

## The Meaning, Method and Tool to Build the Ewha Music Database (EMDB)

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### Abstract

*The Ewha Music Database (EMDB) is an online database comprised of primary source materials related to music education from East Asia during the modern era (1880 to 1945) when Korea, Japan, and China were geopolitically and culturally intertwined.*

*We developed the incipit search in EMDB as an embedded tool. This is the first attempt in Korea to implement a unique search function of musical data using alphabets of musical notes. Unlike in traditional search system that uses general literature information search conditions, such as author, title, publisher, year, number of pages, etc., it offers a new way of searching a musical piece/work and sheet music. This study confirms that digital information technology is an important methodology for research of music culture as a field of humanities.*

**Keywords:** Incipit, Ewha Music Database (EMDB), Online Public Access Catalog (OPAC), International Association of Music Libraries, Archives and Documentation Centers (IAML), Répertoire International des Sources Musicales (RISM), MySQL, LilyPond

## 1. Introduction

In humanities, digital technology not only pursues the accumulation of vast amount of data [1][2], but also the optimization of the quantity and quality of search by allowing searchers to access data quickly through a semantic web that enables linkage between data. Construction of databases and music archives that consider unique characteristics of music data have been proposed in musicology. In the past, scores (handwritten scores, manuscripts, printed scores, full scores, part scores, etc.), as primary sources of music materials, have been cataloged as documents, applying the old practice of cataloging by using general literature system by author, title, publisher, year of publication, number of pages, etc. However, this system is gradually being replaced by new data construction methods.

With a long tradition of cataloging music materials since middle age in the form of manuscript and printed

music, the western countries have established specialized music archives of various types and scales. [3]. Robert Eitner (1832-1905), German musicologist, bibliographer, and editor in the nineteenth century, showed innovative techniques in compiling critical and thematic catalogues. [4]. In the early 1950's each archive, library, or museum began to provide online public access catalog (OPAC) system for general users. RISM is a representative example of this. [5][6]. In comparison, Korea lacked in such specialized music archives and EMDb is the first implementation of music archive system in Korea that discovers, collects, analyzes, and catalogs primary music sources and offers unique search conditions for music data [7]. Through the work of converting sheet music into data, EMDb has enabled data retrieval from incipit search of pitch names in the musical alphabet, not the search keyword. This paper explains the structure of EMDb, followed by the incipit search tool implemented by EMDb. Then, it proposes a way of applying the technology in cultural study of music with specific examples, and ultimately suggests the necessity of close linkage between digital information technology and music cultural research in the present era.

## 2. Method to Establish EMDb

EMDb was established as a result of the foundational study of the National Research Foundation of Korea (2011-2014) conducted by Ewha Musicology Program and has been operating on the web since October 2014 <http://www.emusicdb.info>. Figure 1 shows the main screen of EMDb homepage in Korean.

