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Lessons Learned from EIAH Metadata Application Profile (EMAP)

Emad Khazraee and Jung-ran Park

QUERY SHEET

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Q1. Au: Location?

Q2. Au: Title of article correct?

P.7, Line 242, the term "holding-location" is correct.

P.13, Line 425, This reference is to the special edition of "Journal of Library Metadata," Vol 9, Issues 3 & 4

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Emad Khazraee and Jung-ran Park

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1 **Lessons Learned from EIAH Metadata**
2 **Application Profile (EMAP)**

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5 *Pennsylvania, USA*

6 *The EIAH Metadata Application Profile (EMAP) has been designed*
7 *to meet Encyclopedia of Iranian Architectural History (EIAH) needs*
8 *regarding the organization of architectural resources. The applica-*
9 *tion profile should satisfy community needs and should respect ex-*
10 *isting conventions; architects may think differently from archivists*
11 *or museum curators. The key issues in the design process have been*
12 *addressed here; namely, compliance with the special needs of EIAH*
13 *data architecture, interoperability, compliance with Persian lan-*
14 *guage and localization, as well as simplicity, critical because of*
15 *the wide range of non-cataloger users of the system. The EMAP has*
16 *been designed based on Dublin Core; six element refinements have*
17 *been defined for the Dublin Core element “subject” to facilitate the*
18 *interconnection of resources to entities in the EIAH ontology. In*
19 *particular, human readable documentation guidelines have been*
20 *emphasized as an important factor in metadata quality. Metadata*
21 *crosswalks have also been defined with major standards of the do-*
22 *main to improve interoperability.*

23 **KEYWORDS** *Metadata, application profile, Dublin Core, meta-*
24 *data crosswalk, metadata guidelines, localization*

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INTRODUCTION

BCE

26 The Iranian World¹ is a veritable archive of human history with numerous
27 historic sites and monuments, some dating back to the eighth millennium
28 BC. In spite of the high rate of destruction of the cultural heritage in this
29 territory, the remaining evidence is still considerable, estimated to be up to
30 one million historic monuments and sites. This valuable heritage has not
31 been well documented to this point, a critical issue for historical studies, in
32 particular for the study of architectural history, which is inseparable from ma-
33 terial evidence. Moreover, documentation is not the only problem; owing to
34 a lack of any integrated network for collaborative research many redundant
35 and parallel studies have been carried out. The lack of any infrastructure for
36 knowledge exchange and interoperability has led to the failure of several
37 attempts for the integration of different information centers and a recess in
38 the architectural studies of the Iranian world.

39 The Encyclopedia of Iranian Architectural History (EIAH) was estab-
40 lished aiming to pave the way for scholars in the field and to remove the
41 aforementioned obstacles. The representation of the resources of the history
42 of Iranian architecture, identification, collection, and long-term preservation
43 are the primary goals of the EIAH project. Toward this end, the EIAH meta-
44 data application profile (EMAP) was designed based on the Dublin Core
45 Metadata Initiative (DCMI)² to meet the needs of the EIAH in terms of con-
46 tent management, and interoperability with other applications both inside
47 and outside of the organization. The application profile defines new meta-
48 data elements and provides usage guidelines. The results were tested within
49 the project and the first version was implemented in Dspace software, which
50 is used as the EIAH digital repository.

51 This article presents lessons learned from the EIAH experience in the
52 design of a metadata application profile. We particularly look at the issues
53 drawn from the EIAH project centering on the use of the Dublin Core meta-
54 data standard in the Persian language, interoperability, localization, and the
55 specific requirements of information retrieval of the architectural documents.

