Optimization of Personalized Content Providing Function for Adult Learners with Diverse Backgrounds

Chikako NAGAOKA[a*], Masako FURUKAWA[a*], Yuan SUN[a*], & Kazutsuna YAMAJI[a*]
[a]*National Institute of Informatics (NII), Japan*
*nagaoka@nii.ac.jp

Abstract: The skills required in relation to the same topic can differ depending on learner's attributes such as job and preference. For example, when training on research data management for staffs in universities and research institutes, the skills needed differ depending on the learner's jobs, such as researchers, research administrators, and IT technologists. In the past research, we developed a Moodle plug-in that provides learning contents and quizzes optimized for each learner's job and preference dynamically. In this research, we further enhance this plug-in to register skills retrieved from the skill repository and support learners selecting learning contents based on their preference.

Keywords: Skill Development, Skill Repository, Moodle Plug-in, LMS, Personalized learning, Research Data Management

1. Introduction

In recent years, there have been an increasing number of opportunities for working adults to relearn new skills through reskilling and recurrent education programs (MEXT, 2022) in Japan. According to the theory of andragogy by Knowles (2015), adult learners generally become ready to learn when their life situation creates a need to know (readiness to learn). Therefore, the skills required for adult learners may vary significantly because different learners have different life situations such as jobs in the workplace even if they need to learn the same topic. However, it is difficult to prepare all the courses according to learners' jobs. Furthermore, even if courses on all jobs are developed, if a single learner studies courses on multiple jobs at the same time, time will be wasted due to duplication of learning content between courses. Our institute has developed various learning courses to learn "Research Data Management (RDM)" for faculty staffs in universities and research institutes in Japan, but RDM learners have a variety of occupations and required skills, and learning content needs to be provided in a flexible manner.

To avoid the creation of various learning courses and duplication of learning contents, it is desirable for learning content to be dynamically organized and provided to learners according to the skills required for the learner's jobs and preference. With Moodle, the learning management system, it is possible to display learning activities only to specific learners by using a feature called restrict access (Moodle, n.d.). However, the lack of the concept of skills reduces flexibility and teachers need to connect learners and learning activities manually.

2. Basic Function of Personalized Content Providing Function Developed in The Past Study

In the past study (Nagaoka et al., 2023), we developed a function that links skills, quizzes to check skill acquisition, and learning content that enables users to learn the knowledge necessary to pass the quizzes. Furthermore, we then developed a function that

dynamically generates personalized page which shows quizzes and learning contents according to the learner's job associated with the learner (Figure 1 and 2).

The personalized content providing function developed in the past research (Nagaoka et al., 2023) consists of three main functions: (1) skill registration function that links all possible skills that may be presented to learners with learning content and quizzes for learning those skills, (2) user attribute registration function that links learners with the job, and (3) user content providing function that displays only the learning content and quizzes related to the skills needed by the learner in a tabular format.

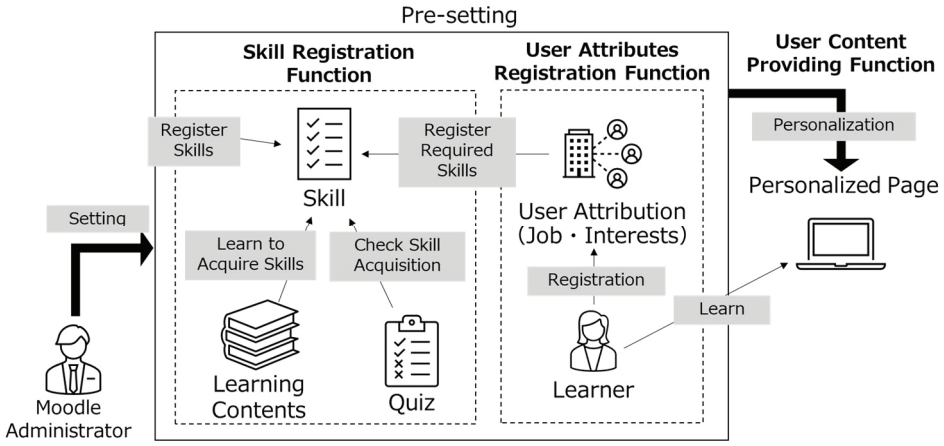

Figure 1. The personalized content providing function (Nagaoka et al., 2023).

