

Application Programs on Mobile Phone for Learning Materials

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We put a mobile photograph posting system to practical use in the science education which was initially developed for marketing training for the department of commercial science. The sole idea was that the developing of the teaching materials is entirely managed by the administrator. By giving such control to the administrator, it became possible to protect copyrights and the so-called right of likeness.

Key words: mobile phone, photograph posting system, teaching materials for science, copyrights, administrator

I. Preface

It has been a recent trend for the lecturer to let students watch demonstrative experiments or experimenting by the students themselves so that the students can deepen their interests and understandings of science. As for the recent tendency, use of still images, videos or animations made with/by still images from the internet has been increasing. E-learning is widely used with the diffusion of mobile devices.

We improved a photography posting system so that it can be fully used in the marketing training of the department of the commercial science. (We refer this photograph posting system as an ICT tool subsequently.)

There are similar tools released and still developed on the internet, they are understood as the early stage of an ICT tool in this paper, as they do not have ability to solve the problems we considered occurring. They cannot be used for lectures as they do not retain a system to avoid the risks we later discuss.

In this paper, we state the summary of the idea, the progress of the development, user instructions, outcome of an experiment and the practical use in the science education.

In the 2nd section, we speak about the development chronology and the outcome, and the practical experiment in science education in the 3rd section.

In the 4th section, we briefly address the problems of the copyrights as ICT tool is inevitably related to the internet. We show a summary and the issues for future

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developments in 5th section.

II. The summary of ICT tool

We have cooperated with the shop owners in Sannomiya Center Street (we abbreviate as SC) for the practical training of a marketing research group and published brochures 4 times a year for the last 5 years. (Fig.1) We have been improving this ICT tool through the project.

In the beginning we started with improving the quality of the still image. The quality of both conventional and mobile digital-cameras increased intensively, digital-cameras on mobile phones can substitute conventional digital cameras nowadays. (Mobile phone cameras are still not good enough for Celestial events.)

As can be seen in Fig.1, the variety of articles in SC is wide spread, it made the articles perfect photographic subjects. In other words, there is an article which requires high quality and a close-up picture while the other article needed a wide angle and long shot picture to show the details.

As an example, we used the ICT tool to consolidate understanding of students in SC and laboratory (editors) to explain in this section.



Fig. 1 A leaflet sample

The editors request the students in SC to take the photographs according to the concepts, then the students in SC react (take photographs) on the request accordingly and post the photographs. Once again the editors discuss the efficiency of the photographs and request changes if needed. The photographs will be finalized with frequent communication between the students in SC and the editors.

In the educational field, an editor will give a certain theme to the lecturer or students so they can take photographs of phenomena according to the theme.

The following two points are the important risk factors that we paid special attention to. There are educational establishments that still use a photograph posting system that lacks of those two risk factors to be mentioned below.

The first risk factor is precision of the photograph. Digital camera capable of at least 10Mbytes per photograph is needed nowadays as some experiments or observations need to capture details of photographs to have an accurate result.

The second risk factor is that a photograph at a spot is not always shareable in public. As the result, this system is programmed not to be a mere photograph publishing system. Before publishing a picture, one needs to acquire permission by an administrator or a manager. By being authorized by the administrator or the manager, only the suitable photographs can be published to the public through internet. By having such a system, the objects can keep its copyrights and it avoids the risks of publishing unsuitable photographs. In the meanwhile, the students in various locations can understand how the project is progressing at the moment, and the integration of information and editing can be finalized quickly.

We also developed a video publishing system under the same concept but it will be discussed in another paper due to limitations of this paper.

In Fig.2-4, we describe the data flow and show captured screens of a project.

The system is programmed in PHP + MySQL. One may post a photograph to the web page by a computer or a mobile (phone) device. As mentioned earlier, the administrator can asses and delete the unsuitable photograph before authorizing for publishing at ③.

In addition, the public screen displays a list of thumbnails as indicated in Fig.3, the actual picture is only shown when the thumbnail is clicked on for further details as shown in Fig.4.

