

Supporting Science Communication in a Museum using Ubiquitous Learning Logs

Hiroaki Ogata
Kyushu University
744 Motoooka, Nishi-Ku
Fukuoka, 819-0395, Japan
+81-92-802-5875
hiroaki.ogata@gmail.com

Kousuke Mouri
University of Tokushima
2-1 Minamijosanjima
Tokushima, 770-8506, Japan
+81-88-656-7497
bono@nii.ac.jp

Mayumi Bono, Ayami Joh
National Institute of Informatics
2-1-2 Hitotsubashi, Chiyoda-ku
Tokyo, 101-8430, Japan
+81-3-4212-2534
bono@nii.ac.jp

Katsuya Takanashi
Kyoto University
Yoshidahonmachi, Sakyoku,
Kyoto, 606-0851, Japan
takanasi@ar.media.kyoto-
u.ac.jp

Akihiko Osaki, Hiromi Ochiai
National Museum of Emerging
Science and Innovation
2-3-6 Aomi, Koto-ku
Tokyo, 135-0064, Japan
a-osaki@miraikan.jst.go.jp

ABSTRACT

This paper proposes how to enhance sharing knowledge among science communicators (SCs) in a museum. Our approach is to use SCROLL system to share learning log, which is defined as a digital record of what learners have learned in the daily life using ubiquitous technologies. One of the important skills of SCs is to create mutual communication with visitors and motivate them to know more. However, they have to acquire this skill from the daily experiences because this skill is not shared among SCs. Also, this skill is not easily taken over because the employment term of SCs is 5 years. In this situation, SCs registers learning logs into SCROLL and their activities are also recorded into video. They have a reflection session using learning logs and video in a week. Both interaction analysis by the expert and data analysis using SCROLL are combined.

Keywords

Science communication, ubiquitous learning logs, museum.

1. INTRODUCTION

Ubiquitous Learning Log (ULL) is defined as a digital record of what learners have learned in the daily life using ubiquitous technologies[2]. It allows the learners to log their learning experiences with photos, audios, videos, location, QR-code, RFID tag, and sensor data, and to share and to reuse ULL with others. Using SCROLL, they can receive personalized quizzes and answers for their questions. Also, they can navigate and be aware of their past ULLs supported by augmented reality view. SCROLL has been used for overseas students learning Japanese, and for Japanese students learning English. Also, seamless learning was conducted using SCROLL in English as the second language course[3].

This paper describes how SCROLL can be used in a science museum, called Miraikan in Tokyo. There are science communicators in Miraikan so that they can link scientists/engineers with the general public. When a SC communicates with a visitors, just an explanation of the

technology is not good. One of the important skills of SCs is to create mutual communication with visitors and motivate them to know more. However, they have to acquire this skill from the daily experiences because this skill is not shared among SCs. Also, this skill is not easily taken over because the employment term of SCs is 5 years [1]. Therefore, SCROLL can be applied to capture SCs' skill, share and reuse them for educate SCs.

2. Learning Logs in Miraikan

Miraikan is the National Museum of Emerging Science and Innovation in Tokyo, which is a new type of science museum that links people directly with the new wisdom of the 21st century. At the heart of Miraikan's activities is cutting-edge science and technology. This is state-of-the-art knowledge and innovation, which Miraikan aims to share with the whole of society as part of an enriched human culture.

The role of science communicators in Miraikan is to link scientists/engineers with the general public. They create mutual communication between science and society through activities such as providing demonstrations and explanations on the exhibition floors, planning or producing media, events and exhibits as they investigate the trends behind cutting-edge science and technology research. Miraikan also conducts training programs for external personnel working as science communicators, in order to promote interactive communication between citizens, and scientists and engineers. There are about 50 SCs in Miraikan, who have a variety of background such as engineer, news reporter, and medical staff.

SC has a paper-memo, which includes visitor's information such as date, place, gender, and the number of the group. Also it includes how to start the communication, and what was told with the visitors. These information is crucial to remind the context of the communication. These items are stored in SCROLL as a learning log using mobile devices. In addition, the level of interactivity and the level of explanation are added. The higher the level of interactivity is, the better the interaction is. Using a mobile tablet or smartphone, SC inputs data shown in figure 1. SCs also can share the data as shown in figure 2 using SCROLL.

Actually, the quiz function is not used in SCs. Instead of quiz, they have a reflection session per a week or so.



Figure 1. SC and visitors. Figure 2. SCROLL mobile interface.

The interactions between a SC and visitors are recorded into video. In reflection meeting (fig 3), SCs discuss about the video with interaction analysts (IA) and engineers. Also the learning logs stored in SCROLL are referred in the reflection session at the same time. The IAs create the interaction scripts from the video in order to analyze the contents of the video (fig 4), and find important interactions and gestures. For example, IA pointed out that the standing point of the SC, check the availability of the next showcase, and management of time of visitors are very important at the beginning of the interaction with visitors. Especially, the beginning of interaction are highly significant to attract visitors and to make them want to know more. Therefore, the reflection meeting is essential to integrate the results from quantitative analysis using SCROLL and the results of qualitative (micro and content) analysis.



Figure 3. Reflection meeting.

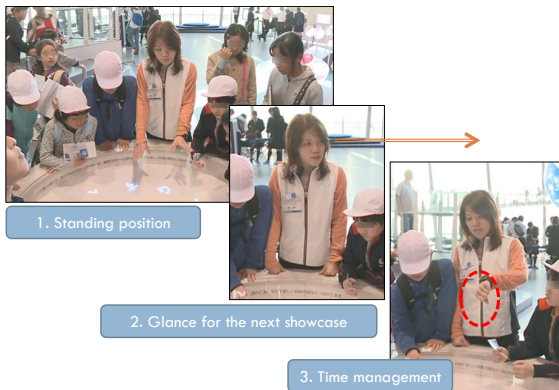


Figure 4. Video analysis.



Figure 5. Learning log in SCROLL. Figure 6. Data analysis.

As of Jan 2014, 28 SCs have stored 580 data in SCROLL (figure 5). SC can analyze them by selecting an attribute of data such as the level of interactivity as shown in figure 6.

3. Conclusion and Future Works

This paper describes a learning log system called SCROLL. This paper also proposes how to support science communicators in a science museum by using SCROLL, and shows the role of ULL to integrate the quantitative and qualitative analysis. In the future works, we will conduct a long time evaluation in Miraikan in Tokyo and create a guideline for SCs.

ACKNOWLEDGMENTS

This research work was supported by JST PRESTO, and the JSPS Grant-in-Aid for Scientific Research No. 25282059, 25540091 and 21650225 from the Ministry of Education, Science, Sports, and Culture in Japan.

REFERENCES

- [1] Bono, M., Ogata, H. et al. (2013). Science Communicators as Knowledge Interface, IPSJ SGI HCI, 2013-HCI-151-22.
- [2] Ogata, H. et al. (2011). SCROLL: Supporting to Share and Reuse Ubiquitous Learning Log in the Context of Language Learning, RPTL, Vol.6, No.2, pp.69-82.
- [3] Uosaki, N., Ogata, H., Li, M., Hou, B. and Mouri, K. (2013). Guidelines on Implementing Successful Seamless Learning Environments: a Practitioners' Perspective, International Journal of Interactive Mobile Technologies, Vol.7, No.2, pp.44-53.