LITERATURE REVIEW

57 This review of studies dealing with application profiles is not meant to
58 be exhaustive. For comprehensive coverage of the literature on application
59 profiles and metadata best practices, see the special issue on metadata best
60 practices of *Journal of Library Metadata*.³

61 Different institutions have different functional requirements. Also, the
62 differences in the format and knowledge domains of resources cause var-
63 ious needs in terms of metadata. The concept of the application profile

64 is reflective of the need to support domain-specific semantics and require-
65 ments. Heery and Patel introduce application profiles as mixing and matching
66 metadata schemas that are suited for a particular local application.⁴ The use
67 of the application profile has two mottos “do not re-invent the wheel” and
68 “reuse existing schemas.”⁵ In addition, interoperability is an important factor
69 in information system design. By achieving semantic interoperability, appli-
70 cation profiles provide a basis for harmonization of metadata and semantic
71 mapping between systems.⁶

72 A Dublin Core Application Profile (DCAP) is a document or set of
73 documents that specifies and describes the metadata used in a particular
74 application.⁷ An application profile defines metadata elements and their
75 structure as well as usage guidelines. It uses identifiers for identifying terms
76 with precision. In addition, it should precisely describe term usage and its
77 attributes. The other important aspect, especially for a formal expression of
78 the application profile, is the constraints on term use; these constraints define
79 whether the usage of the term is mandatory or optional; they also define the
80 cardinality of the term usage.⁸

81 DCAP emphasizes the importance of human-readable descriptions and
82 the provision of guidelines for the expression of the application profile in
83 Resource Description Framework (RDF) and Extensible Markup Language
84 (XML). The Dublin Core Abstract Model (DCAM) is another important ba-
85 sis on which the application profile is constructed. DCAM precisely de-
86 fines the schema components and their structure in order to be machine-
87 processable.⁹

88 The DCMI Abstract Model, published as a DCMI Recommendation in
89 March 2005, provides a metadata model of the type required for formal-
90 izing a notion of machine-processable application profiles. In September
91 2007, Mikael Nilsson presented a framework for the definition of Dublin
92 Core Application Profiles that was dubbed later the “Singapore Framework.”
93 The Singapore Framework defines a set of mandatory and optional com-
94 ponents for construction of the application profile, including Functional Re-
95 quirements (mandatory), Domain Model (mandatory), Description set profile
96 (mandatory), Usage guidelines (optional), and Encoding syntax guidelines
97 (optional).¹⁰

98 The rapidly growing body of digital repositories calls for system-
99 atic examination of documentation practices. Metadata best practices
100 encompassing metadata guidelines and application profiles function as
101 an essential mechanism for metadata planning, application, and man-
102 agement. The growing number of application profiles demand novel
103 approaches and techniques for extracting, analyzing, and comparing lo-
104 cally developed documentations. Such future endeavors may further con-
105 tribute to the development of mechanisms for sharable and interoperable
106 metadata.