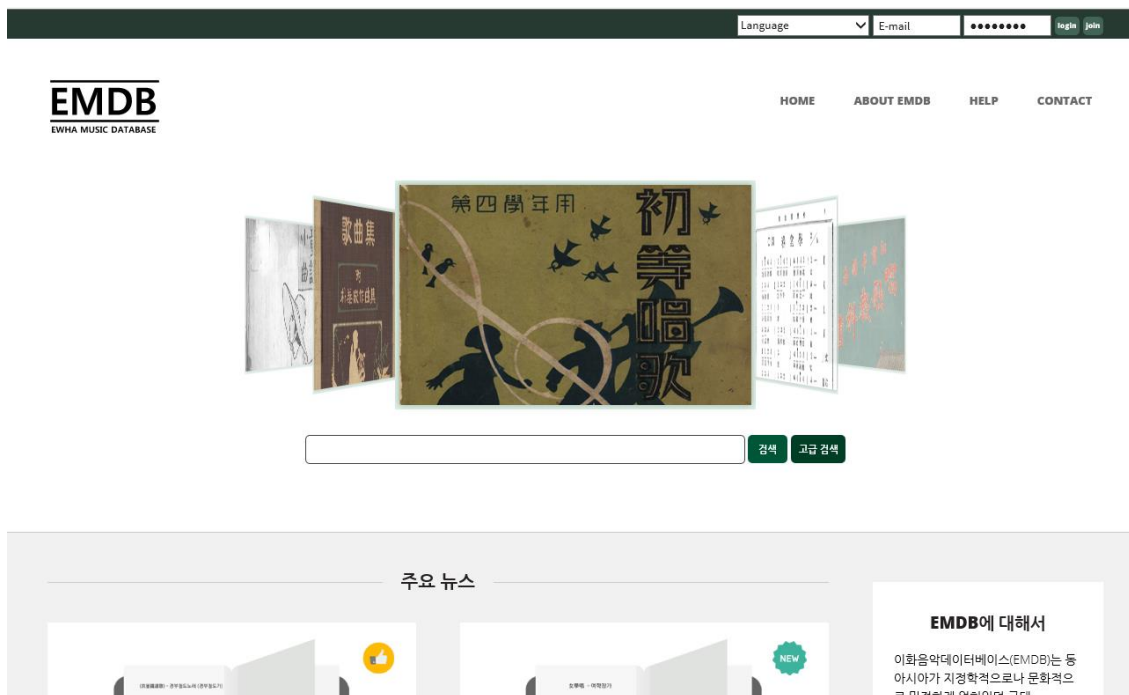


Figure 1. The main screen of EMDb (Korean) <http://www.emusicdb.info>

Figure 2 shows the main screen of EMDb homepage in English.

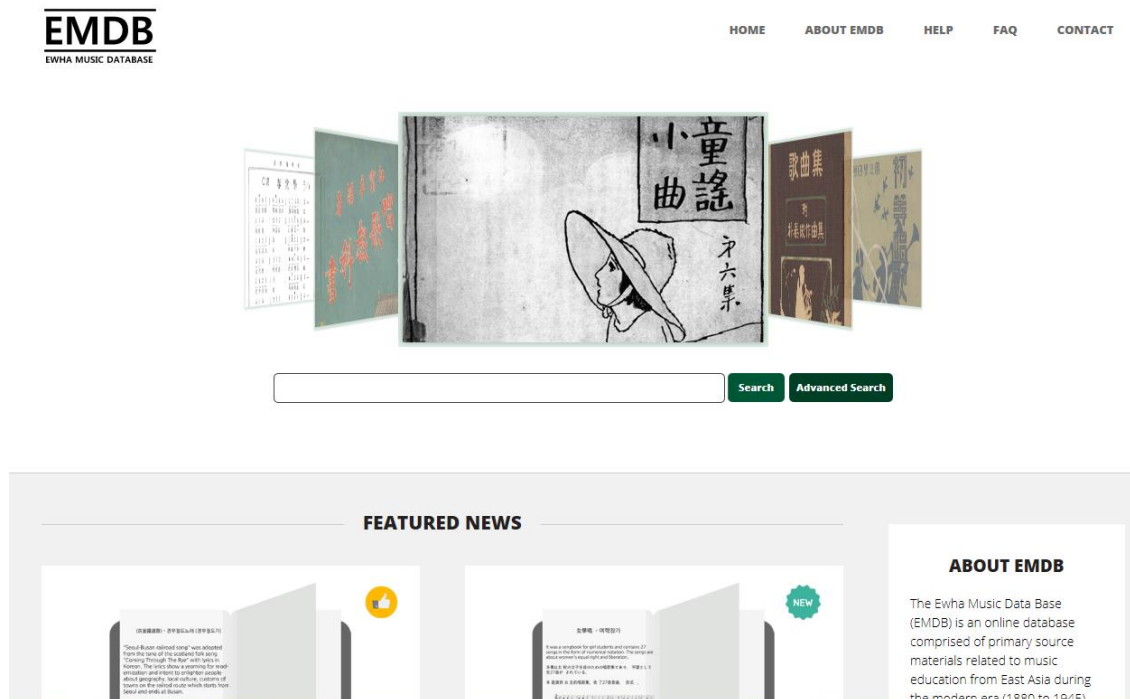


Figure 2. The main screen of EMDb (English) <http://www.emusicdb.info>

EMDB was developed with an intention of providing an accurate identification and discovery of music sources and detailed information specific to music data. In designing the music database, it examined the modern musical heritages during the time the Western music culture was first introduced, and in particular, it focused primarily on the East Asian modern music education materials. This is because, first, music education plays a critical role in shaping a country's music culture. Second, music materials published by educational institutions and widely used in societies during the cataclysmic time of modernization in East Asia were relatively well preserved [8].

EMDB is a unique database that includes modern musical education data from Korea, Japan, and China, and categorizes the data by characteristic, form, and content. It includes a compact and accurate description of the substance of the data, along with the detailed information about the collection, such as where the data was found and in what state, and the collection number unique to the collection location. The architecture of the EMDb system consists of three fundamental parts: the web browser, the web server and the MySQL database [9]. EMDb implements search function through score, which is a unique form of record for musical data. Below is the schema diagram of EMDb, which includes a total of 15,241 contents. Figure 3 shows the schema diagram of EMDb.

