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Mobile Educational Learning Using Qr Based U-Learning for Personalized Tutoring

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Abstract: M-learning is learning process across multiple contexts, via social and content interactions with personal electronic devices like handheld computers, MP3 players, Mobile phone and tablets. M-learning focuses on the mobility of the learner interacting with portable technologies. This mobile learning model provides a new delivery mechanism to overcome time and space limitations of traditional classroom learning. QR Code handles several dozen to several hundred times more information. QR Code is capable of handling all types of data, such as numeric and alphabetic characters, Kanji, Kana, Hiragana, symbols, binary and control codes. CCDS (Course Content delivery system) is a useful tool to motivate students learning during outdoor teaching activities. Moreover, results of the IMMS (Instructional Materials Motivation Survey) questionnaire indicated that students assigned to the proposed u-learning system achieved better results than participants learning via conventional methods. That the proposed u-learning system is advantageous because it enhances student motivation and allows for higher levels of engagement, particularly during outdoor learning activities.U-learning system can create a learning experience that engages students with interest.

Key words: QR-Code · U-Learning · CCDS

INTRODUCTION

The concept of context-aware ubiquitous learning (u-learning) is identified as a novel learning environment [1] through which students can be taught appropriate content at the right time and in the right place. This novel learning environment can detect contextual information in the real world and adapt accordingly to provide customized learning content through mobile devices in response to different learning con-texts or situations. The potential use of QR code technologies in an educational context has been investigated quite recently. This system allows students to generate QR codes and download related learning materials directly onto their mobile devices. All of these studies reveal the vast potential of applying QR code technologies in support of educational applications as an innovative teaching tool.

QR Code is a form of 2D bar codes was developed by Denso-Wave, a Japanese automatic data capture equipment company (Denso, 2009), in 1994. "QR" (Quick Response) which is readable by moderately equipped mobile phones with cameras and QR scanners. Information such as URL, SMS, contact information and plain text can be embedded in the two dimensional matrix. With smart phones, One can visit the Website linked by the URL quickly, send the SMS message directly or save the contact information to the address book easily. In Japan, this format of 2D bar codes and it emerges gradually around the world because (a) the patent right owned by Denso Wave is not exercised, (b) its specification is disclosed to the public by the company so as the specifications, ISO/IEC 18004:2000&2006 (International Organization for Standardization) and JIS X 0510 (Japanese Industrial Standards), can be formed (ISO, 2010; JISC, 2010) and (c) it has a large data capacity in a small printout size and high speed scan utilities via mobile devices are readily available. A QR code is capable of holding 7, 089 numeric characters, 4, 296 alphanumeric characters, 2, 953 binary bytes, 1, 817 Kanji characters or a mixture of them. The data capacity is much higher than other 2D codes such as PDF417, Data Matrix and Maxi Code. It stores information in both vertical and horizontal directions. A QR code can be read even it is somewhat distorted by either being tilted or on a curved surface by alignment patterns and timing patterns. The error correction capability against dirt and damage can be up to 30%. A linking functionality is possible for

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a QR code to be represented by up to 16 QR codes at maximum so that a small printing space is possible. The size of a QR code can vary from 21x21 cells to 177x177 cells by 4 cell- increments in both horizontal and vertical direction. Data can be easily encrypted in a QR code to provide a confidentiality of information embedded in the code. It can also handle various languages. For examples, there are a number of standards adopted by Asian countries like GB/T 18284 by Chinese National Standard in 2000, KS- X ISO/IEC 18004 by Korean National Standard in 2002 and TCVN7322 by Vietnam National Standard in 2003.

Ease of Use

Using CCDS for Teaching Activities: The Social Influence factor indicated that the teachers believed that it was important how others encouraged and promoted them to use CCDS in the planning of their course content. In general, the Facilitating Conditions factor revealed that teachers were confident enough in their abilities and skills to be proficient in using the CCDS. The teachers can positively use the CCDS in creating an ideal context-aware u-learning environment. In addition, a majority of the teacher's surveys indicated that the proposed u-learning system could be helpful in motivating students' learning and attract students' attention. With sufficient practice and preparation, teachers can become confident in using CCDS as an effective content delivery system that motivates students in the learning process [2].