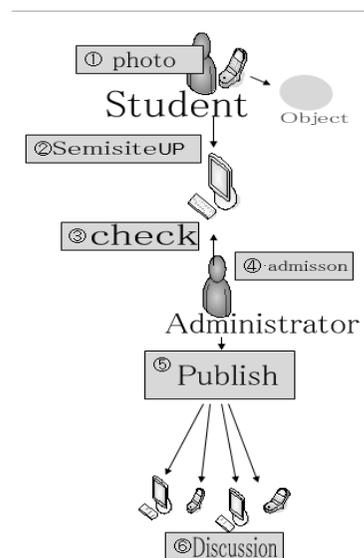


Fig. 2 Data flow of our system

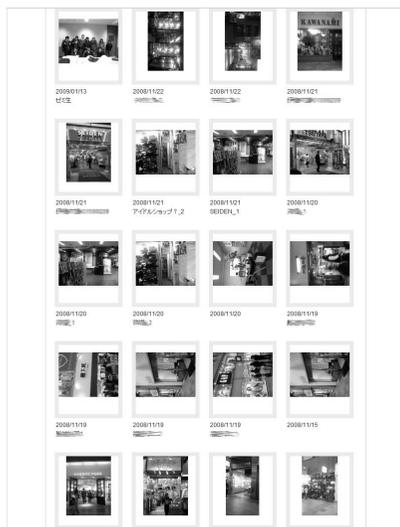


Fig. 3 Low resolution screen

The editing room is in Fig.5. In the room, the administrator and the editors discuss the credibility of the photographs and give instructions to the students in various locations.



Fig. 4 Posted image



Fig. 5 Editing room and screen

III. Application to the science education

We hereby show some examples of a practical experiment carried out in the science education. It was used as a teaching material for supplementary lessons for the trial examinations such as SPI in a university. The purpose of the experiment was to remind the students how reviewing materials for science class were used in their school days.

1 A weather forecast

It is a fact that the weather changes from the West to the East. Using this fact, the possibility to predict the weather in advance of the weather forecast is tested using the ICT tool.

We intended to contribute to a prediction of concentrated rain (So-called guerilla heavy rain). Especially for elementary school students, pre-study about weather is

needed for such lesson.

Our students began to post photographs (from 2 different locations) as soon as it rained. In the editor room we were going to measure the moving speed of one particular weather pattern.

In this experiment, the rain moved between Himeji and Kakogawa in an X number of minutes. It lacked on precision as there were only two locations for the photographs, we could confirm that the rain moved from West to the East for an X number of Kilometres per hour.

2 The cloud



Fig. 6 Change of clouds

The classroom experiment to lower the atmospheric pressure and condense vapour into water to demonstrate the generation of the cloud is well known. But it is easier to understand how the cloud changes in the sky with photographs taken every 30 seconds by using a fixed point camera than any classroom experiment.

Fig.6. consists of some photographs taken by a mobile phone per 30 seconds and uploaded to an ICT tool. The dynamic movement of the cloud is easily understood. The entire class agreed on a fact that a small cloud can vanish within a minute.

With this ICT tool, it seems that considerable numbers of experiments throughout elementary school to high school will be easier to explain. As there's limited space in this paper, further examples are not to be mentioned.

IV. Copyrights

Teachers are given exceptional rules on copyrights as long as it is solely used within a classroom in a school hour, so that he is allowed to copy documents in considerable amount. However, it is not permitted to share the copied documents on the internet even for reviewing purpose.

When a teacher uses an ITC tool, as the photographer is a part of the project and administrator has checked the credibility, there will not be a copied material. This will free the teachers from taking the time to get permission from the copyrights owners for the lessons. This also is a part of an ICT tool's contribution to the class.

V. Future developments Improvement for the future use

The ICT tool is a system that is easy to use for everyone as long as he can send a photograph with a mobile phone. The present system only makes thumbnails in order of submission, we plan to develop an automated system to divide the photographs per project to avoid confusion within the system.

By having such a system, it will be possible to handle numbers of projects in a short period of time as the photographs will be sorted by projects.

When taking photographs, the photographer should be aware of laws and ordinances regarding copyrights. The remedial rules are listed below;

- 1) When an individual is photographed, the resolution should be lowered to the level 'close-up photograph' so that the individual is not recognizable at the time of sending the photograph.

- 2) Confirmation of consent from the individual in the photograph. If the individual understands the purpose and agrees with publishing, the photograph can be submitted.

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