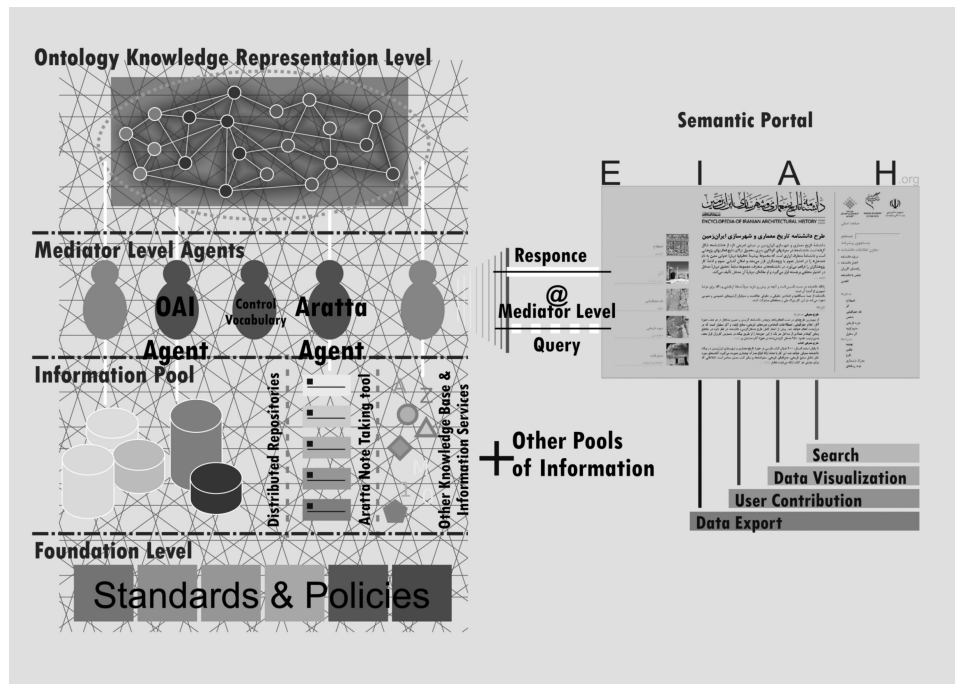


FIGURE 1 EIAH Information Architecture (EIAH-Cake).

107 METHODOLOGY OF APPLICATION PROFILE DESIGN

108 EIAH: Information Architecture and the Purpose of Its Metadata

109 Application Profile

110 EIAH information architecture is a three-layer architecture called EIAH-cake,

111 as Figure 1 illustrates.

112 There is an information pool consisting of a set of distributed digital

113 repositories. In addition to the EIAH digital repository, some supplementary

114 services such as the Aratta collaborative research tool¹¹ are included in this

115 layer. On the upper level, there is an ontology of the topics in the domain

116 of Iranian architectural history. The mediator level functions in the middle in

117 order to gather metadata from the information pool and to interconnect the

118 resources in the information pool to the topics in the ontology.¹² According

119 to the very modular nature of this design, interoperability plays a key role

120 in the system. Also, resources should be described in a way which facilitates

121 the interconnection of the resources to the topics of the history of Iranian

122 architecture.

123 Since metadata plays a key role in the establishment of this informa-

124 tion architecture, the EIAH metadata model needs to comply with the re-

125 quirements of the EIAH information architecture. Thus, the EMAP should

126 have characteristics such as semantic interoperability and extensibility and

127 be able to be used by many in a wide spectrum of cultural heritage institu-
128 tions who are not cataloging professionals. Given the characteristics of the
129 Dublin Core Standard, namely, simplicity, semantic interoperability, exten-
130 sibility, and compliance with the Resource Description Framework (RDF),¹³
131 the Dublin Core metadata standard was adopted by EIAH.

132 As mentioned, application profiles play a key role in interoperability.
133 Given the primary need of EIAH information architecture to exchange data
134 between standalone agents, the use of an application profile capable of
135 improving interoperability is vital.¹⁴

136 The Process of Application Profile Design

137 To start the process we needed to think about the specific requirements of the
138 EMAP. In addition to the usual procedures and requirements, two additional
139 criteria for EMAP, were identified, namely, ease of use and compliance with
140 the EIAH objectives. Ease of use is an essential factor because this application
141 profile is to be used in a wide range of institutions.

142 To achieve the highest level of compatibility we decided to follow the
143 most widely used application profile design in the community. The Sin-
144 gapore Framework was in its early stages when the EMAP design process
145 started; therefore, we chose to use the former Dublin Core guideline.¹⁵ In
146 addition, the Singapore Framework emphasis on the formal expression of
147 the application profile in the Singapore Framework was not welcomed by
148 the librarian side of the EIAH project.

149 Hence, it was decided to design the application profile based on the
150 former guidelines in the first phase and later move incrementally toward
151 the new framework by observation of the development of the application
152 profile notion in the community. Therefore, the application profile in the
153 first phase consisted of a selection of metadata elements and new elements,
154 an agreement on term usage, the choice of appropriate vocabularies, spec-
155 ification of permitted schemes and values (e.g., use of a specific controlled
156 vocabulary or encoding scheme) and the usage guidelines. One of the major
157 objectives of the usage guidelines was defining the appropriate use of the ap-
158 plication profile in different institutions for architectural resource description.

