Development for an Introductory Active Learning Program: Utilize a Digital Storytelling

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Abstract

In this study, we describe the preliminary education program employed before the adoption of the PBL process so that learners can smoothly carry out PBL exercise through group activities. Our practical experience of education has shown that the group activity-based PBL process requires the ability to express one's own ideas to others (communication skill), the ability to abstract problems and develop one's thoughts (computational thinking skill), and the ability to move ahead with tasks in a planned manner (skill to see the big picture of matters). Therefore, we gave our attention to digital storytelling as an activity that will sharpen these three skills and that lets a student complete assignments by himself or herself. This paper reports on classroom exercise into which digital storytelling activities were incorporated. According to a questionnaire survey conducted after the class, our education program received positive feedback from about 60% of the students who took the course. Meanwhile, it has been revealed that the students evaluated their own works produced using the digital storytelling techniques more strictly than the teachers expected.

Keywords: *Digital Storytelling, Engineering Design, Active Learning.*

1. Introduction

In the classroom setting where the PBL process is employed, educators can take a variety of approaches to creative education using PBL according to the grade of learners by setting a subject to cover in class as a "familiar issue," an "issue that the local community is facing," an "issue to tackle in collaboration with companies," or the like. The PBL exercise attaches weight to solving issues through teamwork, which contributes to enhancement of students' generic skills required after they start working for companies. As PBL is performed by teams composed of students from various departments in our college, it is expected that it will improve students' capabilities to think about matters from a multifaceted perspective. PBL is one of the most effective educational methods available in higher education, and a number of studies have been conducted regarding more effective, PBL-based classroom practice. Thus, this research explores introductory education programs that will enable learners to carry out PBL exercise in a smooth and more satisfactory manner in higher education [1, 2].

This paper assumes the sophomores at our college of technology to be students who have not been introduced to PBL yet. These learners will be required to engage in more advanced PBL processes in higher grades (their fourth and fifth years) at our college and after they get transferred to university. Therefore, targeting these students, this study examines whether digital storytelling practice is feasible as an education program that broadens the above mentioned three skills [3].

2. Digital storytelling exercise

We offered "Digital Storytelling Exercise" in "Creative Design II" that sophomores of the department of global information at our college took in academic year 2016 and 2017. A total of 83 participating students were divided into a first group of 20 (for the spring and summer quarters) and a second group of 20 (for the fall and winter quarters) in each year. When one group was attending the digital storytelling class, the other group was engaged in another course (computer graphic design). For both groups, the period of the course was 15 weeks, with about two hours allotted to each week (two 50-minute lectures per week). The students used animation as a means of communication in the digital storytelling exercise course. The details of our digital storytelling exercise class are as follows:

2.1 Creation of scanimation

In the first three lessons of our 15-week course (from the first week to the third week), the students produced animations based on the principle of the scanimation techniques. Scanimation is also referred to as slit animation. Scanimation works as follows: 1) A transparent slit sheet (a sheet in a black and white stripe pattern) is put on a composite image created by laying "a few images that

represent movements" on top of each other. 2) The slit sheet is moved from side to side in a manner to make the synthesized image look like a series of images made of multiple film frames through the slit sheet. 3) Invisible parts are supplemented by the human brain, and people feel as if they were watching an animation. The students took on challenges for "entertaining the audience" with their works.

2.2 Creation of flip-books

The students then created flip-books in the next three weeks of a total of 15 weeks (from the fourth week to the sixth week). A flip-book is a work where an array of slightly different pictures are drawn on each page of a special notebook in a way to make the pictures seem to be moving due to the residual effect brought about by turning the pages quickly. In this assignment, the students produced their flip-books using "Notebook for Flip Book," a notebook manufactured by Tanaka & Shobundo Graphic Art Co., Ltd. exclusively for the purpose of flip-book production. This special notebook is composed of 50 pages, with its size being 60 mm long and 120 mm wide. Furthermore, the students were required to do stop motion photography of their works, digitize them using Windows Media Player, and submit the digitized data. The students yielded 10-second animations. The aim of this assignment is to offer the students an opportunity of giving it their all to "communicate some messages."

2.3 Digital storytelling exercise

The last nine lessons of the 15-week course (from the seventh week to the fifteenth week) were dedicated to digital storytelling. Digital storytelling here means an activity of producing two to three-minute-long stop motion animation with a well-constructed plot according to the theme that the teacher gave. The production processes are to 1) sort out problems with the theme and collect materials, 2) establish a story (create storyboards), 3) photograph static images for creating stop motion animation, and 4) edit the pictures for producing a final short video.