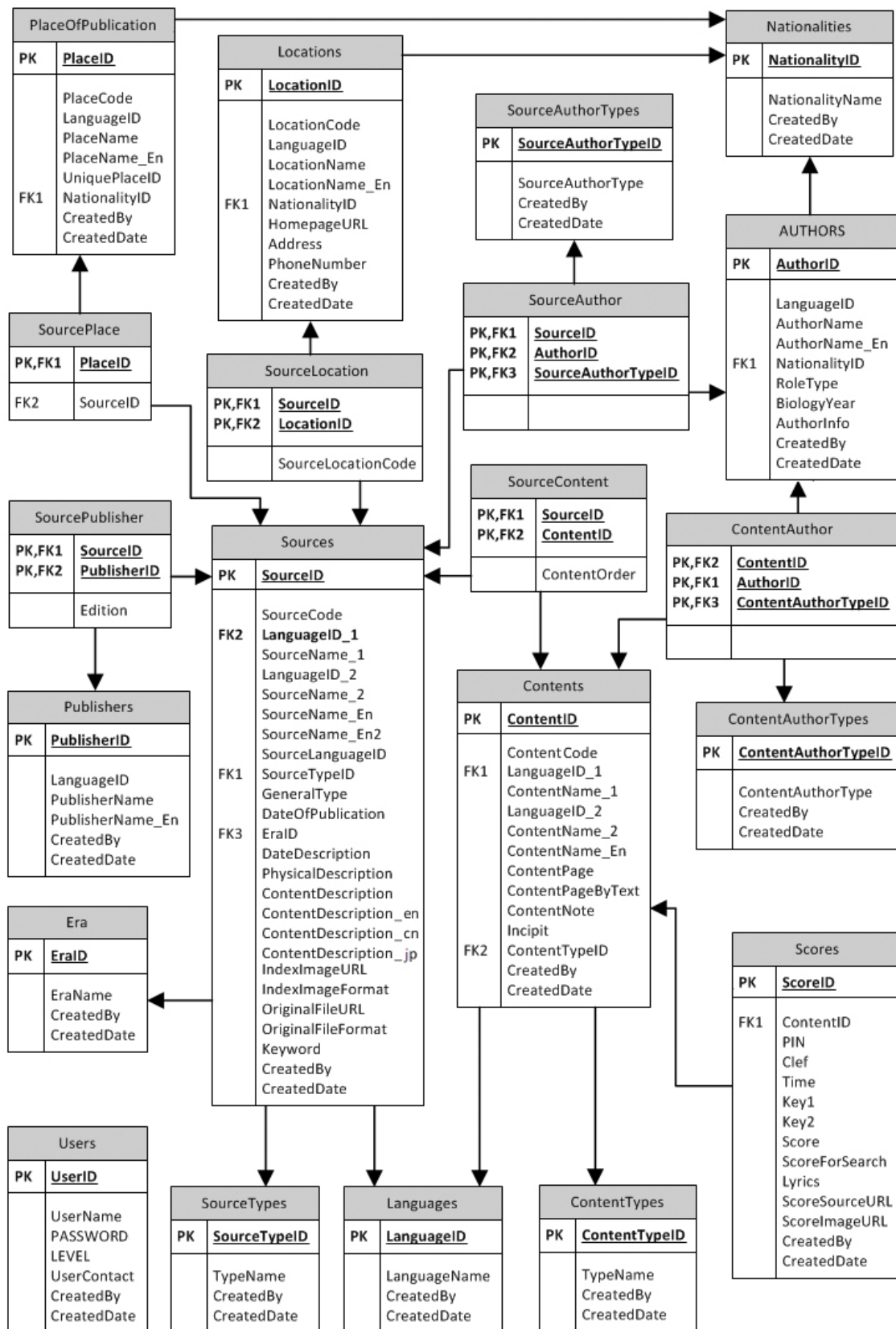


Figure 3. The schema diagram of EMDb

### 3. Incipit Search

The most distinctive technology of EMDb is the implementation of incipit search. In the case of sheet music, which accounts for the largest portion of the primary data in music, search is limited if the searcher does not know the name of the composer or editor, or the title of the music work. As one would in the conventional literature information system, the searcher, then, would need to use additional search items, such as genre and year. Subsequently, there is a procedural hassle of entering search words for the subcategories in several steps, which in many cases, does not necessarily lead to a satisfactory result.

EMDB uses a technology that searches scores with the input of alphabets of initial pitches (incipit) of music. Even if the searcher does not know specific information such as the exact title or lyrics, entering the notes of the melody in the search box can retrieve Korean, Chinese, and Japanese songs that include those notes in common. From the search result, one could derive common or distinct characteristics in the music culture.

Musical incipits typically feature the first few bars of a piece with the most prominent musical material written on a single staff. To register the music score information notation, LilyPond2, a computer music-engraving program, was used, which produces high quality scores automatically. Figure 4 shows the register screen using LilyPond.

