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An Online Service Encouraging Museum Visitors to Learn Related Research Fields

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Abstract: In recent years, museums, such as zoos and science museums, have provided many learning programs and considerable information on exhibited items and animals. Despite enhancing visitors' interest in the related research fields through the exhibitions, it is difficult to lead visitors to learn about related research fields more deeply after their visit. Meanwhile, much of the learning content in the related fields is provided online through various platforms, such as MOOCs (Massive Open Online Courses). In this research, we discuss our design and the development of an online service "Gateway to Field," which encourage museum visitors to learn existing online learning content through the gateway provided by the exhibited items and animals. Specifically, visitors record their interest in specific items and animals with their mobile devices and the learning content of related research fields will then be recommended automatically to them.

Keywords: Museum, MOOCs, Mobile learning, STEM

1. Introduction

The purpose of museums, such as zoos, aquariums, and science museums, is to educate the general public as well as to preserve different species and exhibited items. For example, according to the Association of Zoos and Aquariums (AZA), AZA-accredited zoos and aquariums enhanced the public's understanding of wildlife and the need to conserve the places animals live and visitors believe zoos and aquariums play an important role in conservation education (AZA, 2018). At museums, staff present explanation panels on each exhibited animal and item, and the curator and relevant professionals present learning programs. Reading explanation panels, joining educational programs, and touching exhibited items and animals is very useful for enhancing visitor's interest not only in the exhibits but also in the related research fields. For example, in the case of an aquarium with a dolphin demonstrating the theme "How can dolphins swim so fast?" the theme is connected not only to the animal's behavior, but also to various fields such as physics, the theory of evolution, and robotics (Figure 1). Thus, the exhibited items and animals work as a gateway to enhance visitor's interest in related research fields.

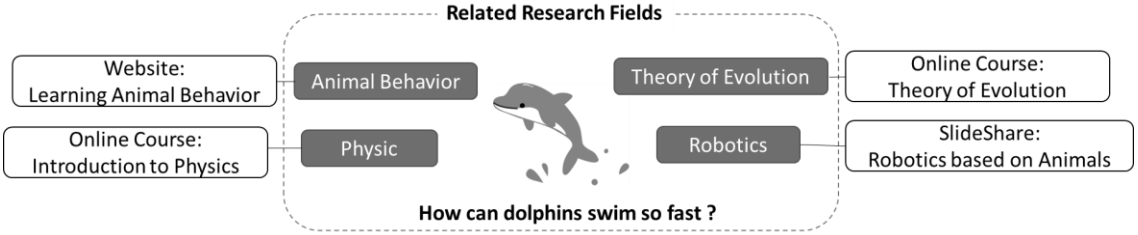

Figure 1. Related fields and learning contents to "How can dolphins swim so fast?"

In various research fields considerable online learning content already exists, such as "Astrophysics: Cosmology" provided by the Australian National University on edX, and "The Earth in My Pocket: An Introduction to Geology" offered by The Open University on FutureLearn. Most learning content is offered for free and visitors can use it to learn in greater depth after visiting the museum.

Although museum visitors enhance their interest in related research fields through viewing the exhibited items and animals, and hearing explanations from museum staff, it is difficult for them to find out more about associated research fields and spontaneously learn more about them; this is because identifying related research fields and the appropriate learning content by oneself may be difficult even when one has acquired an interest in the exhibited items and animals. Therefore, in this research, we discuss our design and ongoing development of an online service that encourages visitors to learn about the appropriate online content through the exhibit itself.

2. Design and Development of the Online Service "Gateway to Field"

2.1 The Object and Components of This Service

In this research, we designed and are developing an online service called "Gateway to Field" in which visitors record their interest in exhibited items and animals with their mobile devices; the learning content of related fields will then be recommended automatically through the service as shown in Figure 2. By using this service, visitors will be able to find appropriate learning content after visiting museums to deepen their interest and knowledge of various points. Several mobile applications already exist that provide detailed information on exhibited items (Smithsonian, 2016) and animals (Tokyo Parks Navi, 2016). However, most applications provide only detailed information on the exhibited items and animals themselves and cannot stretch to leading the visitors' learning after the visit such as recommending online courses.