159 Preparing the EMAP

160 A team was formed consisting of two members of the research department
161 responsible for collection and description of resources, and two members of
162 the IT department responsible for the implementation of tools and software.
163 As a first step, the team studied the available documentation of Dublin Core
164 to gain a shared image of the work. This was an essential stage as there exist

165 different notions about metadata usage and the lack of conceptual integrity
166 would cause problems in the later usage of metadata terms.

167 Dspace, an open source software, was adopted as the digital repository
168 platform for digital resource management and preservation. Dspace supports
169 different metadata schemas; however, by default it uses a qualified version of
170 the Dublin Core schema based on the Dublin Core Library Application Profile
171 (DC-Lib).¹⁶ As the project has powerful connections with the library side, and
172 most system users are more familiar with the library legacy, we decided to
173 develop our work based on the DC-Lib approach and to reuse the terms and
174 vocabulary. The team defined its functional requirements initially and then
175 endeavored to define the required elements. Finally, after the early draft, we
176 performed some tests both in-house and outside to measure the efficiency
177 of the early application profile. After the preliminary tests and revisions, the
178 first version of the application profile was compiled and used in the EIAH
179 digital repository and in the Aratta Web-based collaborative note-taking tool.
180 The results from the first phase will be used to improve the next version.

181 Important Issues of the Design Process

182 The EMAP is designed to be used by the staff of cultural heritage institutions
183 not familiar with complicated cataloging rules. Therefore, use of overly com-
184 plicated metadata schemas such as Categories for Description of Works of
185 Art (CDWA) with 532 categories and subcategories,¹⁷ VRA (Visual Resource
186 Association) Core,¹⁸ and Cataloging Cultural Objects¹⁹ (CCO) fell outside of
187 the focus of the project, but we did look to these for reusable elements. At
188 first glance, CDWA or CCO seemed to be sufficient for the description of
189 architectural records; nonetheless, CDWA is designed for curatorial jobs and
190 is based on a museum perspective; for example, it records the history of
191 repairs of the work. Both standards look at architecture as an object; how-
192 ever, architecture has a social and cultural life that is absent in the study of
193 objects. As Christopher Alexander has stated, in architecture we face both
194 spatial and event patterns.²⁰

195 On the other hand, working with these standards calls for a group of
196 highly trained catalogers with a wide knowledge of the arts and art history.
197 In addition, the EIAH repository does not retain the records of objects but
198 the documents, which contain information about architectural artifacts and
199 are stored along with other historical resources including books and articles.
200 Furthermore, a widely accepted standard is needed to provide interoperabil-
201 ity with the other data available on the Web and to provide linked data.
202 Owing to the success of Dublin Core as a generally used metadata standard,
203 it was decided to place at the center the Dublin Core Metadata Initiative
204 (DCMI) approach and elements as the basis of the design in order to achieve
205 the highest compliance with DCMI while trying to define crosswalks with the

206 major standards in the field of cultural heritage such as CIDOC-CRM (Con-
 207 ceptual Reference Model),²¹ CCO, CDWA, FRBR (Functional Requirements
 208 for Bibliographic Records), and FRBR-Object Oriented.²²

209 Inasmuch as the cultural centers are scattered around Iran, frequently
 210 without network connections, it was impossible to use a Web-based or an
 211 integrated system. Therefore, the solution in many cases was to enter the
 212 information in simple spreadsheet files (e.g., Excel) and to import this infor-
 213 mation later to the digital repository or to a note-taking tool. Accordingly,
 214 the description sets had to be as simple as possible to be implemented in the
 215 Excel forms with a written guideline for filling the forms. A minimum choice
 216 of elements could make the task unambiguous even for a novice user.

