Analysis of Elements in Teaching Simultaneous Piano Playing and Singing from the Viewpoint of the Acquisition of Physical Skills

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Abstract: This paper focuses on simultaneous piano playing and singing, which is considered to fall in the field of physical skills. The authors previously proposed and implemented an educational approach that makes use of multimedia learning materials and annotated musical scores. In order to clarify the roles of these materials, this paper discusses how learners acquire a physical skill in an educational approach that makes use of only annotated musical scores. The paper reveals that there is a limit to the effectiveness of using only annotated musical scores to acquire such a physical skill, and that multimedia materials are also important for the effective development of physical skills.

Keywords: physical skill, learning approach, video submitting, meta-cognition

Introduction

Furukawa et al. defined a "physical skill" as an "advanced skill physically acquired through practice" [1]. Activities that require physical skills range widely from dance to manual craftsmanship, the playing of musical instruments, sports science, and medical care. Furukawa et al. have identified problems encountered in acquiring a physical skill, and the need for support systems. Suwa found it important to express a physical skill in a meta-cognitive language, which serves as a support tool for acquiring such a skill [2][3]. He introduced studies in which a skill was expressed in such a language. He referred to his previous study in which meta-cognition had been applied to the activity of singing. The study identified a correlation between the volume of expressions of a skill in the meta-cognitive language and the performance of the learners, and found that learners can improve their singing performance by undertaking the process of expressing the skill they were learning in a meta-cognitive language for a certain period. Saito argued that the capacity for intercorporate imagination of physical skills (ability to mimic or copy skills) is central in the acquisition of physical skills [4].

The educational approach we have adopted so far (Nakahira et al., [5][6]) focused on physical skills for the simultaneous playing of a musical instrument and signing – specifically, simultaneous piano playing and singing. The approach has combined the learner's capacity for intercorporate imagination and expression of skills in a meta-cognitive language. Specifically, the approach has required the individual learner (i) to view a video of a model performance (capacity for intercorporate imagination), (ii) to mimic

it while referring to the guidance comments created on the basis of a certain instructional approach and added to the musical score, and (iii) to submit and critically review videos of his or her own performance. Nakahira et al. reported that these requirements had led to improvements in the learners' performance [6]. However, since (i) and (ii) were introduced simultaneously, it was difficult to verify which of these contributed more significantly to the improvement of the learners' performance.

To clarify the effectiveness of these requirements, this paper focuses on the use of annotated musical scores, and studies how this affects learners in acquiring the physical skill of simultaneous piano playing and singing.

1. Environment of the Experiment

In this experiment, the proposed learning approach was applied to 10 third year undergraduate students and one graduate student in K Women's University. The approach is shown in as below. First, each student selected one or two songs that she wanted to practice for simultaneous piano playing and singing, took a video of her performance using a digital camera, and submitted the video to a designated server via a Webpage. Later, she was given an annotated musical score created according to the process described in Fukami et al. [7], and practiced the song, referring to the annotated score. After about one week of practice, she took a second video of her performance, and submitted it to the server. At the same time, she was requested to submit a report describing how her performance had changed after referring to the annotated musical score.

A key element in this experiment is how to express the required skills accurately in the meta-cognitive language. Annotated musical scores, which embody this process, were created using the instructional approach for e-learning reported by Fukami et al. [7]. Users of the annotated musical scores were students in an institute of pre-school teacher education. The learners' previous familiarity with music in general and piano playing in particular were widely varied. Since an annotated musical score cannot be used effectively unless it is adjusted to the individual student's musical capability and level of skills in piano playing and singing, the authors created annotated musical scores according to an instructional approach called the ADDIE model (Gagne et. al., [8]).

A conceptual image of an annotated musical score developed through these phases (Fukami and Akahane,[9]) is shown in Fig. 2. Special features of the developed annotated musical scores are (i) that overall advice on how to play the song is shown at the top of the musical score, (ii) that if the same phrase appears more than one, finger numbers are shown only the first time it appears, so that students will learn to discover the same phrase elsewhere, and (iii) that use of musical terminology is avoided as far as possible in order not to baffle beginners.

2. Data Analysis and Discussion

We show the students' self-evaluation of the two videos of their performance: one video submitted before and the other after the use of the annotated musical score. The items in which a large number of students felt they made improvements after using the annotated musical score are (1) the feel of the song, (2) finger movements, and (3) the lengths of musical notes and rests. In contrast, many felt that they made little improvement in enunciation. Many responded that they did well even before the use of the annotated

musical notes in (4) posture during performance, and (5) breaths. The instructors found that the students made no improvements in (6) balance in sound volume between singing voice and the piano, and (7) balance in sound volume between the right and left hands even though the students concerned thought that they made improvements.

The above results reveal the following. The annotated musical scores are effective for those performance aspects that students have difficulty in recognizing just from viewing the model performance, such as the feel of the song, finger movements, and lengths of musical notes and rests. The annotated musical scores successfully expressed these aspects in a meta-cognitive language. However, the annotated musical scores failed to reliably convey techniques for those aspects that students cannot recognize unless they actually listen, such as balance in sound volume, and those aspects of physical skills that require a long time of practice to acquire.

3. Conclusions

The evaluation results show that the annotated musical scores created according to the ADDIE process successfully expressed the technical aspects the creator wanted to convey, such as the feel of the song, finger movements and the lengths of musical notes and rests, in a meta-cognitive language. However, the annotated musical scores were less successful in conveying the technical aspects that students cannot recognize unless they actually listen many times, such as balance in sound volume between singing voice and the piano, and balance in sound volume between the right and left hands.

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