in bf:Extent, dbo:WikePaageLength, dbp:gross, dbp:hanja, madsrdf:authoritativeLabel and nlon:newsTopic. Regarding the most interesting elements, the largest differences were in bf:Extent, bf:Place, bibo:isbn, dbo:WikiPage Length, dbphanja, dbp:language and dc:reastor. Regarding the least interesting elements, the largest differences were in bf:Extent, bf:Place, dbp:hanja and dbp:length.

When participants were asked about barriers to adoption, 75% of responses focused on lack of knowledge of LD, while 15% considered the potential cost of switching to LD, and 10% did not answer. Responses to an additional free text question focused on multilingual and multicultural issues including issues of translation.

4. Conclusion

This study examined differences in users' understanding of metadata elements on linked data in multilingual contexts. Most differences were found in bf:mainTitle, dctersm:title, dc:creator, dbo:WikiPageLength, dbp:gross, dbp:hanja, dbp:language, bibo:isbn and bf:Extent. The most differences in meaningful elements were

Table 1. *Differences in users' perceptions and on metadata elements in linked data*

category	meaningful		confusing		most interesting		least interesting	
native language	English	Korean	English	Korean	English	Korean	English	Korean
bf:Extent	0(0%)	2(2.44%)	5(13.51%)	1(1.2%)	1(2.7%)	6(7.32%)	5(13.51%)	0(0%)
bf:Language	1(2.7%)	0(0%)	1(2.7%)	0(0%)	1(2.7%)	0(0%)	0(0%)	2(2.44%)
bf:mainTitle	23(62.16%)	0(0%)	0(0%)	0(0%)	1(2.7%)	1(1.22%)	0(0%)	0(0%)
bf:Media	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	1(2.7%)	0(0%)
bf:Place	0(0%)	1(1.22%)	1(2.7%)	2(2.41%)	0(0%)	7(8.54%)	1(2.7%)	9(10.98%)
bf:Work	0(0%)	0(0%)	1(2.7%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
bibo:isbn	0(0%)	3(3.66%)	1(2.7%)	3(3.61%)	0(0%)	11(13.41%)	3(8.11%)	7(8.54%)
dbo:WikiPageLength	0(0%)	0(0%)	3(8.11%)	23(27.71%)	0(0%)	6(7.32%)	4(10.81%)	16(19.51%)
dbp:country	1(2.7%)	1(1.22%)	0(0%)	1(1.2%)	0(0%)	2(2.44%)	0(0%)	2(2.44%)
dbp:gross	0(0%)	0(0%)	4(10.81%)	25(30.12%)	1(2.7%)	1(1.22%)	4(10.81%)	11(13.41%)
dbp:hangul	0(0%)	5(6.1%)	1(2.7%)	0(0%)	1(2.7%)	1(1.22%)	2(5.41%)	0(0%)
dbp:hanja	2(5.41%)	0(0%)	9(24.32%%)	3(3.61%)	4(10.81%)	2(2.44%)	3(8.11%)	14(17.07%)
dbp:language	0(0%)	1(1.22%)	0(0%)	1(1.2%)	7(18.92%)	3(3.66%)	1(2.7%)	1(1.22%)
dbp:length	0(0%)	0(0%)	0(0%)	2(2.41%)	1(2.7%)	3(3.66%)	1(2.7%)	6(7.32%)
dbp:runtime	0(0%)	0(0%)	1(2.7%)	6(7.23%)	0(0%)	5(6.1%)	2(5.41%)	2(2.44%)
dc:creator	5(13.51%)	20(24.39%)	1(2.7%)	5(6.02%)	8(21.62%)	11(13.41%)	2(5.41%)	4(4.88%)
dcterms:title	1(2.7%)	38(46.34%)	1(2.7%)	1(1.2%)	2(5.41%)	4(4.88%)	2(5.41%)	0(0%)
madsrdf:authoritativeLabel	0(0%)	0(0%)	5(13.51%)	0(0%)	1(2.7%)	0(0%)	0(0%)	0(0%)
NA	4(10.81%)	5(6.1%)	0(0%)	7(8.43%)	4(10.81%)	7(8.54%)	4(10.81%)	6(7.32%)
nlon:newsTopic	0(0%)	4(4.88%)	1(2.7%)	0(0%)	3(8.11%)	8(9.76%)	1(2.7%)	0(0%)
nlon:typeOfResource	0(0%)	2(2.44%)	2(5.41%)	3(3.61%)	2(5.41%)	4(4.88%)	1(2.7%)	2(2.44%)

bf:mainTitle, confusing elements were dbp:gross, most interesting elements were bibo:isbn and least interesting elements were bf:Extent.

References

[1] World Wide Web Consortium, "Linked data glossary," 2013. [Online]. Available: https://www.w3.org/TR/ld-glossary/

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