Using the Context-aware U-Learning System for Students' Learning Motivation: The learning content presented by the proposed u-learning system was crucial and relevant to students' learning interests and expectations. This novel learning method was able to give students confidence that allowed them to learn the required instructional [3] content using the proposed u-learning system and further encouraged participants to complete the learning tasks. Several students indicate that they achieved high levels of concentration when performing the learning tasks through the use of u-learning system. This u-learning system could potentially support students in memorizing and understanding the necessary content required by the course objectives.

Existing System: Electronic learning (e- learning) is used to access the learning content using desktop computers. But the limitation with e-learning [4] is its immobility. Mobile learning (m-learning) is an advanced stage of e-learning in which the learner is equipped with handheld mobile device to access the learning content using various wireless technologies. M-learning [5, 6] provides mobility, but it is not context sensitive. A new mode of learning mechanism called ubiquitous learning(u-learning) is context aware and also provides learning content anywhere, anytime using various mobile devices and sensor technologies. The real challenge [7] in u-learning is the delivery of learning content to mobile devices depending upon surrounding context. Context plays an important role in delivering the right content to the right person, in the right place and at the right time. Two different models such as RFID-based content presentation and location-based services (lbs) using RFID are used to implement the usage of RFID for u-learning.

The radio-frequency identification (RFID) technique has spurred the advancement of context-aware u-learning environments. With the help of the RFID technique, u- learning systems can detect and record students' learning behaviors in the real world and enables students to learn content found in the real world "actual space" rather than in cyberspace. Most of the teachers no sufficient programming knowledge and they lack coding skills to develop and execute the RFID technique. It is not uncommon for educators to face a number of issues when working with RFID systems, particularly when dealing with the complexities of RFID tag production. This is because RFID tags cannot be printed using traditional printers.

Proposed System: Ubiquitous learning is defined as the learning anywhere, anytime and is closely associated with mobile technologies. Traditional lines between formal and informal learning are blurred by the portability of computers and computing devices. Quick Response (QR) Code is capable of handling several dozen to several hundred times more information. QR Code is capable of handling all types of data, such as numeric and alphabetic characters, Kanji, Kana, Hiragana, symbols, binary and control codes. Quick Response (QR) codes in conjunction with a context- aware u-learning system, which allows teachers to create customizable context- aware u-learning materials with-out expert assistance. The integration of QR codes can connect users to information quickly and easily, while the low technical barrier of creating u-learning educational materials along with easy accessibility to code readers allows teachers to build modern learning environments without hassle. As QR code-Decrypting software is practically available on most mobile devices, QR codes have become increasingly popular and widely used in mobile learning applications.

