DOCUMENT RESUME

ED 271 376 SO 017 325

AUTHOR Upitis, Rena
TITLE Teaching Standard Rhythm Notation through Children's Spontaneous Notations: An Example of Reflection-in-Action.
PUB DATE Apr 86
NOTE 13p.; Paper presented at the Annual Conference of the American Educational Research Association (San Francisco, CA, April 1986).
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Aesthetic Education; *Educational Research; Educational Testing; *Epistemology; Field Studies; Foreign Countries; Music Activities; Music Appreciation; *Music Education; Music Teachers; Primary Education; Program Effectiveness; Teacher Effectiveness
IDENTIFIERS Canada; *Rhythm

ABSTRACT

The paper draws on reflective classroom work to propose strategies for teaching standard rhythm notation. The results of the study indicate how young children can make sense of rhythm notation beginning with the knowledge of rhythm that they bring to the learning situation, including motor and symbolic knowledge. In addition, this study of 60 Canadian third-graders shows how classroom teachers, even those with extensive musical and teaching experience, are able to develop new techniques based on reflective classroom practices. (TRS)

TEACHING STANDARD RHYTHM NOTATION THROUGH CHILDREN'S SPONTANEOUS NOTATIONS: AN EXAMPLE OF REFLECTION-IN-ACTION

BY

RENA UPITIS

LEARNING AND EPISTEMOLOGY GROUP
MASSACHUSETTS INSTITUTE OF TECHNOLOGY E15-309
CAMBRIDGE, MASSACHUSETTS 02139

FACULTY OF EDUCATION
QUEEN'S UNIVERSITY
KINGSTON, ONTARIO
CANADA K7L 3N6

Teaching Standard Rhythm Notation Through Children's Spontaneous Notations: An Example of Reflection-In-Action

Rena Upitis

Learning and Epistemology Group
Massachusetts Institute of Technology E15-309
Cambridge, Massachusetts 02139

Faculty of Education
Queen's University
Kingston, Ontario
Canada K7L 3N6

Many music teachers experience difficulty in teaching standard rhythm notation to their students. Although teachers may explain in meticulous detail the measured relationships between notes and the corresponding notation to depict such relationships (e.g., a quarter note is half as long as a half note, and two quarter notes occur in the time of one half note. and each type of duration has a special symbol), students nevertheless seem unable to perform the durations when asked to read from standard notation. One often hears teachers commenting on how students have difficulty with "flow", reporting that students pause at the end of each measure, despite the teacher's attempts at demonstrating and explaining how the melody carries through the measures. Similarly, it is not uncommon for students to perform two eighth notes unevenly, that is, playing them as a sixteenth and a dotted eighth. These phenomena are perplexing for two reasons. For one, the students often seem to understand the measured relationships as explained by their teacher, as indicated by their ability not only to repeat the explanation, but also to describe the correspondence between duration and symbol in words of their own. Second, usually children are quite capable of performing a sequence of durations "by ear" (that is, accurately repeating what they have heard), but then are unable to perform the same sequence of durations reading from standard rhythm notation.

One possible reason for this difficulty in making sense of what seems to be a logical notation system for duration is that standard music notation describes the metric relationships among the durations, but many children respond to the more intuitive, and qualitatively different, figural form of rhythmic structure (Bamberger, 1982; Smith, 1983; Upitis, 1985a). The research reported here indicates that if students and teachers reflect on the differences between figural and metric representations of rhythm, then students will find standard notation for rhythm far less perplexing than might otherwise be the case. Further, by examining the differences and similarities between figural and metric representation of rhythm, the importance of figural structure as it relates to metric structure can also be illustrated. That is, neither figural nor metric representations alone describe the rhythm *in toto*, but rather, the combination of the two representational forms more closely describes the richness of rhythm structures.

