A Constructivist Approach to Learning Music: What Role, if any, does active engagement play in the learning process?

Vincent Rinaldo, College of Education, Niagara University
Stephen Denig, College of Education, Niagara University

Abstract

This study focused on two questions: 1) can teachers, when placed in the role of facilitators, positively affect student learning in music without having a strong background in music themselves? and 2) is there a change in the teachers' knowledge of music that can be measured after they themselves have engaged in a teaching/learning process based on active engagement? Active engagement involved shifting from a traditional teacher – student instruction model that relies on the transmission of knowledge to an experiential/constructivist model that advocates transformational learning. The findings seem to indicate that the reciprocity of perspectives advocated by Schutz (1967) does affect growth, as there was a statistically significant change in content knowledge test scores evidenced not only in the student sample but in the teacher sample as well.

Introduction

Learning, according to Dewey, instruction must be centered on the learner and grounded in experience; the learner and not the subject matter must remain the focus of education (Rinaldo, 2004a). There is evidence regarding the benefits of active learning (Hill, 1982; Johnson & Johnson, 1991; Darch, Gersten, & Taylor,1987; Deming, 1986), yet the majority of this evidence is focused on the traditional teacher–student design model. This study, however, looks at the effects of active learning within the context of a constructivist design. This study examines a paradigm shift that is occurring throughout North American education

as it moves, according to Miller (1985), from transmission to transformational learning.

Review of the Literature

Active learning engages the student in the process of acquiring knowledge rather than placing undue emphasis on the completed product. The reciprocity of perspectives identified by Schutz (1967) appeals to the need for a teacher to simultaneously undertake the role of instructor and student. Within a constructivist paradigm, the learning is predicated on transformation rather than transaction or transmission of knowledge (Miller, 1993). Programs that are aligned to this philosophy of education allow the learner to become actively engaged in the music rather than distanced and analytic. In this regard, it is foundational to transformational learning that learning is a symbiotic process and requires that teachers share their traditional responsibilities with the students, thereby allowing for reciprocity of perspectives. The teachers cannot remain as the sole purveyors of musical knowledge. They too must be allowed to engage in the process as a learner, and in doing so they become empowered by their students who engage with them in the learning process.

The “real" curriculum emanates from the totality of experience, and experience involves people, not things (Rinaldo, 2004a). As educators we often become sidetracked, placing emphasis on the teaching of subject matter rather than on the teaching of students. From a phenomenological perspective, the emphasis

needs to be placed on the relationship that exists between the learner and the subject matter. According to Dewey (1859 - 1952) self-realization, not knowledge, is the goal of education (Dewey,1902/1990). Learning requires active engagement and emanates from within the learner and not from the teacher. It is the individual and not the content that determines learning. The singleness of the arts in general, can be found not in the individual techniques or fundamental elements that pertain to specific disciplines, but rather in their cohesive focus on both meaning and significance. The implementation of programs in the arts centers on the education of the aesthetic being, through the development of a personal expression of a life which is both personal and social in nature.

The literature regarding the use of active learning both in teacher preparation classrooms and subsequently in the classrooms of practitioners, and the effectiveness of this approach on student learning has established a solid foundation for promotion and extension of both the theory and practice extending well over a hundred years. Recently, the practice of active learning and constructivism have found support among educational researchers who have considered the principles and practices of other disciplines and adapted such practices for application into the educational enterprise (Yuretich, 2003; Kvam, 2000;). Several of these practices were based on the post-World War II early work of Deming (1986), and later extended and modified by Hill (1982), by Johnson, Johnson and Smith (1991), and by Vermette (1998). The quality and quantity of research on active learning is significant as it relates to the

effectiveness of this method (Sheeran, 1990; Sheeran and Vermette, 1990; Vermette, 1998). There have been numerous studies regarding the benefits of active learning yet the majority of these studies focus on the traditional teacher–student design model. This study, however, looks at the effects of active learning within the context of a constructivist design by focusing on the following questions:

1. Can teachers, when placed in the role of facilitators positively affect student learning without having a strong background in music themselves?
2. Is there a change in the teachers' knowledge of music that can be measured after they themselves have engaged in the learning process?