217 THE STRUCTURE OF THE EIAH METADATA APPLICATION 218 PROFILE (EMAP)

219 Element Set

220 The EMAP consists of 12 core elements and 31 refinements of which 14
 221 refinements for the core element *contributor* seems to be excessive and
 222 should be decreased in the next version. The most important refinements
 223 are the *subject* refinements, which narrow down the subject of the resources
 224 and can be used to interconnect the resources to the topics of the domain.
 225 These refinements are designed to comply with the EIAH ontology entities.
 226 EIAH ontology includes three major classes of entities: temporal, spatial, and
 227 human (i.e., actors). These major entities are divided into six more compre-
 228 hensible groups as Persons (subclass of human entities), Works (monuments
 229 and sites) and Geographical Names (subclass of spatial entities), Historical
 230 Periods, Events (subclass of temporal entities), and General Terms, which is
 231 the generic level of all the other classes.²³

232 In this way, we defined six refinements for the dc.subject element: Is re-
 233 lated to Person, Is related to Work, Is related to Geographical Name, Is related
 234 to Historical Period, Is related to Event, Is related to Term. These elements
 235 by application of EIAH architectural controlled vocabulary for description
 236 of resources help to identify and connect precisely the related resources to
 237 the six categories of topics. Table 1 illustrates the six refinements for the
 238 dc.subject element:

239 The metadata element dc.location has two different functions and thus
 240 was controversial in the design process. In DCMI metadata terms,²⁴ the
 241 dc.location appears as a class while in DC-Lib it appears as an element for
 242 the proposed “holding-location” term, using the existing element of Metadata
 243 Object Description Schema (MODS).²⁵ There were two needs in EIAH; first,
 244 to identify the holding location of the physical resource when a Uniform
 245 Resource Identifier (URI) is not appropriate; second, to identify the location
 246 of creation of the physical item.

The Table borders must be corrected

TABLE 1 EMAP "DC" Subject Refinements

Term Name: Is Related to Event		Term Name: Is Related to Term	
URI	http://eiah.org/en/Entries#Event	URI	http://eiah.org/en/Entries#Term
Label	Is related to Event	Label	Is related to Term
Definition	An entity responsible for correlating an event to the resource	Definition:	An entity responsible for correlating a term to the resource
Type of term	Property	Type of term:	Property
Refines:	http://purl.org/dc/elements/1.1/subject	Refines:	http://purl.org/dc/elements/1.1/subject
Term Name: Is Related to Geographical Name		Term Name: Is Related to Historical Period	
URI	http://eiah.org/en/Entries#Geographical_Name	URI	http://eiah.org/en/Entries#Historical_Period
Label:	Is related to Geographical Name	Label:	Is related to Historical Period
Definition:	An entity responsible for correlating a geographical name to the resource	Definition:	An entity responsible for correlating a historical period to the resource
Types of term:	Property	Types of term:	Property
Refines:	http://purl.org/dc/elements/1.1/subject	Refines:	http://purl.org/dc/elements/1.1/subject
Term Name: Is Related to Person		Term Name: Is Related to Work	
URI	http://eiah.org/en/Entries#Person	URI	http://eiah.org/en/Entries#Work
Label:	Is related to Person	Label:	Is related to Work
Definition:	An entity responsible for correlating a person to the resource	Definition:	An entity responsible for correlating a work to the resource
Types of term:	Property	Types of term:	Property
Refines:	http://purl.org/dc/elements/1.1/subject	Refines:	http://purl.org/dc/elements/1.1/subject

247 Ultimately, we decided to use the term in two different ways; first as the
248 DC-Lib, for the resources that had not been published officially (e.g., reports,
249 manuscripts); second as the publication location for the published resources
250 (e.g., books, journal articles). After the first phase, we understood that this
251 approach would cause misunderstandings and should only be used as a “lo-
252 cation” element in the DC-Lib. Thus we ascertained that location.publication
253 for the latter use should be added to EMAP.