Figures and Meter

When listening to a piece of music (music here is taken to mean Western tonal music), the listener naturally responds by organizing the various discrete notes into meaningful chunks or figures (Bamberger, 1982; Lerdahl and Jackendoff, 1983; Upitis, 1985a). This chunking phenomenon has been demonstrated in many other domains as a way of organizing complex perceptual information into manageable units (Lerdahl and Jackendoff, 1983; Miller, 1956). Meaningful figures or chunks can be small segments of a melody, such as three or four notes in a sequence, or they can be larger groups such as several motifs which together make up a phrase, or, in turn, several phrases which make up a secti... of a piece (for a full description of hierarchical figural structures, see Lerdahl and Jackendoff, 1983). If one were to use a figural notation for durations, one would use symbols to show how several notes group together and are separate from other notes. Thus, it is possible that short notes and long notes would be notated with the same symbol. For instance, if two short notes followed by a single long note formed a figure, the same symbol would be used for all three events. However, this is not how rhythmic figures are depicted in standard notation. Instead, figures are often marked in the score by the addition of slurs to the metric notation used to depict durations.

Insert Figure 1 about here

One way of responding to the metric aspect of rhythm structure is to tap along with music at a steady rate. The existence of a steady pulse is precisely what makes it possible to develop a measured, standardized system for representing durations. Because the underlying pulse is constant, each of the notes of the melody can be "measured against" the pulse. Thus, if a person is tapping at a quarter note rate, two notes per tap would be eighth notes, and one n...e for every four taps would be a whole note, and so on. Metric organization, like figural organization, is hierarchical. That is, the pulse can be divided (a quarter note pulse could be "played" twice as fast, i.e., as an eighth note beat) or grouped (a quarter note pulse could be played three times as slow, i.e., as dotted half notes). In fact, the particular ways in which the pulse is divided and grouped creates a pattern of strong and weak beats, which together define the meter of the piece. Most Western music is written in either a duple meter (where divisions and groupings of the pulse occur in a 2:1 ratio) or a triple meter (where divisions and groupings of the pulse occur in a 3:1 ratio). In standard rhythm notation, long notes and short notes are consistently notated in terms of the meter of the piece, regardless of their figural function. Examples of figural and metric notation are given in Figure 1. For a fuller discussion of figures and meter, refer to Lerdahl and Jackendoff (1983) and Upitis (1985a).

Research on Children's Knowledge of Rhythm

The empirical basis for children's understanding of rhythm, upon which the reflective teaching practices reported later in this paper are based, is an extensive examination of children's rhythm knowledge (Upitis, 1985a). The study was undertaken to establish the nature and extent of children's understanding of rhythm in terms of the figural-metric model across various response domains which are invoked in learning to play a musical instrument. Several tasks examined children's abilities to produce spontaneously figural and metric descriptions, interpret figural and metric descriptions, produce the metric hierarchy through motor actions, and describe the metric hierarchy by relating it to the durations of the melody notes. Tasks were presented individually through standardized, clinical interviews. Seventy-two children participated, half of whom had musical training outside of school which included note-reading instruction. Findings from portions of three of the five experimental tasks are briefly summarized below.

Non-parametric statistics indicated that all of the children in the study had strong figural understanding across response domains and across types of musical examples (five rhythm patterns and five melodies of different meters, durations, and length were used; see Upitis, 1985a). When asked to make a single description of a rhythm, "drawing something so that you can remember the rhythm or show it to someone who isn't here today", most children, both with and without musical training described the rhythms in a figural manner (64 percent and 59 percent, respectively). However, children with musical training were far more likely to use a metric description than a figural one after being exposed to both forms during an intervention task ($p = 0.0015$), and further, children who could graphically relate the metric hierarchy to the durations of the notes of a melody were more likely to be musically trained ($p = 0.002$). Conversely, children without musical training also exhibited metric knowledge in their ability to keep time to various melodies at different rates, and further, in their ability to describe the metric hierarchy verbally and in pencil-and-paper descriptions. Thus, musically trained children did not lose figural understanding in the process of developing metric abilities, and children with strong figural understanding had some knowledge of metric structures (as indicated by their ability to keep time). This is an extremely important finding, since it indicates that the children understood something of both forms. In fact, the analysis indicated that age was a much more significant predictor than musical training regarding abilities in making and reading descriptions of both the figural and metric forms ($p = 0.0001$ and $p < 0.0001$, respectively), and in keeping time to music ($p = 0.0317$).