Follow the dream (꿈을 따라)

PIN: c  Clef: Treble  TIME: 3/4  Key: d  minor

Incipit(Code): `\tempo "Andantino" \dynamicUp \autoBeamOff  
\compressFullBarRests R2.*1 a4^"dolce." \< d e! f( \times 2/3{f8} e d}  
\times 2/3{ f8 e d} d2\> c4! ef8 g, ef'4 d8 cs d4.\< d8 c!8. bf16! a4  
\>(\ \autoBeamOn \times 2/3 {a8} ( bf! c! ) \times 2/3 {bf8 c d\!}) a2.`

Lyrics: `\addlyrics {그 리 워 어 엽 분 그 님 의 자 태 내 홀 로 꿈 속 에 _ 맞 나 보 - 니 }`


Andantino dolce.

그 리 워 어 엽 분 그 님 의 자 태

내 홀 로 꿈 속 에 맞 나 보 - 니

Figure 4. The register screen using LilyPond

Below is the result of an incipit search using the pitch information, GCCCEDCDECCEGA (solmization: sol-do-do-do-mi-re-do-re-mi-do-do-mi-sol-la), of the Scottish folk song “Auld Lang Syne,” which was sung as the national anthem in the modern era in Korea. Figure 5 shows incipit search screen with total search results.



EWHA MUSIC DATABASE

HOME

Search

Advanced Search

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### Refine Results

Type of Source

Type of Music

- Vocal Music (33)
- Instrumental Music (2)

Source Location


- China (17)
- Korea (12)
- Japan (6)


Author


- 沈秉廉 (3)
- Robert Burns (3)
- 王元振 (1)
- 大和田氏 (1)
- 許地山 (1)
- more...


Publication Date


- 1881 (1)
- 1905 (2)
- 1906 (1)
- 1914 (1)
- 1917 (1)


 **1 Auld Lang Syne**  
 中外學校唱歌集 (中等以上學校用書) (1923)


 **2 Shanghai Team Song**  
 中外學校唱歌集 (中等以上學校用書) (1923)

 **3 ホタルノヒカリ**  
 (京城師範學校音樂教育研究會編) 初等唱歌 第二學年 (1935)

 **4 ホタルノヒカリ**  
 (京城師範學校音樂教育研究會編) 初等唱歌 第一學年 (1935)

 **5 作別曲**  
 二十世紀新青年 修養唱歌集 (1928)

 **6 你能忘記舊時的朋友麼?**  
 역사  
 初中模範唱歌教科書 第一冊 (1934)

 **7 別れの歌**  
 Lyricist: 大和田氏  
 尋常 小學唱歌 第三學年 下 (1906)



 **8 別れの歌**  
 唱歌教材選集 (筆記代用) (1924)

Figure 5. The incipit search screen (total search results)

Figure 6 shows the incipit search screen with the search result of Korean song ‘Music of Farewell.’




EWHA MUSIC DATABASE

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### 作別曲

Romanized Title (Title in English)	chakpyŏlgok (Music of Farewell)
Contents	<a href="#">二十世紀新青年 修養唱歌集</a> Type: Vocal Music List Number : 24 Page Number : 26

### Scores



무 정 세 월 여 류 하 야 오 날 이 곳 에 사 랑 중 에 친 구 를 애 처 름 게 리 - 별

Figure 6. The incipit search screen (search result: Korean song ‘Music of Farewell’)

Through the incipit search, melodies with the same notes are searched in the database of Korean, Chinese, and Japanese songs. As shown in the left screen of Figure 5, refined search shows that the type of music, source location, author, and publication date are retrieved all at once. The result shows how this can be used as an optimal research tool when analyzing the structure of the music materials and tracing the cultural linkage.

EMDB's incipit search technology has received a patent in Korea in 2015. *Title of the Patent: MUSIC CLASSIFYING METHOD BASED ON MELODY AND RECOMMENDATION METHOD OF MELODY BASED ON MUSIC DATABASE* [10].

## 4. Conclusion

By developing a unique information system for primary music source, EMDb established a foundation for research of modern music culture for Korea and East Asia from a more macroscopic perspective. EMDb effectively enabled comparison between East Asian music materials not only through a simultaneous search of materials from Korea, China, and Japan but also through incipit search that subdivides and diversifies search conditions. As a result, the formation and exchange of music culture in each country, as well as the differences in their cultures, can be discovered. Therefore, we have established the first music database that suggests a new direction of research for East Asian music.

Along with the establishment of EMDb, Ewha Musicology with HK [Humanities in Korea] Music Research Institute was appointed as a Korean branch of the International Association of Music Libraries, Archives and Documentation Centers (IAML) and Répertoire International des Sources Musicales (RISM) in November 2014 and March 2015, respectively, and has been playing a central role in building international music archives and researching music culture.

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