254 The conceptual difference between work, expression, and manifestation
255 owing to the International Federation of Library Associations and Institutions
256 (IFLA) Functional Requirements for Bibliographic Records (FRBR) was also
257 a major issue in our EMAP.²⁶ Following the one-to-one principle in Dublin
258 Core we decided to differentiate between the digital manifestation (e.g., pdf
259 version) and the physical manifestation of an expression of the work (e.g., a
260 paper copy). Therefore, we decided to describe these two levels separately.
261 For example, we used the date.created element for the publication or creation
262 of the physical manifestation and the date.issued for the date when a digital
263 manifestation is issued, unless the work is in essence a digital-born resource.
264 This decision created a series of problems. The first and foremost was the
265 confusion in both description and interpretation of data.²⁷

266 Unlike Fedora Commons, Dspace does not support non-literal relation-
267 ships between items. Therefore, it was not easy to define a description set
268 and relate the digital manifestation of a work to the physical one. According
269 to the test results, we understood that we needed to describe the expres-
270 sion of the works (i.e., the digital manifestation inherits the attributes of
271 the expression as the creator and the creation/original date). Otherwise we
272 would follow the Scholarly Works Application Profile (SWAP) model, which
273 explicitly defines the relation between manifestation and expression of a
274 work.²⁸

275 Syntax, Vocabularies, and Schemes: Problems with the Persian 276 Script and Calendar

277 Complexities and variations of linguistic structures across languages and
278 cultures have a significant effect on information access.²⁹ Thus, linguistic and
279 cultural variations need to be taken into consideration in the development of
280 an application profile. Prior to dealing with complicated issues such as word
281 segmentation and boundaries which affect metadata quality, the following
282 basic aspects should be taken into account: In EMAP design two major
283 problems flowed from the nature of localization.

284 The Persian script is written from right to left; tools should be capable
285 of handling bidirectional algorithms in order to store and manipulate data
286 correctly, especially when Persian and Latin scripts are mixed in a state-
287 ment. It was also essential to use Unicode character encoding for all data

288 entered and stored. In Persian, we face difficulties regarding nonstandard
 289 localization. The Arabic character Yeh(ﻱ) was usually used instead of the
 290 Persian character(ﻱ), the Arabic character Kaf(ﻙ) used instead of the Persian
 291 character(ﻙ), and the Arabic character Teh Marbuta(ﻱ) used instead of the Per-
 292 sian(ﻱ). If this problem was not carefully handled, inaccuracy in information
 293 retrieval could result. Because Microsoft Windows does not support the Iran
 294 localization standard for the Persian keyboard (ISIRI9147), most users enter
 295 data through use of Arabic keyboards, exacerbating the inconsistency in data
 296 entry. This in turn affects information retrieval. To reduce this inconsistency,
 297 the guidelines made compliance with Persian script and Unicode character
 298 encoding mandatory for data entry.