Further Research in the Classroom

Given the results of the study described above, it was concluded that techniques for teaching standard (metric) rhythm notation should include an examination of children's figural rhythm knowledge as well as a movement component which would illustrate and reinforce metric organization. The strength of the figural response also indicated that alternate notation forms developed by the children themselves could be used by teachers to foster the integration of the figural and metric forms, both for theory and performance. This is in accordance with studies which have shown that the interaction between the two representational systems creates the overall rhythmic structure of music and aesthetically pleasing performance (Clarke, 1982; Henderson, 1936; Mozart, 1756). The discussion below indicates how two teachers were able to develop techniques to foster children's understanding of the interaction between the two representational forms by reflecting on children's knowledge, which in turn led to the development of new teaching techniques. The process undertaken is akin to what Schon (1983) describes as "reflection-in-action".

Reflection-in-Action

Schon argues that the most effective professional practitioners, be they architects, lawyers or teachers, engage in a continual process of reflection about their professional actions. He identifies several forms of thought and action which together constitute his model of reflective practice. First, he describes knowing-in-action as skillful behavior which occurs seemingly without "intellectual operation" on the part of the actor. For instance, the experienced golfer skillfully judges driving distance with apparent effortlessness. Schon argues that the importance of knowledge-in-action in competent practice is underestimated.

By reflection-in-action, Schon (1983) refers to thinking about "performance" situations within one's practice, and further, reflection-on-action as thinking about prior patterns of actions in practice. He gives the example of jazz improvisation to illustrate reflection-in-action, where the musicians jointly feel the music evolving based in their interdependent contributions, making new sense of the performance and adjusting their performance to the new sense that they have made (Schon, 1983, p. 55). Schon claims that this type of reflection-in-action within the context of professional practice serves to counterbalance the rigidity which may result from "overlearned" knowledge-in-action. He claims that by reflecting in and on practice, the practitioner can criticize the tacit understandings, and can make new sense of situations of uncertainty or uniqueness (Schon, 1983, p. 61).

Schon argues that the educator who reflects in such a way while teaching in effect conducts experimental research within the classroom, actively exploring new methods and endeavoring to "develop in himself [sic] the ability of discovering them" (Schon, 1983, p. 66). Music teachers reflecting on their practice might do well to question why the same methods have been used to teach certain aspects of the discipline, such as rhythm notation, despite the commonly experienced problems associated with such methods.

On the basis of a two-year teaching experiment, Schon suggests that reflective teachers conduct what might be regarded as three specific forms of classroom experimentation: exploratory experimentation, move-testing, and hypothesizing. He describes exploratory experimentation as the "probing, playful activity by which we get a feel for things" (Schon, 1983, p. 145). It is through this rather informal probing or messing about that Schon claims that new phenomena or teaching methods are often discovered. In move-testing experiments, the teacher undertakes an action with a particular end in mind. Taking an example from the present research, once a new technique for teaching standard notation was envisaged during the exploratory experimentation period, it was applied with the intent to give children the means to notate their own rhythm patterns using standard notation. Finally, in hypothesis testing, the teacher conducts on-the-spot experimentation, using the same logical inferences as in hypothesis testing in the scientific context, but differing from scientific hypothesis testing in that the teacher has an interest in transforming the present situation. In the present study, there was considerable hypothesis testing in terms of individual children who seemed unable to use standard notation, even with the use of non-traditional teaching strategies.

The Classroom Setting

The two teachers involved in the classroom research conducted a teaching experiment where they taught Grade 3 children music composition in the reflective manner described by Schon's theory (Upitis, 1985b). The research took place in Kingston, Ontario, from October 1984 to June 1985. Sixty children were involved in the study. They were taught in small groups of up to 15 students per group.

Several aspects of the research setting encouraged reflective practice. First, one of the teachers was the principal investigator for the classroom study and for the empirical study already described. This meant that the author was intimately involved both with the teaching and research, and thus, reflective processes were critical to both teaching effectively while at the same time considering the research implications. Although this necessitated the "wearing of two hats", the advantages were considerable. While it could be argued that the lack of objectivity inherent in the present research was a disadvantage, the opposite view is taken here. When new strategies are being developed and examined, the potential power of such strategies is more likely to be discovered by an experienced teacher who has a deep interest in developing new methods. For examples of related research, see Fleshner (1958), Kalmykova (1955), and Kantowski (1979), where master physics and mathematics teachers were observed in their natural classroom settings.

