



THE ROLE OF INSTRUCTIONAL SCAFFOLDING TO FACILITATE PROBLEM SOLVING SKILLS IN MUSIC IMPROVISATION

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This study aims to investigate the role of instructional scaffolding in developing problem-solving skills in melodic improvisation among beginner piano students. Three action research cycles were implemented to identify the effectiveness of scaffolding instructions. The process of measuring students' problem-solving skills in improvisation is audio-recorded and further transcribed onto music scores in the third action research cycle for data analysis. The findings showed a positive development and improvement in the students' problem-solving skills and filled the knowledge void for music teachers to plan and teach music improvisation progressively. These findings were helpful for music teachers to implement future musical tasks in creative activities.

KEYWORDS: Scaffolding, Improvisation, Action Research, Problem Solving

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INTRODUCTION

Effective teaching has always been an essential element for all educational purposes, particularly useful for teaching specific skills. Scaffolding, a systematic method of instructing new material progressively, guiding students during initial practice, checking for students' understanding, encouraging active and successful participation from students, as well as providing all students with an elevated level of successful learning environment has been highly recommended by educators.

Instrumental lessons normally consist of multiple skills learning such as the learning of aural, cognitive, technical, musical, communication, and performing skills. These music lessons combine the cognitive functions and physical movements simultaneously, hence, progressive learning with a focus on the subject matter is essential. Music problem-solving skills on performing, music listening, music-making (improvisation and composition), requires knowledge on the basic elements of music along with the awareness of the learning complexity, music teachers are encouraged to provide scaffolding to music students as well (Elliott, 1995; Hallam, 2006; Kennell, 2002). Since improvisation is a creative activity (P. R. Webster, 1990), it is usually performed without any written improvised music notation which creates a void in teachers' ability.

Therefore, the purpose of this work is to explore the process in directing students' improvisation through instructional scaffolding. The significance of this study is three-fold: (1) to observe how music students interact with and respond to the instructional scaffolding; (2) to realize the scaffolding strategies for facilitating problem-solving skills in music improvisation; (3) to acknowledge the process towards students in achieving the learning goals.

REVIEW OF LITERATURE

In pedagogical theory, scaffolding is a metaphoric term for systematic instructional techniques to learning and development (Kupers, van Dijk, & van Geert, 2017). According to Rosenshine (2008), educators have employed this explicit sequence of instruction, sometimes with modifications in their teaching styles, to teach students complex cognitive skills. The metaphoric term, 'scaffolding' teaching technique started in general education (Bruner, 1985; Wood, Bruner, & Ross, 1976; Wood, Wood, & Middleton, 1978). Teachers are the scaffold, supplying the temporary support to guide students for a deeper understanding of knowledge and skills which are beyond their current ability. Wood et al. (1976) theory of scaffolding was particularly influenced by the work of Russian psychologist, Lev Vygotsky (1896-1934). Vygotsky developed a theory of cognitive development in children's higher mental function. He maintained

that the most successful learning occurs when children are guided by adults towards learning goals that they could not attempt on their own (Vygotsky, 1978).

Elliott (1995) suggested “scaffolding as one of the teaching-learning strategies to help music students find, solve, and reduce musical problems” (p. 279). Learning to develop music skills involves sensory, cognitive, and motor skills (Lehman & Davidson, 2002). These music skills function, interact and evolve in complex ways as they required mental, physical, affective, and social cognition. Rosenshine, Froehlich, and Fakhouri (2002) said that since music has definite core teachings that required guidance for these explicit musical skills, systematic instruction is essential as a practical teaching model. Scaffolding is applied to the initial learning of instrumental skills as well (Hallam, 2006, 2016; Kupers et al., 2014; Meissner & Timmers, 2018). As music students progress, the teacher may gradually remove the scaffold or bring the scaffold to a higher level of learning. The learning is always developing with more depth as the teacher leads the students to internalize the subject matter. The significance of systematic teaching allows students to identify difficulties in a music task, to clarify how to solve the music problems, and to progress from mistakes to independent learning.

To conduct effective scaffolding teaching strategies, there are certain steps music teachers are encouraged to understand and apply in their teaching (Hallam, 2006; Wiggins, 2015; Wood et al., 1976). At the initial stage, the music teacher must encourage and maintain the student’s interest in the learning material. The learning material must be presented in simple and small stages then progressively improved to more challenging materials. Checking for understanding, getting feedback to minimize students’ frustration is essential for progression.