Method

Both teacher and student learning was examined through the use of specific lessons excerpted from the *Teachers' Choice Music Program* (Rinaldo, Grosso, & Thorne, 1999/2004) and measured through the implementation of a pretest-posttest design. The Teachers' Choice Music Program is a graduated program of study that places emphasis on music theory, through student engagement in the creation, performance, and analysis, of music. Beginning in Grade One, and continuing through the end of Grade Eight the program focuses on the individual's ability to effectively explore and express ideas and feelings through either vocal or instrumental arrangements. Where traditional music programs are

delivered from a western perspective that moves from the written to the aural, the Teachers' Choice Program emanates from an eastern perspective which, like the learning of language begins with an experience as a means of moving toward understanding. The lessons that were excerpted from this program for the purpose of this study were integrated into other core areas such as mathematics, social studies and language arts. Engagement included psychomotor activities such as creating and performing melodies and rhythms, affective activities such as discussions of emotional responses to a variety of rhythmic and melodic phrases or compositions, and cognitive activities such as listening to and analyzing musical elements present in a musical work.

The program is based on constructivist principles as they align with Piaget's theories of cognition. By presenting musical theory through an integrated format, the content is experienced in a manner that can become both relevant and meaningful to the learner. Each concept is presented using a variety of instructional strategies which allows the learner to make his or her own connections. Although students are physically engaged in activities that emphasize listening and creativity, it is the role of the facilitator to encourage cognitive engagement throughout the activity to ensure that learning is occurring. In addition, the program encourages the facilitator to capitalize on his or her pedagogical and personal strengths when delivering the lessons.

Participants

Approval was obtained from the both the university and school district Review Boards to ensure ethical practices. During the first month of school, two letters were sent to principals of 38 elementary schools. The first letter which was directed to the principal of the school introduced the researchers, explained the proposed study, and requested their consent to recruit members of their staff to participate in the study. The second letter was addressed to the teachers and was disseminated to them during the first staff meeting in instances where the building principal agreed to participate. Of the 38 principals to whom recruitment letters were sent only five agreed to participate. From these five staffs, 9 teachers volunteered.

Participants consisted of a sample of 8 female teachers and 1 male teacher (n=9) from 5 elementary schools in two Southern Ontario school districts. Eight teachers held Baccalaureate degrees in education and one held a Master's degree in education. One participant who currently held a Baccalaureate degree was in the final stage of completing a Master's degree in education. Teaching experiences of the sample ranged between 2 to 21 years (One participant had taught between 2 and 5 years, four participants had taught between 6 and 9 years, two participants had taught between 14 and 17 years, and two had taught between 18 and 21 years). Although only three teachers had formal musical training (two of which had 1-5 years of piano training and one 6 - 10 years of

violin), only four participants described themselves as uncomfortable with teaching music as part of the core curriculum.

The students who participated consisted of 28 first graders, 54 third graders, 15 fourth graders, 49 seventh graders, and 31eighth graders. School populations from which the samples were selected were similar with respect to SES and ethnicity.

Procedure

The study used a pretest- posttest design and ran for seven months during the first and second grading terms of a regular school year, commencing in the middle of October and ending in the middle of April. Consent was procured from all participants. In order to maintain confidentiality, each participating classroom teacher selected a pseudonym that was used throughout the study. Each classroom teacher completed and returned a personal information sheet and identified him or herself using the pseudonym. Teacher participants then were sent packages which contained five lessons per grade each of which was directly aligned with the school curriculum. Each package also included all materials needed to deliver the lessons (i.e., student work sheets, notes, examples, activities, etc.) as well as assessments and answer sheets relating to each of the lessons included in the package. The materials were excerpted from the *Teachers' Choice Music Program* (Rinaldo, Grosso, & Thorne, 1999/2004) which is self-contained music program for grades 1-8. Participating teachers were given

a list of five concepts that were addressed at each grade level and asked to select one with which they were neither familiar nor comfortable but which was grade appropriate and part of their regular curriculum. Each participating teacher then self-administered a pre-test (prior preparation or delivery of the lesson) to himself or herself and then re-administered the same test one week after the lesson had been taught. Teachers administered these same assessments to their students prior both to the teaching the lesson and again one week after the lesson had been taught. Classroom teachers scored the tests simultaneously using the answer sheets provided in the package after the posttest had been completed. All scores were recorded as percentages and entered into excel where the data was then scrubbed, leaving only paired data (those who had completed both the pretest and posttest). Brief informal interviews were then held with the participating teachers who were able to provide some insight into why they believed the changes occurred.

