Learning Lessons from Natural Disaster: Visualizing and Understanding Digital Archives for Great Earthquake in Eastern Japan

Akinobu Nameda[*], Kosuke Wakabayashi[**], Takuya Nakatsuma[***], Tomomi Hatano[****], Shinya Saito[*****], Mitsuyuki Inaba[******], Tatsuya Sato[*******]

Abstract

The social significance of digital archives is not only preserving cultural assets but also inheriting socially useful knowledge to the next generations. After the Great Earthquake in Eastern Japan, digital archives are becoming increasingly important as a means of succeeding collective memory and lessons learned from the natural disaster. The point here is that how we can create and develop the archives that the information including experiences and lessons on natural disasters is preserved for people in the future society as well as the present days. In discussing the ways that information in archives is effectively displayed, the present study explores a frame of the archives useful for the future and present society.

We created a digital archive with 3D visual interface by using the data from the questionnaire survey conducted by Kashima city in Eastern Japan. The questionnaire survey was on people's experiences after the earthquake in city and what they require in the present and future. Free responses to the questionnaire survey were put into KACHINA CUBE (KC) system that allows us to store textual information and display it in virtual 3D space. The textual

[*] Ph.D. Student, Center for Law and Psychology, Ritsumeikan University, Japan. E-mail: lt106038@ed.ritsumei.ac.jp.
[**] Research Assistant, Center for Law and Psychology, Ritsumeikan University, Japan. E-mail: kwakaba@fc.ritsumei.ac.jp.
[***] Ph.D. Student, Center for Law and Psychology, Ritsumeikan University,Japan. E-mail: t.nakatsuma@gmail.com.
[****] Lecturer, Center for Law and Psychology, Ritsumeikan University, Japan. E-mail: y0300528@pl.ritsumei.ac.jp.
[*****] Lecturer, Digital Humanities Center for Japanese Arts and Cultures, Ritsumeikan University. Japan. E-mail: ken@arc.ritsumei.ac.jp.
[******] Professor, Digital Humanities Center for Japanese Arts and Cultures, Ritsumeikan University, Japan. E-mail: inabam@arc.ritsumei.ac.jp.
[*******] Professor, Center for Law and Psychology, Ritsumeikan University, Japan. E-mail: satot@lt.ritsumei.ac.jp.

information that was put into KC was organized by time and space. In other words, KC had a geographical map of Kashima city having numbers of districts on the bottom of the cube and time line including three time periods on the vertical.

The archive by using KC could allow us to separately look at the information of happenings immediately after the earthquake, experiences of evacuation and at evacuation centers, recovery process of infrastructure, and distribution of foods and goods supply. We could also learn lessons by using the searching function. For example, when putting the search word “tsunami” in the search box of the archive, we found that not only the descriptions of happenings on tsunami but also those of the requirements could be seen in places such as Namino, Hirai, and Takamatsu districts.

On the one hand, with the use of the information archive that we created, it could be useful for local government to overlook and understand what happened and what is required in what districts in city, in terms of the earthquake. On the other hand, showing the information of disaster experiences that was organized by districts in the archive is not concrete enough for local people. There is still room for discussions to improve archive on natural disaster.

Keywords: Visualization, Digital Archive, Disaster Archive, The Great East Japan Earthquake, Learning Lessons

從自然災害汲取教訓：
東日本大地震數位典藏資料之視覺化與知識化

滑田明暢[*]、若林宏輔[**]、中妻拓[***]、破田野智己[****]、齋藤進也[*****]、

稻葉光行[******]、佐藤達哉[*******]

摘要

數位典藏之社會意義在於保存文化資產，傳承具社會效益之知識。自東日本大地震發生以來，數位典藏因能保存集體記憶和天災紀錄，使其重要性與日俱增。有鑑於此，本文之重點，著重於如何在數位典藏中記錄天災所帶來的經驗與教訓，作為當今社會與後人之借鏡。藉由探討數位典藏資訊之有效呈現方式，試圖尋找對現今與未來社會有用的數位典藏模式。

本研究利用東日本鹿嶋市(Kashima)之問卷調查結果，建構具 3D 視覺化介面之數位典藏系統。問卷詢問受試者在災後之體驗和當下、未來生活之所需，問卷結果依其時空屬性，以文字形式儲存於 KACHINA CUBE (KC)網路平台，並可於虛擬 3D 空間呈現；也就是在 KC 平台上，其底部為涵蓋許多小地區鹿島市地圖，縱軸上則有包含三個時段的時間序列。

透過 KC 平台，使用者可於本資料庫分別檢視災後事件、疏散過程、避難中心之經歷、基礎建設重建狀況、糧食物資之供應與分配。欲了解災變相關訊息，亦可使用資料庫搜尋功能，如於搜尋框鍵入「tsunami」(海嘯)，可得海嘯相關事件之描述，以及波野(Namino)、平井(Hirai)、高松(Takamatsu)等地區符合搜尋條件的相關資料。

本資料庫可供地方政府鑑往知來，了解市內各區因應震災之不同需求。然而，以地區分類呈現災難資訊之方式，對當地民眾仍欠缺實用性，

[*] 日本立命館大學法律心理中心博士生，E-mail：lt106038@ed.ritsumei.ac.jp。
[**] 日本立命館大學法律心理中心研究助理，E-mail：kwakaba@fc.ritsumei.ac.jp。
[***] 日本立命館大學法律心理中心博士生，E-mail：t.nakatsuma@gmail.com。
[****] 日本立命館大學法律心理中心講師，E-mail：y0300528@pl.ritsumei.ac.jp。
[*****] 日本立命館大學日本文化與藝術數位人文研究中心講師，E-mail：ken@arc.ritsumei.ac.jp。
[******] 日本立命館大學日本文化與藝術數位人文研究中心教授，E-mail：inabam@arc.ritsumei.ac.jp。
[*******] 日本立命館大學法律心理中心教授，E-mail：satot@lt.ritsumei.ac.jp。

因此未來相關天災資料庫仍有進步的空間。

關鍵字：視覺化、數位典藏、災害紀錄、東日本大地震、教訓