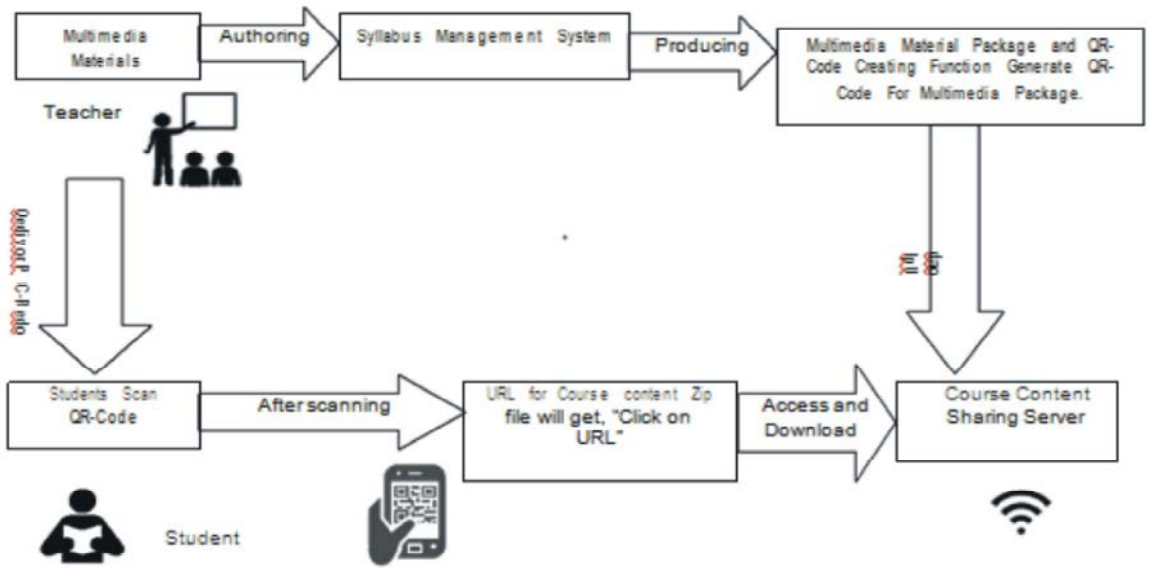

Fig. 1: Over all system Architecture for CCDS/

The overall system architecture diagram of CCDS is shown in Fig. 1. In the class room, the integration of u-learning (ubiquitous learning) [8] has been recognized as a novel teaching method, through which students can interact with real-world problems via an enhanced learning environment. However, many teachers do not have sufficient programming knowledge and often lack necessary coding skills to create their own context-aware u-learning environments. Thus, CCDS was designed specifically to support teachers in developing u- learning materials using its three sub-systems: the Syllabus Management System, the Course Content sharing server and the context-aware u-learning system.

Through CCDS, teachers can produce unique teaching content and share u-learning materials with their counterparts. The goal of this system is not only to support teachers in building an engaging context-aware u-learning environment, but also to generate interest and promote acceptance of combining u-learning materials into an existing coursework. Various learning systems have been developed in the past decade; the majority of these systems are implemented either with client-server architecture or are centralized server based. The client-and centralized server approaches are metaphors of student-teacher and repository centric which reflects the real world learning scenarios in which teachers act as the content producers while students act as the content consumers.

Syllabus Management System: In this module admin login into QR U learning website. Then admin have to upload whole syllabus. Admin will view the syllabus what admin has previously uploaded and create a new syllabus for particular subject. After creating new syllabus admin will upload that content to server. Admin view all the professor details and allocate the syllabus to particular professor.

Course Content Sharing Server: In this module professor register in a QR U learning website. While login in QR u learning website the syllabus allocated by the admin will be downloaded and shown in the professor main page. The allocated syllabus are displayed by units. If the professor select the unit example (unit 1) that particular unit syllabus will be displayed. Then professor will choose the particular content in an unit syllabus. The professor will upload the core content and relative content for the selected content in an unit syllabus. In Fig. 4 shows the composing of multimedia [9] course content.

Context-Aware U-Learning System: In this module the already created core content view [10] by the professor. Inside the core content the important words are mapped to similar meaning or images or text or documents or other specified relative unified resource locater by the professor. When mapping is finished the professor click

to the create multimedia material button. The material are compressed in to zip file format and mapped content are created a new java server page(JSP) page the page verified by the professor and click to the create generate QR code. The QR code generated after teacher provides the QR code student. The student scan the QR code in electronic device(mobile) the related content are downloaded to student mobile. Fig. 4 shows the generated QR code for multimedia package. In encoding of QR Code, each QR Code symbol consists of an encoding region and function patterns. Finder, separator, timing patterns and alignment patterns comprised function patterns. Function patterns shall not be used for the encoding data. The finder patterns located at three corners of the symbol intended to assist in easy location of its position, size and inclination.

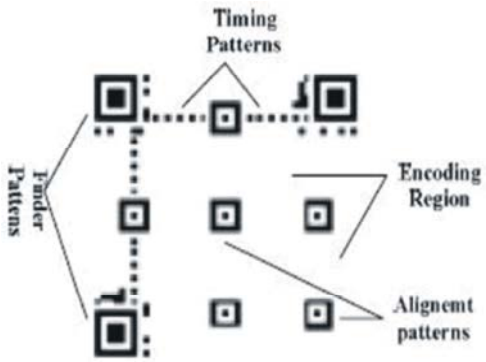

Fig. 2: The structure of QR Code

The encode procedure of QR Code including follows steps. Firstly input data is encoded in according to most efficient mode and formed bit stream. The bit streams are divided into code words. Then code words are divided into blocks and add error correction code words to each block. All these code words are entered into a matrix and Mask pattern is used to mask the pattern. Function patterns are then added to the QR symbol to form a QR Code symbol. In Structure and Decoder Procedure of QR Code includes a QR code symbol is a square array which consists of some square modules. It comprises an encoding region and a function region (includes finder patterns, separator symbols, timing patterns and alignment patterns). Function region shall not be used for the encoding data. The surrounding region of a QR code symbol is blank space. The finder patterns (includes three probing patterns) located at three corners of the symbol intend to assist in easy location of its position, size and Inclination. There are separator symbols width as a module between each probing pattern and the encoding region. All of them consist Coordinates of modules. The structure features of QR code symbol must be adequately used in its decoder procedure. It mainly includes follow steps:

- Binarization.
- Obtain the approximate region of QR code and implement coarse positioning for QR image according to the finder patterns.

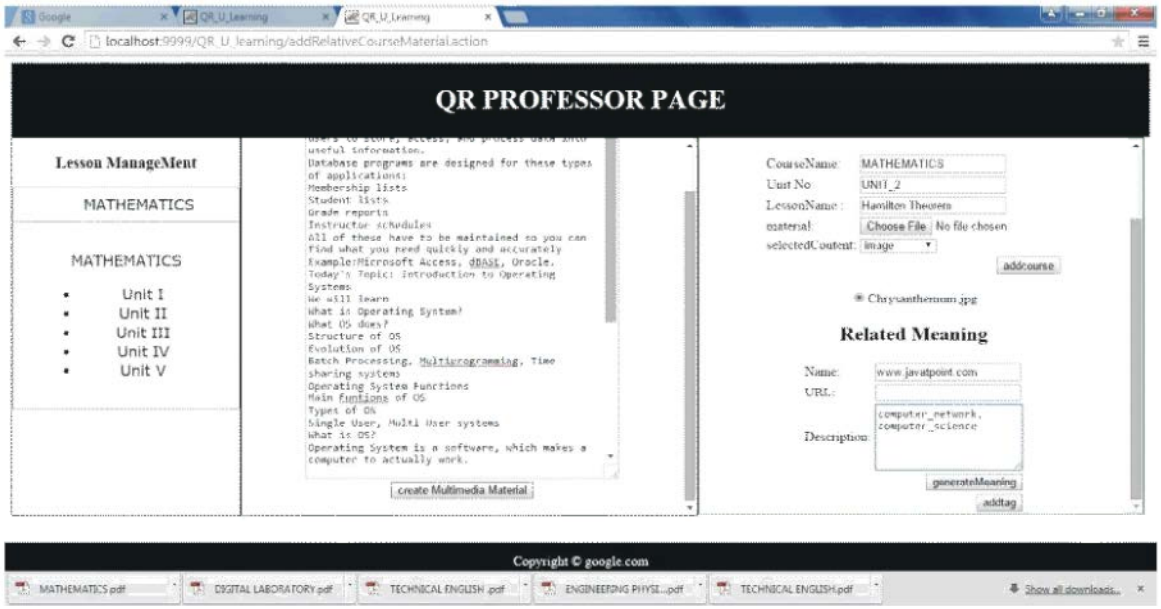

Fig. 3: Composing of Multimedia Course content

Fig. 4: QR-Code generated for Multimedia Package

- Implement accurate positioning according to the alignment patterns.
- Calculate the angle of inclination to rotate QR image and implement rectification processing; obtain version number and implement self-adaptive sampling.
- Decode based on corrected image and input a standard 2D matrix.

Conclusion and Future Works: This study proposes the use of a tool called the Course content delivery system (CCDS) that truly helps teachers build a context-aware u-learning environment. This new technologically enhanced learning environment enables students to interact with real-world problems and further combine real-world resources with a wealth of digital world information to find knowledge appropriate to their needs. Therefore, CCDS was designed to resolve issues encountered when using conventional outdoor teaching approaches, which are often very time-consuming and labor-intensive. With a high level of technical support built into the CCDS, teachers can easily incorporate outdoor teaching activities into their domain knowledge, with demonstrable benefits in student learning and motivation. In future this target could be extended to encourage teachers to develop a context-aware u-learning environment, which supports students in obtaining adequate knowledge during outdoor teaching activities. The future work is intend to provide engaging self-learning opportunities for students to review teaching content and brush up on related materials in a way that is suitable to their unique individual needs.

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