The teacher’s demonstration of the task is required for students’ progression and clarity. Providing hints and cues, assessing students’ current knowledge and experience then only instruct tasks appropriately are effective strategies in scaffolding teaching (Belland, 2017; Copple & Bredekemp, 2009; Elliott, 1995). Previous studies from Silliman, Bahr, Beasman, and Wilkinson (2000) suggested using directed and supportive instructions focusing on the task to enhance greater students’ understanding. Further, it was indicated that employing explicit and systematic instructions within the learning context had benefitted the children greatly. Instructions that balance the skill and strategy-based learning were most helpful.

Hallam (2006) reiterated teacher’s communication skills such as direct instructions, questions, and non-verbal gestures were also identified as critical features to assist students’ level of understanding. Hallam (2006, 2016) continued that motivation to learn, and the use of praise contributes to shaping

student's behaviour as well. Students achieve positive emotional impact when they complete a learning task successfully thus, creating higher self-esteem and motivation to carry on to a higher level of learning.

According to Belland (2014), there must be active, meaningful participation from the students in specific tasks activities. Exposure to specific tasks to generate new knowledge have a significant impact on students' learning (Belland, 2014; van de Pol, Volman, & Beishuizen, 2010). Active participation from students is essential for the related task problems that will lead to desired learning and understanding (Belland, 2014; Hallam, 2015). According to Hallam (2015) through active participation, students' cognitive levels improved, thus enhancing confidence and aspirations with making music. As Dewey (1938) defined on contemporary education to encourage students to actively participate in the related tasks not only to promote productive learning but also to create a desire and nurture reflective thinking through the experiences.

Music problem-solving skills on performing, music listening, music-making (improvisation and composition), requires knowledge on the basic elements of music (Elliott, 1995; Hallam, 2006; Wiggins, 2015). The term problem-solving has been linked often with terms like critical thinking, high order thinking skills, reflective thinking, and conceptual thinking. Nevertheless, all these terms are directed to a learning goal which is thinking and reasoning for a solution. To acquire effective problem-solving skills in music, knowledge about the subject matter is needed, to identify, analyse the problem, and assess the impact for music solutions (Garrett, 2013; Topoglu, 2014; Younker, 2002).

Acquiring music problem-solving skills correspondingly encourages aesthetic as well as intellectual processes (Tervaniemi, Tao, & Huotilainen, 2018). Hallam (2006) and Rosenshine et al. (2002) have identified progressive music problem-solving skills that can be applied to the development of reasoning for music solutions.

Similar to scaffolding process, the role of teachers is to support an appropriate learning environment and gradually provide motivation for higher-level critical thinking to acquire music problem-solving skills, (Kennell, 2002; Pogonowski, 1989). Small (1987) stated that teachers should develop specific questions and related music exercises to aid music thought processes for students to reach a better understanding of their subjects. Similarly, DeLorenzo (1989) stressed that students need many exploratory experiences in music playing as well as thinking the process of understanding to acquire music problem-solving skills.

According to the Alperson (1984) music improvisation is an "elaboration" or an "adjustment" of a tonal and harmonic "music framework" (p. 21). It

could be an additional part that is not fully notated; the ornamentation of an existing part, a cadenza passage, or variations based on a recurring theme. The most common form of music improvisation of the twentieth century is in jazz. Musicians, singers, and composers have embraced the creative art of music improvisation into their craft and have evolved into a specialized art in their work. It involves the ability to create spontaneous music improvisation within specified music parameters (Azzara, 2002). The musical elements in improvisation include harmony, melody, rhythm, dynamics, mood, and articulation (Kenny & Gellrich, 2002).

Improvisation communicates the musical spontaneity of emotions (Gorow, 2002) relating to the original music structure. Kenny and Gellrich (2002) and Kennell (2002) advised that teaching improvisation must be approached systematically utilizing well-known melodies due to its complexity in the initial stage.

Previous researchers had highlighted the work of Wallas (1926) which consists of four main stages of the creative process (preparation, incubation, illumination, and verification) as a conceptual model for creative activities (Sadler-Smith, 2015). Wallas (1926) summarized that the preparation stage (stage 1) is important as the specific creative abilities or ideas are gathered for new knowledge. At the incubation stage (stage 2), these ideas are retained in the subconscious mind until the illumination stage (stage 3), whereby an inspiration emerged to form the ideas coherently. At the verification stage (stage 4), various explorations are executed for some solutions to the problem.