Results

As indicated in Table 1, mean scores were calculated for pretest and posttest scores for each set of test takers. The findings yielded increases of 29.46% for test takers in Grade 1, 15.41% for test takers in Grade 3, 28.06% for test takers in Grade 4, 50.53% for test takers in Grade 7, 37.97% for test takers in grade 8 and 35.67% for teachers. A further analysis of the raw mean scores showed an increase in the number of test takers who scored perfectly on the test; while twenty-one student test takers obtained a perfect score on the pretest, this

number increased to seventy on the posttest. Of the 9 teacher participants only one had a perfect score on the pretest while 8 of the 9 obtained a perfect score on the posttest.

Table 1: Pretest and Posttest mean scores

	N	Pretest Mean	Posttest Mean	Difference in Mean
Grade 1 Pretest	28	62.54	92.00	29.46
Grade 3 Pretest	54	74.52	89.93	15.41
Grade 4 Pretest	15	41.00	69.06	28.06
Grade 7 Pretest	49	37.31	87.84	50.53
Grade 8 Pretest	31	44.06	82.03	37.97
Teacher Pre	9	60.56	96.89	36.33

Teacher scores were examined and means for each grade were calculated and used as the norms against which students scores were examined. In the cases where there was a large discrepancy in the teacher scores, tests for independent samples were conducted to determine whether these differences impacted the student scores on either the pretest or the posttest. The test was determined by the size of the sample.

An examination of the two Grade 7 classes that participated showed that there was a substantive difference in the pretest scores of the two teachers (TPT1= 30%, TPT2= 92%); in this case the Mann-Whitney U test was applied and showed no significant difference (Z=-.682, p=.495) between the students whose teachers scored low on the pretest (m=44.31, sd=28.28) as compared to the

students whose teachers scored high on the pretest (m=43.80, sd=30.16). No significant difference was found on the posttest scores (Z=-.548, p=.582) between the students whose teachers scored low on the pretest (m=81.88, sd=12.409) as compared to the students whose teachers scored high on the pretest (m=82.20, sd=14.458).

Of the four Grade 3 teachers, two scored high (Mean = 75), and two scored low (Mean=28). As the scores were within 10 percent of one another, classes were divided according to teacher pretest results and a t test for independent samples was conducted. Levine's test for equality of variances was applied to pretest results (f=2.94, p=.121) and to the posttest (f=1.166, p=.203) and found not to be significant for either. An independent *t* test comparing the two groups found no significant difference t(53)=.610, p=.545 for the pretest scores. The mean scores of students in classes where the teachers had scored poorly on the pretest (m=75.96, sd=19.98) was not significantly lower than the mean scores of students in classes where teachers had scored well on the pretest (m=73.07, sd=14.371). There was no significant difference t(52)=.279, p=.781 between the posttest scores of the students in these classes. The mean scores of students in classes where the teachers had scored poorly on the pretest (m=89.37, sd=15.858) was not significantly different from the mean scores of students in classes where teachers had scored high on the pretest (m=90.48, sd=13.276).

As there was only one class of students in Grades 1, 4 and 8, individual teacher scores were used as the norms (Grade 1, m=73; Grade 4, m=44; Grade 8, m=96) against which the students' scores were compared. One sample *t* test was conducted on each set of scores. Although no significant difference was found for Grade 4 t(15)=1.004, p=.331, a significant difference t(27)=2.199, p=.037 was found between the teacher and student pretest scores for Grade 1 and for Grade 8 t(48)=9.636, p<.001.