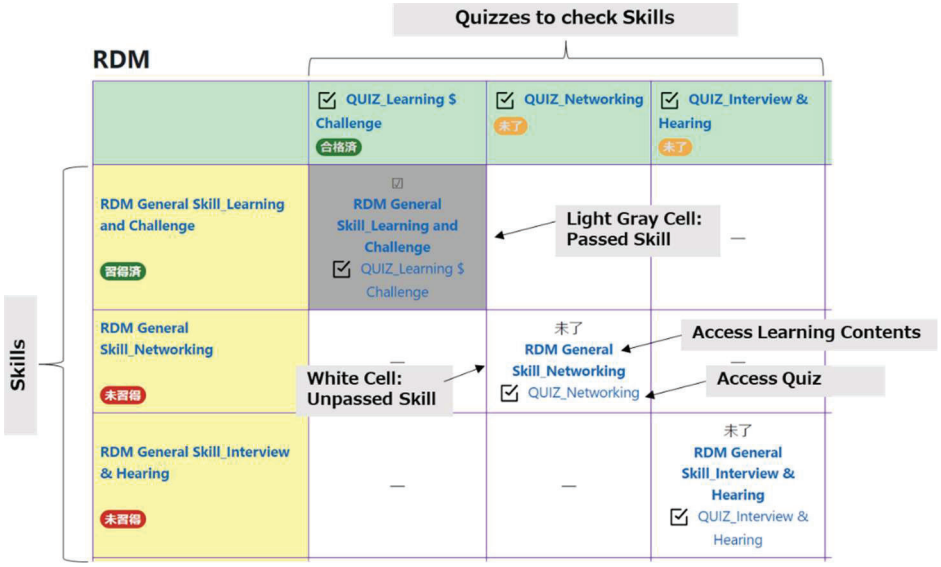

Figure 2. Automatically generated page by personalized content providing function (Nagaoka et al., 2023).

3. Additional Functions of Personalized Content Providing Function Developed in The Present Study to Use in RDM Context.

Our past research (Nagaoka et al., 2023) has established the basic function for providing learners with optimal learning content. However, there were two features that were missing to use this system in RDM: (1) the function for learners to select skills by themselves, and (2) the function to register skill data retrieved from skill repositories.

3.1 The function for learners to select skills by themselves.

On the system which we developed in the past study, only Moodle administrators (LMS administrators) can link learner's attributes and skills. However, when using this system for RDM learning, there was a possibility that learners need to learn skills other than those

assigned to their own jobs depending on their own interests and circumstances such as department movement. Especially in smaller organizations, the range of skills that a single staff should learn considered to be wide and flexibility is required to choose skills. Therefore, we developed a function that allows learners to select the skills which they want to learn.

3.2 The function to register skill data retrieved from skill repositories.

In the past study, Moodle administrators register skills one by one, manually. However, in recent years, a system for sharing skills has been developed. For example, 1EdTech (n.d.a), which provides technical standards for education-related systems, offers the Competencies and Academic Standards Exchange (CASE) as a standard for skill sharing systems. Based on this standard, the IMS Case Provider (1EdTech, n.d.b), a repository for sharing skills, has been published. In this research, we developed a function that allows Moodle administrators to register skills to Moodle with JSON data format retrieved from the WEKO3 repository system (Research Center for Open Science and Data Platform [RCOS], n.d.), which used as the skill repository to share and update skills in this research. By using this function, we can register and update skills on the repository and register latest skill data to Moodle.

4. Future Works

This paper detailed the characteristics and additional functions of the content providing system. One future work of this study is the consideration of how to integrate this system with the skills repository. Since skills on the skill repository can be constantly updated, it is necessary to consider how to reflect the updated skills in the Moodle side. For example, we can use or develop an API to obtain information, so that the skill repository side and the Moodle side always synchronize skills. In addition, it is necessary to consider whether we should customize the skill repository system to adjust standards such as 1EdTech's CASE.

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