American Journal of Multidisciplinary Research & Development (AJMRD)
Volume 03, Issue 12 (December - 2021), PP 14-19
ISSN: 2360-821X
www.ajmrd.com

Research Paper **Open Access**

The Effect of Solfège Syllable Indications on Sight-Reading Skills of Undergraduate Music Majors

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Abstract: This study was designed to examine the Effect of Solfège Syllable Indications on the sight- reading skills of undergraduate music majors. Subjects (*N*=32), consisting of two groups participated in a pretest which showed no significant inter-group average difference. The experimental group alone was then taught a 3-day sight-reading lesson using exercises from McGill and Stevens' *90 Days to Sight Reading Success.* A posttest followed, in which the experimental group sight-read with Solfège syllables written on the score while the control sight-read using audiation and Curwen hand signs. Pretest and posttest were recorded and scored by music educators. It was anticipated that writing solfège syllables into music would have no effect on subjects' sight-reading skills. The study achieved ordinal level data. A Mann-Whitney *U* test on the posttest averages of the two groups revealed a significant $U = -1.97$, $n_1 = n_2 = 16$, $p < 0.05$ two-tailed. Hence the H_0 was rejected. It was concluded that writing solfége syllables into music had an effect on subjects' sight-reading skills. Future investigations will explore whether writing solfége syllable indications on the score will be helpful to instrumental music instructions. Also, further research is needed to determine how useful the Curwen hand signs pedagogy still is in the 21st century music classroom.

Keywords: sight-reading, solfége syllable, audiation, curwen hand signs, pedagogy

I. Introduction

Performing the unrehearsed music, otherwise referred to as sight-reading, is an important skill required in various fields of music, especially within the western music cultures. Kopiez (2008) observed that sight-reading is characterized by great demands on the performer's capacity to process highly complex visual input (the score) under the constraints of real time without the opportunity of error correction. Not only is it of particular interest for music professionals, such as piano accompanists, conductors, and orchestra players, but it is also one of the five basic performance skills every musician should acquire (McPherson & Gabrielsson, 2002). These
skills are defined (McPherson et al., 1997) as follows: 1) The ability to perform a repertoire of rehearsed music, to perform music from memory (where music was memorized using notation and then re-created aurally), 2) To play by ear (where music was both learned and reproduced aurally), and 3) To improvise in both 'stylistically conceived' and 'freely conceived' idioms, and to sight-read music without prior rehearsal. However, the definition of sight reading is sometimes obscure, especially when the performance of a piece, having already been read a couple of times, is still designated as sight reading. In the context of this experiment however, I adopted Wolf's (1976) definition of sight reading as being a skill of performing music from a printed score or part for the first time without the benefit of practice.

A fundamental postulation (Hodges, 2020) is that "sight-reading is a complex musical transcriptive task involving a series of overlapping perceptual, cognitive, and fine-motor musculature processes which can best be described by a component skill model" (p. 243). Component skills refer to a selection of independent predictors revealed by multiple regression analysis. The use of component models is a widely accepted approach in cognitive psychology, for example, in determining the processes involved in human working memory (Baddeley et al. 1999). Waters et al., (1998) used a set of six predictors to show that a given sight-reading achievement can be explained by three component skills: 1) Pattern recognition in musical score elements, 2) Prediction skills, and 3) The ability to use auditory representation, thus inner hearing.

The indispensable role of sight-reading in professional music practice suggests a reason for it being widely considered one of the most essential parts of general music education and plays an important role in developing

independent music learners (Collins, 2008). It is therefore, a good indicator of music achievement (Hayward & Gromko, 2009) since it is believed that better sight-readers tend to be better performers (Lehman & McArthur, 2010). Furthermore, sight-reading is one of the core skills mentioned in the National Association for Music Education's Core Music Standards (NAfME, 2015). In many states and countries across the world, sight-reading is a required constituent of musical contest participation as it is for all-state choir auditions in the United States of America (Henry, 2011). A variety of opinions exist, however, as to the best method of teaching sight-reading in the general music classroom (Arthur et l., 2020; Henry, 2001; Orton, 1929; Salzberg,1989).

Although myriad approaches are being used by music educators to help learners develop sight-reading skills, Kim et al., (2021) the most commonly used melodic pitch systems according to McClung (2001) include interval names, letter names, fixed-do, scale-degree numbers, and moveable-do. Research regarding the best teaching method has so far been inconclusive (Demorest & May, 1995), yet averred that singers using moveable-do solfège achieved significantly higher scores in sight-reading than those using fixed-do syllables and other related techniques. They contended that a focus on targeted pitch instruction will improve sight-reading skills, making reference to Rohwer and Henry's (2004) finding of a significant increase in sight-reading ability of students after a twelve-week duration of targeted pitch instruction. Furthermore, Boyle and Lucas (1990) found that sight-reading scores were significantly higher when the sight-reading performance included a harmonic accompaniment.