Kenny and Gellrich (2002) suggested that new improvisers should learn to improvise in one musical style first in the initial stage, before moving on to improvising a more complex style. Improvising in this controlled situation could encourage progressive learning to extend the range of other ideas. Cheong et al. (2014) conducted a study on music improvisation which emphasised the importance of higher order thinking skills in procedural knowledge and creative music product in improvisation. The study proposed a teaching-learning framework and a theoretical model of higher order thinking skills in improvisation. Thus, the teaching-learning framework could assist music teachers to set teaching goals and reflects learning progress. The theoretical model of higher-order thinking skills supports the music teachers to develop effective teaching strategies in music improvisation. Furthermore, it was indicated that acquiring improvisation abilities systematically enhances general intelligence, academic ability, and performance achievement as well, in a recent study by Cheong (2019).

The progressive teaching and learning of musical improvisation suggested a scaffolding process while musical problem-solving skills are essential in the spontaneous nature of improvisation. The two core elements of

scaffolding and musical problem-solving skills interwoven in the outcome of musical improvisation. Hence, this study investigated the role of instructional scaffolding for developing problem-solving skills in melodic improvisation among the beginner piano students.

RESEARCH METHODOLOGY AND SAMPLING

Three action research cycles were applied to address the objectives of this study. Action research is a form of research that enables practitioners to investigate, evaluate their work, and search for solutions to daily real problems experiences at work (McNiff & Whitehead, 2006; Robson, 2011).

McNiff (2016) stated that it would be ideal to transform action learning into action research but to ensure to describe the action plan, explaining the reason for the plan and the anticipated results, collect information, and eventually to identify the findings according to the research questions (Cain, 2011; McNiff, 2016).

The study involved eight students, aged 8-9 years old, from a public school. These students had limited music experience in listening, singing, and playing contemporary music on keyboards. Every student played on their keyboards in the music classroom. Each action research cycle used a different lesson plan with different music materials. Students were guided in research cycles 1 and 2, whereas, in research cycle 3, the students had to apply problem-solving skills independently with minimal guidance. The theoretical cycle of action, reflection, and modified action framework (McNiff, 2013) for each research cycle was the structural guide for each lesson plan. Simultaneously, the theoretical model of mental operations of level 1, level 2, and level 3 (Marzano & Kendall, 2007) was applied in each of the research cycle. It is an educational paradigm that incorporates gradual cognitive skills with areas of learning that influence students' thinking and provides a research-based theory for teachers to enhance students' knowledge progressively. Simple instructions were incorporated for progressive learning as well (see Table 1).

ANALYSIS AND INTERPRETATION OF DATA

Throughout the three action research cycles, data collection methods included audio and videotape recordings of the teacher and students in action. Besides, notes and reports were taken and kept systematically during the three action research cycles. Two other qualified music teachers were invited to observe the video recordings and gave their feedback on the data and to improve on the execution of the lesson plans. At the same time, this critical feedback allowed the teacher (the researcher) to reflect, evaluate, and modify another level of

instructional scaffolding and mental process for the next cycle to stimulate student's understanding to problem-solve improvisation. The process of measuring students' ability to problem-solve improvisation was audio recorded in the third cycle. Their creative output was written out during the students' performance as well onto their scores.

DISCUSSION ON FINDINGS

Music Students' Interaction and Response to Instructional Scaffolding

Through video-observation on action research cycle 1, the students were unsure of the instructional scaffolding vocabularies such as, "Sing; Listen; Play; Sing and clap; Sing and play; Look at the score and sing". However, the teacher had managed to overcome the problem by going through the learning sequence at a slower pace with frequent repetitions.

In action research cycle 2, it was observed that the students were more alert with their responses on the instructional scaffolding. They listened with more focus and managed to execute the improvisational patterns that were demonstrated by the teacher with accuracy to the given tempo. They were also more vocal with their thoughts on the music tasks (see Table 1 and Figure 1).

By the third week, through video-observation in action research cycle 3, there was a change in the class dynamics. The students were attentive to the teacher's instructions and at the same time, there were more dialogue sessions between the teacher and students. Students' behaviour was more confident, and they were eager to showcase their ideas on improvisation (see Table 1).