299 The Persian calendar was another major localization issue. The Solar
 300 Hejri calendar called Taqwīm-e hejri-e šamsī has been the Persian official
 301 calendar since March 1925. This calendar is a combination of the solar year
 302 and the hejri era. The start of the Islamic calendar is the hejra (i.e., Prophet's
 303 flight from Mecca to Medina). Iran/Persia has used a solar calendar system
 304 called the Jallai calendar since 1079 CE.³⁰ The Persian year starts at the vernal
 305 equinox; therefore, the dates are different from the Gregorian calendar. To
 306 achieve interoperability, we adopted the widely used W3 Consortium Date
 307 and Time Formats (W3CDTF) and the Gregorian calendar, even though the
 308 official calendar of Iran is the Persian calendar. Because services and users
 309 outside the organization need access to the stored metadata via the Open
 310 Archives Initiative (OAI)-server and they need to retrieve dates in a compre-
 311 hensible format to be used globally, we decided to store dates in W3CTDF
 312 format in all applications. However, the date can be entered and represented
 313 in the Persian calendar format and use of a date conversion algorithm based
 314 on the most precise algorithm known as the 33-year algorithm is employed.³¹
 315 The guideline for implementation of this feature is added to the EMAP docu-
 316 mentation. This feature was later implemented in localization of the Dspace
 317 digital repository. The dates are stored in W3CTDF in the database but when
 318 a user selects the Persian mode the dates are converted by JSP UI to the
 319 Persian dates. Thus, in data entry and representation an interim conversion
 320 step is implemented to support this feature. Sorting of items by date was not
 321 a challenge because the sequences of events are calendar scheme indepen-
 322 dent and would be the same in both calendars. This process is handled by
 323 user interface, making it possible for a user to browse, search, and retrieve
 324 data based on the Persian, as well as the Georgian, calendar.

"and use of" must
 be omitted, "by
 using" must be
 inserted

325 Usage Guidelines

326 Inasmuch as the system is designed to be used by those who are not metadata
 327 experts or catalogers, the guidelines play a significant role in the improve-
 328 ment of metadata quality, especially when enriched by different examples.³²

329 The guidelines should place emphasis on basics to reduce ambiguity regard-
330 ing term usage. The most complicated cases are *title* and *subject*. Most of
331 the documents in the cultural heritage organizations do not have a title, in
332 particular the photos. In certain cases a rhetorical title is used such as “the
333 most beautiful dome of the world!” which is an impression of the photogra-
334 pher in a documentation project. Such titles obviously do not help the user
335 ascertain the name of the edifice or its location.

336 To overcome this problem, the team studied available resources such
337 as *Guide to the Description of Architectural Drawing*³³ and consulted with
338 domain experts in meeting sessions. Finally, a guideline with different real-
339 world examples was prepared for users on how to provide a title and subject
340 for different types of resources. The lack of thesauri and authority files was
341 another flaw in the domain of Iranian architectural history and Islamic archi-
342 tecture. The *Getty Art and Architecture Thesaurus* (AAT)³⁴ does not cover
343 Islamic art and architecture and has a Western-centric point of view. Nor do
344 the terms have Persian equivalents. Neither is there a Persian equivalent for
345 the *Thesaurus of Geographic Names* (TGN), and most authority files do not
346 cover the history of architecture.

347 From the early stages of the EIAH project, there was a serious effort
348 undertaken to prepare controlled vocabularies for the domain of Iranian
349 architectural history. At present, the process has led to the accumulation
350 of 6,000 geographical names, 15,000 architectural monuments, 750 person
351 names, and 6,000 architectural terms. Step by step, these vocabularies were
352 used for different subject fields. In addition, the project ^{intended to} provide an open
353 version of the Persian cultural thesaurus, subject headings, and authority files
354 prepared by the National Library and Archive of Iran (NLAI), and expressed
355 in SKOS. The EMAP is planning to use these vocabularies in the next version.

356 The Crosswalks

357 While adhering to Dublin Core, EMAP also examined different standards in
358 the domain for reusability of terms and attempted to define crosswalks to the
359 major metadata schemas in the cultural heritage domain. Efficient resource
360 management requires interoperability among systems dealing with different
361 metadata schemas. In order to achieve interoperability, we should be able to
362 define mappings across different metadata schemas.³⁵ Different crosswalks
363 are available^{36,37} between Dublin Core and the other schemas; here only the
364 crosswalk between the EMAP six subject refinements and CIDOC-CRM³⁸ and
365 FRBR³⁹ has been addressed. A simple mapping is provided in Table 2.