As indicated in table 2, an examination of the relationship between pretest and posttest scores using the Pearson Product Moment Correlation showed a moderate relationship for test takers in Grade 1 (r=.470, p=.012), and low correlations for test takers in Grade 3 (r=.342, p=.017) and Grade 8 (r=.397, p=.027 . A Kendall's Tau b found no correlation between pretest and posttest scores for either the teachers (r=.129, p=.664) or test takers in Grade 4 (r=.166, p=.386).

Table 2: Paired Sample Correlations

		N	Correlation	Sig.
Grade 1	Pretest & Posttest	28	.470	.012
Grade 3	Pretest & Posttest	54	.324	.017
Grade 7	Pretest & Posttest	49	.107	.463
Grade 8	Pretest & Posttest	31	.397	.027

As indicated in table 3, paired sample *t* tests were conducted on pretest – posttest means for takers in Grades 1, 3, 7 and 8 to determine difference. The results showed significant growth at all grade levels.

Table 3: Paired sample t tests

		Mean	t	df	Sig. (2-tailed)
Grade 1	Pretest - Posttest	29.464	7.011	27	.000
Grade 3	Pretest - Posttest	15.407	6.080	53	.000
Grade 7	Pretest - Posttest	50.531	7.938	48	.000
Grade 8	Pretest - Posttest	37.968	8.004	30	.000

A Wilcoxon Rank Order test was used to determine difference between the pretest and posttest scores for test takers in Grade 4 and for the teachers, as the size of each data set was not deemed sufficient to meet the assumptions of the paired sample *t* test. The results showed a significant difference between the pretest and posttest scores for test takers in Grade 4 ($z=-.3$, $p=.003$), where there was an increase in the scores of 13 test takers and a decrease in the scores of 3 test takers. A significant difference was also found for teachers ($z=-.2.521$, $p=.012$). Of the 9 teachers who participated in the study, the scores of 8 teachers improved and the score of one teacher remained unchanged.

A one-way ANOVA using the Welch statistic and post hoc Bonferroni was conducted to determine difference between teachers' and students' scores on the pretest and posttest. No significant difference was found to exist between the pretest scores of teachers and student test takers ($p>.05$). However, a significant difference $F(5,181)=7.977$, $p<.001$, was found between the posttest scores of

teachers and student test takers. Post hoc tests identified these differences as only existing between teachers and student test takers in Grade 4 where the concepts traditionally associated with music are first introduced.

Discussion

It is important to note that the increase in posttest scores could be attributed to a number of possibilities. These can include previous exposure to the test or the fact that the initial test was given prior to instruction, which may be seen as automatically biasing the results. However, the posttests were not given immediately after instruction but rather one week later. In a previous study that utilized these same lessons and assessments with a sample of graduate students, no significant difference was found to exist between tests given immediately following instructions and follow-up tests given two weeks after instruction (Rinaldo, Sheeran, Vermette, Smith, & Heaggans, 2006). In this initial study, there was no instruction or review of material between tests and students were not informed of the follow-up test so as to divert the possibility that some may choose to prepare themselves for the second assessment (Rinaldo, et. at., 2006). However, this same study found that when these same concepts were taught using a traditional model of instruction, there was no significant difference between the pretest and follow-up to the posttest for students in the control group. In light of the previous study, the significant improvement in scores from pretest to posttest could be interpreted as learning. What is also of importance is that the number of test takers who obtained a perfect score increased

dramatically to 39.5% on the posttest and that the most dramatic change occurred in the teacher sample, where all but one received a perfect score on the posttest.

The impact of prior teacher knowledge also seemed not to play a role in the learning process as posttest scores between classes based on prior teacher knowledge were not found to be significantly different. There is however a definite shift in the difficulty level of the music curriculum from the third to the fourth grade which then holds constant from Grade 4 through to Grade 8. This may explain in part why the Grade 4 test takers had the lowest posttest scores. Although the material is considerably more difficult in Grades 7 and 8, the students in these grades would have already been introduced to some of the concepts in earlier grades, a luxury that the students in Grade 4 did not share.