There was a gradual improvement in the students' interaction and responses throughout the action research cycles. It was likely that a positive connection existed gradually between students' interaction and responses with the instructional scaffolding. Observation on the clarity of instructional scaffolding implemented in the study revealed a progressive sequence of intentional vocabularies (Marzano & Kendall, 2007) for students' understanding and execution of the music tasks.

The students proceeded through a series of instructional scaffolding process of musical activities and keen listening skills through interacting music tasks. Learning through instructional scaffolding had encouraged a progressive understanding of the specific musical skills for students to develop confidence gradually. Hence, by research cycle 3, students became more confident and verbal in their music tasks.

The Scaffolding Strategies and Instructions Used by the Teacher to Facilitate Problem-Solving Skills in Music Improvisation

By prioritizing the scaffolding theory and mental operations in mind, the teacher had implemented the development of problem-solving skills gradually. New knowledge was introduced and instructed progressively with the initial singing of the improvised melodies, clapping the new rhythmic patterns, and demonstrations of the improvised melodies (Hallam, 2006; Rosenshine et al., 2002). Directed, sequential instructions and gestures (nod of the head or hand gestures from the teacher) were frequently used during lessons when the students had to perform their melodies to the tempo of the teacher's accompaniment. As students progressed in the learning, the teacher gradually withdrew the scaffold (instructions). Questions and prompts were forwarded instead to help students think for a solution to problem-solve the improvisation tasks. Discussions between teacher and the students offered ways to improve students' thoughtful ideas for application to the melodies. Encouraging students to follow the learned systematic procedures on singing the actual melody first, then sing or hum the improvised melodies, clap the new rhythmic patterns, play through the new improvised melodies, listen, and decide for the best solutions had provided musical experiences as well. At the same time, by allowing the students to make mistakes without teacher's interruption, brought out the awareness in the listening and performing skills to correct themselves immediately.

The Effectiveness of Instructional Scaffolding Process on Students' Achievement in Improvisation

According to educational theorists (Bruner, 1996; Dewey, 1938; Rogoff, 1990; Vygotsky, 1978), students should be allowed to experience and interact with the learning processes. In this way, learning should take an active role, in a progressive learning curve to construct their understanding. Similarly, Allsup and Westerlund (2012), Hallam (2016), Sawyer (2011), P. Webster (2018), Wiggins (2015) reiterated that in a musical context, learning through creating, listening, and performing forms the active experiential learning curve for music students.

With the above theory in mind, the teacher created an environment through the instructional scaffolding process, where students' creative ideas were valued. Every student took the time to showcase their improvisation at their keyboard. The teacher cued them in by calling out their names and providing the accompaniment pattern for their melodic improvisation. Students were encouraged to play out their ideas on their keyboards and eventually to perform individually. They were also assured that there was no incorrect impro-

visation except sometimes the music patterns may not sound right but that would create another learning experience to try out for another pattern.

The instructional scaffolding process helped to stimulate students to problem-solve improvisation by experiencing the musical thoughts and sounds through practice. Keeping quiet and listening to their friends playing out the improvisation individually had also brought out the awareness of the possibilities of various music patterns. By engaging students in meaningful musical, active lessons, students were able to embrace experiential learning towards creating and listening to their own and friends' musical ideas. At the same time, students managed to generate the ability to problem-solve improvisation gradually.

Planning the systematic teaching method was aided by the progressive mental operations by [Marzano and Kendall \(2007\)](#). The educational paradigm that incorporates cognitive skills with areas of learning that influence students' thinking had provided a research-based theory for the teacher to enhance students' knowledge. The findings of the study indicated that the instructional scaffolding process had revealed a progressive pattern for the systematic teaching method. Since music education has a wide scope of knowledge with specific content and explicit skills, researchers have recommended supporting learning through the systematic method as a teaching model ([Rosenshine et al., 2002](#)). Through the systematic process, the objective learning goals could be accomplished gradually. Sequential instructional goals and objectives with directed instructional verbs were easier to plan and carry out during lessons when the teacher has acquired the skills for the subject matter.