Also, according to Lovorn (2016), educators have experimented with removing rhythm from sight-reading exercises to improve pitch accuracy, and found that pitch accuracy of a passage that was sight-read was not affected by the presence of rhythm tasks, even when the tasks were of varying levels of difficulty. Rather, teachers lack time and other resources for regular sight-reading assessment. Similarly, Daniels (1986) argued that sight-reading ability was not directly related to curriculum and had more to do with attitude of the music teacher toward the skill. If the teacher finds sight-reading important, then the students sight-read at higher levels, and vice-versa. This correlates with Demorest's (1998) study that found that proper attention to individual testing is a useful technique in aiding the development of sight-reading skills.

Studies in neuroscience have led us to an understanding that music experiences are processed in several areas of the brain (Hayward & Gromko, 2009). Research has also been conducted on visual, spatial, and kinesthetic learning tools when teaching sight-reading (Hutton, 1953) revealing that the use of visual materials simplifies the learning process and diminishes the effort required to understand abstractions. So, one of the tools strongly recommended in the Kodály way of music instruction is the use of solfège syllables (Choksy, 1998). When using this Kodály-inspired instruction, solfège syllables are usually printed spatially on unlined paper or within note heads on staff paper. The use of moveable syllables, often reinforced kinesthetically with hand signs, is a commonly researched method. (Bentley, 1959; Bridges, 1982; Frey-Clark, 2017; Harris, 1918; Vajda,1991). While Killian and Henry (2005) argued that students performed with higher accuracy while sight-reading individually using hand signs. Meanwhile, McClung (2008) found the opposite result, contending that the use of Curwen hand signs did not have any significantly different effect.

The use of shape-note notation was another tool found to be useful in music reading as found by Martin (2014) that placing the note heads or letter representations of syllables at varying heights on cards did improve student sight-reading performance. In a comparative study of the use of audio-visual materials in sight-reading instruction, Hutton (1953) revealed that students who learned with the aid of flash cards, musical games, and slides scored significantly higher than the students who received no visual aids during instruction. Meanwhile, the use of color-coded notation on 5th and 6th grade beginning instrumental players' sight-reading ability showed no significant advantage for the experimental group who had been taught to read with the color-coded notation over the control group that was instructed with normal un-colored notation in Rogers' (1991) study. Nonetheless, the students in the experimental group seemed to be dependent on the color-coded notation, scoring the lowest scores when reading regular black and white notation. Furthermore, in a latter experiment Rogers (1996) found instruction involving the addition of color to standard rhythmic notation positively affected the performance of students on the tasks of vocalizing and clapping rhythms at sight.

Research conducted in music education has shown that sight-reading is improved through teaching approaches that integrate auditory, visual, and kinesthetic processing (Hayward & Gromko, 2009). One of the tools which music teachers use is making learners write solfège syllables into the music score. Several music educators believe that the action of writing is used to reinforce the learner's ability to pair each note to its solfège syllable. It is also common to have the learners write the solfège syllables next to the note to try to reinforce the spatial positioning of the notes on the staff (Harris, 1918). By this practice, effort is made to combine auditory, visual, and kinesthetic skills to sight-read a piece (Martin, 2014).

The purpose of this study was to investigate the effectiveness of writing solfège syllables into music as a mean of developing learner's sight-reading abilities. The H_0 was that writing solfège syllables into music would have no effect on subjects' sight-reading skills.

II. Method

This experiment was modeled after Lovorn's (2016) *The Effect of Writing Solfège Syllables into Choral Repertoire on the Sight-Reading Ability of High School Choir Students*. However, unlike the extant model, my experiment was conducted on undergraduate subjects being general music teacher trainees in the University of Education, Winneba (UEW) - Ghana. Other significant differences in my work include the sample size, sampling procedure, the duration of the experiment, the testing instrument, as well as my H_0 instead of research questions, among others. I have designed two sight-reading melodies similar to exercises from "Week 13" in McGill and Stevens' *90 Days to Sight Reading Success* (2003) as cited in Lovorn, (2016). Each melody was nine measures long, in the key of G major, in simple duple meter, and on the treble staff as shown in the Appendix. I did much to ensure that both melodies were of similar difficulty by using the same number of rhythmic changes and the same intervals.

Undergraduate students (N = 32) in the department of music education, UEW were sampled to participated in the study. This department hosts three different music programs, with ten levels (classes) of students. These include (1) Two-year Diploma in Music (levels 100 and 200), Bachelor of Arts in Music Education (levels 100 - 400), and Bachelor of Music (levels 100 - 400). Each class had a separate interactive group whatsup platform, with some faculty members included. Having worked in the department for five years I was still on many of those group whatsup platforms in good rapport with both students and faculty. Therefore, with prior permission of the departmental Chair, I invited the students via their group platforms to participate voluntarily in the study by showing their consents on the group platform, or to my personal phone number or through email.

A pre-test was conducted to determine the baseline sight-reading abilities of subjects prior to the start of experiment. Subjects were then randomly assigned to sight-read either melody A or melody B. In each group, half of the participants were pretested with melody A while the other half did melody B. Participants were given one minute to chant through the melody. At the end of the chant period, the tonic chord was played and subjects were instructed to sing the melody.