It is a generally accepted belief that teachers should have a strong understanding of the content area that they are required to teach (Katz, 1988; Darling-Hammond, 1998); however, in the case of the arts, this is not always possible. One possible substitution is the use of a program which can engage not only the students in the learning process, but the teacher as well (Darch, Gersten, & Taylor, 1987; Meyer, Gersten, & Gutkin, 1983). This study seems to offer some support to this theory as classroom teachers who did not believe that they had sufficient background in music and who were not comfortable teaching music to

their students significantly raised the scores of their students, not to mention their own scores as well.

It is also interesting to note that the gains made by the teachers were greater than those of the students. This finding seems to suggest the importance of engaged learning. Although these findings should be viewed with caution based on the sample size and the restrictive nature of the study, there does seem to be empirical evidence that teachers can, if engaged in the learning, benefit as much, if not more, from involvement than can their students.

Conclusion

The first question examined whether teachers who did not possess a strong background in music and yet who were placed in the role of facilitator could have a positive effect on student learning. While a learning environment that employs more traditional methods (that rely on the transmission of knowledge) may be adversely affected by a lack of expertise on the part of the instructor, a constructivist model which advocates transformational learning provides situational experience from which the learning occurs. In this case, it appears that the knowledge base does not need to emanate directly from the instructor as long as the instructor has access to the correct information and can act as a facilitator in the learning process. Further research should examine whether teachers who have specialized qualifications in music provide a more enriched experience for students than teachers who do not.

The second question examined whether there is a change in a teachers' knowledge of music after actively engaging in the learning process. Although caution should be used in forming an answer to this question based on such a small number of teachers, the results indicate that a strong possibility that teacher learning occurred in this form of music instruction. Essentially, active engagement in the experience was not restricted to the students. By undertaking the role of facilitator rather than instructor, teachers were able to actively engage in the experiences with their students, and their scores increased significantly. The reciprocity of perspectives (Schutz, 1967) allows for the exchange of roles; students who studied music could be called upon by the facilitator to engage the class in further dialogue and instruction. The results of this study of teacher learning align with the well-known Learning Pyramid first introduced by the National Training Laboratory (NTL Bethel Maine, n.d.), which suggests that the most effective strategy for learning new information is through teaching others.

Three related findings emerge: a) teachers were not generally as well versed in content as were the students; b) regardless of this factor, students made significant gains in their learning; and c) although they were not comfortable with the material, the gains made by the teachers were greater than that of any of the student groups

Katz (1988) identifies four categories of learning: knowledge, skills, feelings, and learning dispositions; Darling-Hammond (2000) has also identified knowledge of content as an important element of teaching. An interesting finding in this study was that classroom teachers who did not believe themselves to be competent in the area of music (i.e., “knowledge) and who did not have a background in this area (as confirmed by the pretest scores) were successful in raising the scores of their students.

With a focus on improving test scores, many school districts across North America are purchasing and requiring teachers to implement new programs specific to numeracy and literacy. Without sufficient in-servicing on these programs teachers often find themselves frustrated and out of their element. For example, those who have a fear of math find themselves having to implement new math programs that often require skills they themselves question with respect to their own abilities. The findings of this study are especially relevant to a climate such as this. New curriculum, new programs, and new methods of teaching are constantly being introduced into the classroom and teachers need to be kept on the cutting edge. One way to ensure this would be to introduce curriculum that emphasizes facilitation over teaching, thereby allowing teachers and students to engage in the learning process.

This study produced findings that will require further research in the area of retention and higher level applications of what has been learned. The findings

also require extension beyond the scope of music education into more mainstream curricular areas such as Mathematics, English Language Arts, Social Studies, and Science. In doing so it is important to focus on how this approach differs from traditional methods of delivery as well as how long its effects last. It is important to determine whether such a method allows students to "learn" at a level that goes beyond the test. It appears that the *Teachers' Choice Music Program* has been successful in its alignment with Dewey's interpretation of progressivism through its emphasis on the need for active engagement. Rather than accept the traditional roles of teacher and student as they are found in the classroom, the program creates a learning environment that requires all participants to undertake the role of learner. It also appears that there does exist an alternative to the all or nothing approach that has come to fruition due a lack of funding for the arts. Next steps will require the application of this approach into mainstream curricula.

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