The action research cycles in this study may be limited to only three cycles, but the impact it had on the teacher was significant. In the sense that the 'gap' between the actual acts of 'doing' the whole process compared to just 'knowing' the facts had indeed been a learning process for the teacher. The experience of planning the study had brought out the awareness of music activities and correct vocabulary was helpful with the planning for future lessons. It had also created a positive learning curve for the teacher that systematic teaching indeed needs planning and evaluation at each lesson. It is not a 'one size fits all' for every lesson plan. For example, if the subject matter for the lesson was too overwhelming for the teacher to teach and the students could not grasp the details, then it would be practical to spread the learning subject into a few lessons instead of just one lesson. This would setback the flow of schedule but helping students to grasp the core foundation of the subject matter first before moving on is desirable.

Throughout the music activities, students responded positively during lessons. However, some students were as skilled as the others, and the instructional scaffolding process was modified to assist these students. Super-

vision was given at these guided practices; instructions were repeated and encouragement was provided to these less-skilled students in practicing the skills.

Table 1

An Overview of the Frequent Verbs/Phrases Used in Action Research Cycle 1, 2, 3 (ARC1, ARC2, ARC3) Guided by the Mental Operations (Marzano & Kendall, 2007).

Mental Operations	Verbs/Phrases	ARC 1	ARC 2	ARC 3
Level 1(Retrieval)				
Recognizing	Listen, do you recognize the melody.	Yes	Yes	Yes
Recalling	Listen sing clap.	Yes	Yes	Yes
Executing	Listen sing play	Yes	Yes	Yes
Level 2 (Comprehension)				
Integrating	Listen, what has changed here...?	Yes	Yes	Yes
	Clap sing and play	Yes	Yes	Yes
Symbolizing	Copy this note here	Yes	Yes	Yes
Level 3 (Analysis)				
Matching	Remember the patterns we had played?			Yes
	Do you want to change the 1 st or the 2 nd note of the first bar?			Yes
	Play the pattern on your keyboards. Do you like the sound?			Yes
	Do you want to repeat that pattern here?			Yes
	How about this new pattern?			Yes

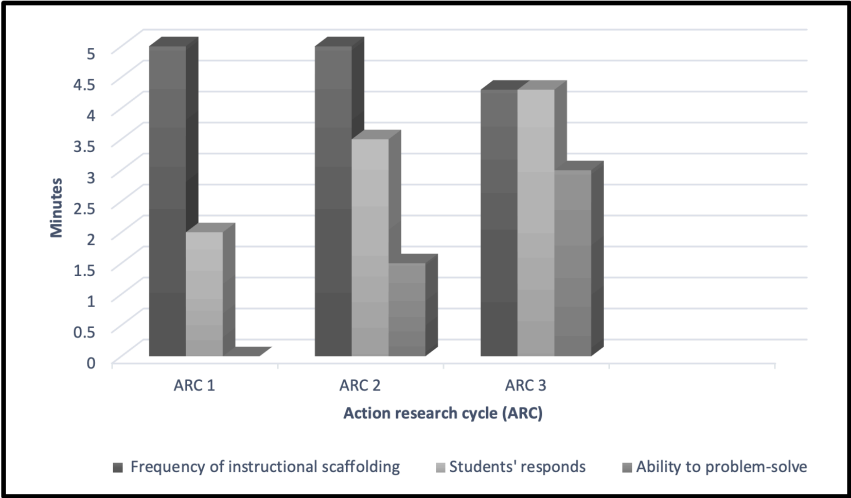


Figure 1. Summary of the frequency of instructional scaffolding to students’ response and ability to problem-solve melodic improvisation in each action research cycle.

CONCLUSIONS

Instructional scaffolding as an effective teaching method is not only beneficial to support music skills learning but also for promoting creativity among students. Through the integration of active participation and experiential learning, students could develop music skills learning in these environments into a long-lasting learning experience. These learning skills help students transfer the cognitive process, teamwork, and social skills in music learning to other learning disciplines as well (see Figure 2).

The teacher who was also the researcher in the study acknowledged the creative teaching experiences throughout the study. The instructional scaffolding allowed the teacher to develop support strategies through creative music activities. Thus, scaffolding formed the opportunities for a personal gradual creative learning environment for the teacher as well. Throughout the study, the teacher was expanding, and developing her critical thinking skills to seek for the best approach for students’ progressive learning by keeping the scaffolding theory in mind. In this sense, the teacher had to improve her teaching skills and critical thinking to a higher level which involved creating a positive change on a professional level in effective music teaching of the 21st century.



Figure 2. Expanding creativity in music teaching and learning from the scaffolding process further findings from the study.

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