Stop motion animation is produced by gradually moving static objects and take several pictures for each film frame, editing the pictures as a short video using film editing software, such as Windows Media Player, and adding music and sound effects as needed. In this class, the students used a non-contact scanner "SV600" manufactured by Fujitsu Limited in order to lessen their burdens of photographing still images, as the scanner cuts down on the time for instrument setup for image photography and accordingly allows the students to easily photograph a series of static images. That the students can move objects with their both hands is another reason for using the scanner. The students were instructed to take about 4 pictures per one second of their videos to produce an about two-minute-long animation work. This means that they had to finish photographing approximately 500 images in total within a predetermined time frame. The students efficiently took pictures of still images and completed their works based on their respective storyboards that they prepared in advance. Fig. 1 shows the work of one of the students.

Fig.1. Student's work in the stop motion animation work activities

3. Questionnaire survey

After the class, a questionnaire survey was carried out, targeting 83 students who had submitted the above three works. 80 out of 83 students gave valid answers (Fig. 2). The following questions were asked, in order to grasp the situation of students after this class.

    Q1: After this exercise, do you think that you became able to summarize and convey your idea to others?

Q2: After this exercise, do you think that you became able to reconsider your design while developing it and redesign it (to embody your idea)?

Q3: After this exercise, do you think that you became able to plan and engage in something within a limited period of time?

Q1 is a question regarding "to convey ideas to others," and about 69% of students gave positive answers. Q2 are regarding "the abilities to develop ideas and embody them." For the question, about 79% of students gave positive answers. Q3 is a question about project management. About 75% of students answered these questions positively, "I certainly became able to do so" and "I became able to do so." These results are reasonable as an introductory course.
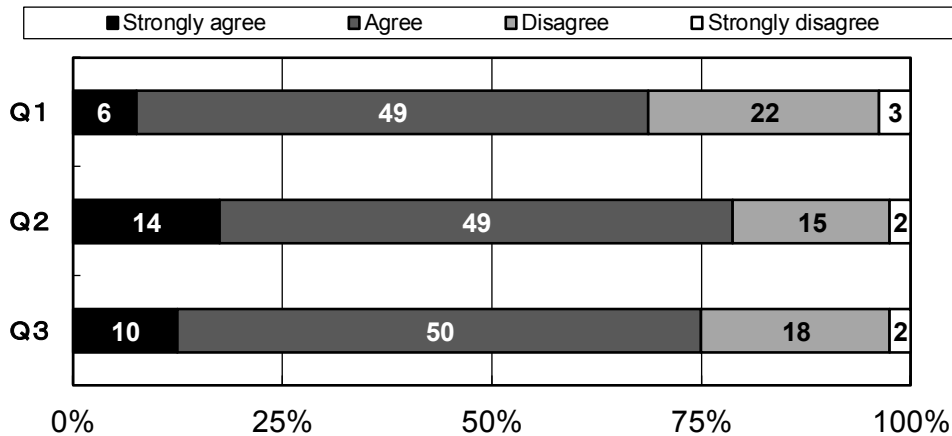

Fig. 2. Questionnaire survey conducted targeting students

4. Conclusions

In this study, we conducted a questionnaire survey through the digital storytelling exercise as to three skills, which are 1) the ability to express one's own ideas to others (communication skill), 2) the ability to abstract problems and develop one's thoughts (computational thinking skill), and 3) the ability to move ahead with tasks in a planned manner (skill to see the big picture of issues). Before working on digital storytelling using stop motion animation techniques, the students engaged in two animation creation assignments as preliminary steps to learn about how animations are produced.

References

[1] Takemata, K., Minamide, A., Kodaka A. and Yamada H. "Engineering Design Education based on the CDIO Approach", 19th International Conference on Engineering Education, Zagreb, Zadar (Croatia), 2015, pp. 759-766.

[2] Bonwell, C.C. and Eison J.A. "Active Learning: Creating Excitement in the Classroom", 1991, Jossey-Bas.

[3] Kordaki, M., Kakavas, P. "Digital storytelling as an effective framework for the development of computational thinking skills", EDULEARN17 Proceedings, 2017, pp.6325-6335.