Each pre-test was recorded and scored from the recording. Subjects received a point for every correctly sung pitch with a maximum score of 20. An independent expert music educator analyzed 55 % of the pretest recordings randomly selected from group. A Mann-Whitney U test conducted revealed a z- score, $z = 2.3$, $p<0.5$, indicating that there was no statistically significant difference between the means of the two groups.

When the pre-tests were completed, both group A and group B were taught a 30-minute sight-reading lessons for three consecutive days on zoom. Each lesson contained a melody from the *90 Days to Sight Reading Success* book. Lessons from day one through day three corresponded with "Week 8 through week 10" respectively in the book. Group A (n = 16) was given a new melody for each lesson and given 40 seconds to write solfège syllables on their score. Half of the group wrote the solfège syllables next to the note head and the other half wrote the solfège syllables under the staff. Subjects then chanted through the melody three times followed by pitching it on the tonic of the key and singing the melody three times.

Group B (n = 16) was as well was given a new melody - same melody as group A was given for each new lesson, and were asked to chant through it three times using solfège syllables (without writing the solfège syllables on the score). After that the tonic chord was played and subjects were be given two minutes to audiate the melody individually. In the process of audiation, the students were instructed to hear the melody in their head while mouthing solfège syllables and doing John Curwen hand-signs alongside. At the end of the two minutes,
the tonic chord was played again and subjects sung melody three times.

When the three-day instruction was completed, every participant took a post-test. In this test, subjects used the alternative melodies in their groups which they did not sing for the pre-test; thus, the opposite melody from their pre-tests in their respective groups. That means if a participant did the pre-test with melody A then they did posttest with melody B. All participants were given two minutes to chant through the melody. At the end of the chant period, the tonic cord was played followed by instruction for the subjects to sing the melody. Just like the pre-test, each post-test was recorded and scored from the recording. Every subject was awarded one point for each correctly sung pitch with a maximum score of 20 points. Two music educators from the same department assisted me in conducting the pre-test, the three-day lessons, and the post-test. Scoring was done by the expert music educators who scored the pre-test with 96% reliability.

III. Results

The study achieved ordinal level data with two independent groups; Group A(n=16) and Group B (n=16). A Mann-Whitney U test was conducted to evaluate the H_0 hypothesis that writing solfège syllables into music would have no effect on subjects' sight-reading skills. The results of the test were contrary to the H_0 as $U = -1.97$, $n_1 = n_2 = 16$, $p < 0.05$ two-tailed. Hence the H_0 was rejected. The control group had an average rank of 14.97, while the treatment group had an average rank of 23.63, indicating that writing solfége syllables into music had a significant effect on subjects' sight-reading skills.

IV. Discussion

The purpose of this study was to investigate the effectiveness of writing solfège syllables into music as a mean of developing learner's sight-reading abilities. It was anticipated that writing solfège syllables into music would have no effect on subjects' sight-reading skills. Results indicated that both the control group and the experimental group made significant improvement from pre-test to post-test. Upon studying the difference in score results, both groups had a more dramatic change in score from pre-test to post-test. This showed the act of practicing sight-reading in class, using either audiation with mouthing the solfége syllables simultaneously with Curwen hand signs, and writing the solfége on the score would help students improve the skill. This improvement confirmed inconclusive the views of Demorest & May (1995) that various means could be used to help improve sight-reading abilities of learners. However, this did not correlate with Killian and Henry (2005) whose research findings suggested that daily rehearsal as an approach is not significant enough in itself to individual sight-reading test results.

In the experimental group, half the participants were instructed to write the solfège syllable under the staff and the other half wrote it next to the note. Although I did not hypothesize this observation, it is worth noting that subjects who wrote next to the note head performed better on the post-test than those who wrote under the staff. Even though both groups were able to look at the written syllable, Martin (2014) argues that the act of writing next to the note and reading next to the note was more valuable than just looking under the staff.

In conclusion, Curwen hand signs as employed in the study is an integral part of the Kodaly method (Choksy, 1998). The visualization of and kinesthetic response to music promoted by hand signs is thought to aid the more abstract vocal response to notation. Visual-spatial representations (hand movements) of aural stimuli seem to aid children's ability to make aural discriminations (Forsythe & Kelly, 1989). Opposing research findings however caution against reliance on Curwen hand signs, saying that the specific use of Curwen hand signs has not resulted in significantly better sight-singing scores, nor in greater accuracy during echo-singing (Yarbrough et al. 1991) than those that accrue through solfége alone.

The results of this study are potentially applicable in the choral classroom, even though teachers in specific instruments areas may as well apply these techniques until further research probably proves otherwise. If students are writing solfége on the score or just audiating pitches in their head, the use of either of these sight-reading methods could improve sight-reading ability. Future research will explore whether writing solfége syllable indications on the score will be helpful to instrumental music instructions. Finally, since the popularity of the Curwen hand signs since the 1950s was still heralded recently (Choksy, 1998), further experiments will help determine if there are reasons for which the hand sign pedagogy requires some modification to retain its effectiveness in the 21st century music classroom.

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Appendix

Melodies A and B, used alternately by the experimental group during pre-test and post-test