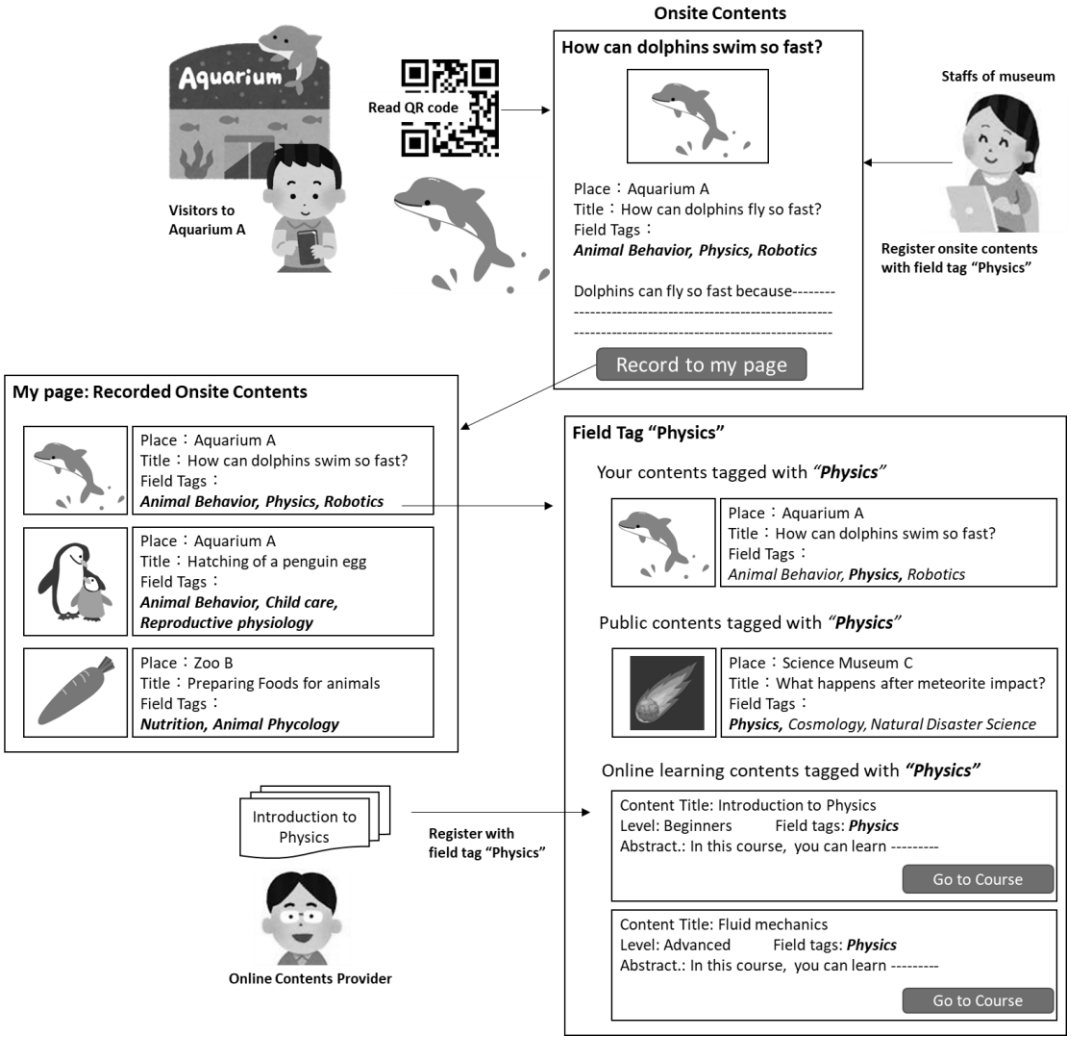

Figure 2. An image in "Gateway to Field."

We are developing the service in PHP and Laravel (the PHP framework for developing web service), and Bootstrap to adjust both PC and mobile devices.

2.2 How Museum Staff Can Make Onsite Content

The museums' staff can create onsite content (e.g., how can dolphins swim so fast?) for each exhibited item and animal in this service. To make the onsite content, staff need to register place (the museum's name) and title, and either create or select tags from a list of research fields, such as physics and robotics. After making the onsite content, a QR (Quick Response) code will be provided automatically from the online service and staff can introduce the QR code to museum visitors.

2.3 How Learning Content Provider Can Register Online Learning Content

The provider of the online learning content can register any content such as online courses, presentation files, or blogs. To identify the learning content, meta-information such as title, level (beginner/middle/achieved), summary, field tag, and the link of the learning content should be registered. Registered content and meta-information will be shown automatically to online service users whose registered items and animals from the exhibit have the same field tag as the learning content.

2.4 How Visitors Can Use the Online Service

Museums visitors can read the QR code of exhibited items and animals they are interested in and register the contents. Registered contents will be shown on the service with field tags. Based on the field tags, related learning content, such as the online courses provided by MOOCs, will be automatically recommended and visitors can choose the appropriate learning content by checking its level and abstract.

3. Future Study and STEM Education

In future research, we plan to continue developing the service and its use in museums as part of a formative evaluation from both qualitative and quantitative perspectives. After the evaluation, we will publish this service so that anyone can use it for free. And it must be valuable to connect the service with social media such as LINE and Facebook messenger to enable visitors to get onsite contents in the chatbot.

Furthermore, the service is expected to be useful for STEM (Science, Technology, Engineering and Mathematics) education. There already exists various attractive online courses for STEM fields and need to increase the number of STEM graduates. Therefore, it is important to enhance interest in STEM and encourage learning using exhibited items and animals in museums as a gateway to further learning even if for visitors who are not interested in museums.

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