366 The EMAP in Use

367 The EMAP is used primarily in the EIAH digital repository and other digital
368 repositories that use the EIAH platform. EIAH has customized and localized

TABLE 2 Crosswalks between EMAP Six Subject Refinements and CIDOC-CRM and FRBR

EMAP	CIDOC-CRM	FRBR Model
Is related to Person	E21 Person	Has as Subject (Person)
Is related to Work	E26 Physical Feature	Has as Subject (Work ⁴⁰)
Is related to Geographical Name	E35 Place	Has as Subject (Place)
Is related to Historical Period	E4 Period	Has as Subject (Event)
Is related to Event	E5 Event	Has as Subject (Event)
Is related to Term	E33 Linguistic Object	Has as Subject (Concept)

369 the open source Dspace software as its institutional repository. The EMAP
 370 application profile has been implemented in Dspace. An agent, in the me-
 371 diator level of the EIAH-cake, automatically retrieves information from the
 372 repository and uses EMAP to interconnect different resources in the digi-
 373 tal repository to the entries of the encyclopedia implemented in Semantic
 374 Mediawiki. This is possible owing to the subject refinement elements and
 375 their compliance with entries classification. As mentioned earlier, Dspace
 376 cannot handle relationships among repository items; this creates some prob-
 377 lems in the implementation of DC Singapore Framework as it cannot handle
 378 non-literal properties in this regard.

379 The EMAP is also used in the Aratta Web-based Collaborative Note-
 380 taking tool.⁴¹ This collaborative tool is a semantic wiki used by EIAH scholars
 381 for note-taking from a historical resource and for assigning semantic tags to
 382 the resources. These notes are used as references for EIAH entries and the
 383 aggregated tags will be used for building controlled vocabularies. Again, we
 384 have the six DC subject element refinements as the semantic tags for the
 385 notes.

386

CONCLUSION

387 In the design of an application profile, several aspects should be considered
 388 including the very essential issue of context. The application profile should
 389 satisfy community needs and respect existing conventions; architects may
 390 think differently from archivists or museum curators. When the use of a
 391 new technology brings a shift to the community, it is crucial to respect the
 392 adaptability of legacy users; a gradual change usually ensures better results.
 393 The digital divide may affect application profile design. For example, in the
 394 case of the EMAP, it was important that simple spreadsheet files (e.g., Excel,
 395 OpenOffice Calc) could be used for resource description.

396 Guidelines play a vital role in metadata quality, especially for users
 397 who are non-cataloging professionals. Providing full details and varied real
 398 examples would be very helpful in this regard. Human-readable documen-
 399 tation should be provided in the application profiles as well as technical

400 documentation. Localization for different contexts is a major issue as well
 401 (e.g., Persian calendar and script). This is essential to achieve interoperabil-
 402 ity. Thinking globally regarding linked data, we should act locally to comply
 403 with the specific conditions of different societies while looking to the stan-
 404 dards to prevent reinventing the wheel to contribute to metadata mapping,
 405 a key to improving interoperability.

406 The next phase of work on the EMAP will be focused on compliance
 407 with the Singapore Framework and expression of the new version in RDF.
 408 Prior to the next phase of development, EMAP competency with the func-
 409 tional requirements and its effect on metadata quality should be assessed.
 410 Park emphasizes that metadata quality depends on to what degree it can
 411 perform core bibliographic functions,⁴² in particular, information discovery.
 412 Thus, both recall and precision should be measured. On the other hand,
 413 it seems that element refinements could be decreased to achieve a more
 414 concise application profile. In the next version, the six subject refinements
 415 could be matched with terms from frequently used namespaces (e.g., FRBR).
 416 Another task would be the application of compiled controlled vocabularies
 417 (e.g., EIAH, ASFA, and NLA Authority files). The next version will be pub-
 418 lished in both Persian and English in metadata registries for public use and
 419 development.

The whole sentence have to change in this way:
 Casting an eye to the standards of the field would prevent the reinvention of the wheel and would contribute to the provision of metadata mapping: a key to improving interoperability.

420

NOTES

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