Another aspect which made the research described here different from many other music education studies is that the two teachers spent nearly the full school year conducting the research, replacing the regular school music teacher. Thus, the students came to regard the two research-teachers as "regular" teachers, rather than mere visitors who came to observe and perhaps intervene in their normal classroom activities.

The third factor which made the present study an unusual one was that the music program focused on music composition as the primary means to develop music interest, literacy, and performance. Much of the school year was spent teaching children standard music notation so that they would have the language with which to use the composition tools. Thus, the children had a special reason to learn standard notation. Children were involved in various individual and group activities focusing on composition, improvisation, and performance. Specific group activities included, but were not limited to, singing, movement games, instruction on pitch and rhythm notation (specific techniques are described in the following section), performance of compositions on simple instruments or a computer, and instruction on specific aspects of composition which arose from the children's work, either as problems or as examples of successful techniques. For example, one child was particularly good at creating melodies using "upside-down notes", which led to a group session on the use of inverted motifs. Individual activities included improvisation and composition using various tools such as computer programs, manuscript paper, simple instruments, or the piano, and such activities as story and poetry writing (later set to music). Classes were 45 minutes in length. Usually children spent 30 minutes of that time working on individual pieces or perhaps with a partner. Occasionally, the entire time was spent on individual projects when the children were deeply involved in a particular composition or preparing for a performance of their compositions. Conversely, if a special group activity was planned, such as a guest performer, no individual time was allotted. The mood of the classroom was energetic, with students working in many different directions. The two teachers acted as consultants when the children were working on individual activities by helping out with specific melody, harmony, or notation problems, or by just being the first to hear new masterpieces offered by the children.

Rhythm Teaching Strategies

Rhythm notation was taught in the group setting, using a combination of figural and metric techniques. The two most important features of the strategies used were that they combined both movement and symbolic notation, and that they were developed from the findings described earlier in conjunction with reflective classroom interaction. In fact, it was through the individual work sessions that the techniques were first tested and developed with only a few children, before they were taught to all of the members of the classes. Two important techniques are described below. The development of the second technique is described in some detail in terms of reflective practice.

Using movement to teach musical concepts is not a new idea. For many years, teachers have used such techniques as those developed by Emile Jaques-Dalcroze to relate various principles to children. In fact, several Dalcroze strategies were used in the present study (for a description of other Dalcroze techniques, see Abramson, 1978). For instance, children performed "body canons" to help emphasize duple and triple meters. In one version of the body canon, the leader (the teacher or a child) performs a one measure pattern on some part of the body (e.g., in 3/4 time, the leader may play a pattern of a quarter, two eighths, and a quarter on his or her knees). The other children then repeat the pattern at the same time as the leader plays the next pattern (e.g., a half note and a quarter note on the shoulders). Thus, as the children play the canon, they both feel and see the relationship between meter and measure and the various durations which are played.

It was observed that while children were easily able to perform body canons, they nevertheless tended to use figural notational forms when notating rhythm patterns of their own creation in the context of the composition activities described earlier. Thus, the possibility of teaching standard notation through movement was explored with a few children. In this stage of exploratory experimentation, the children were given four pieces of colored paper, with a different color denoting each beat. The teacher had a similar set of papers. The papers were arranged in a row, forming a visual spatial analog for the underlying meter. The teacher played a pattern on the papers, just as a pattern was played on the body in the body canon movement activity. For example, a pattern of four eighth notes (beats 1 and 2) and two quarter notes (beats 3 and 4) might be played in 4/4 time. The children were asked to repeat the pattern on their own papers, and then to describe what happened on each of the beats (e.g., "What happened on yellow?" or "Which colors had eighth notes?", followed by "What happened on beat 2?", etc.). Children took turns as leaders, as was the case for the body canons. During this exploratory stage, the teachers experimented with the degree of complexity of patterns which children could play back and also describe verbally. It was found that duple relationships were easily grasped (e.g., eighth:quarter:half:whole), but triple relationships were more difficult (e.g., triplet eighth notes:quarter).

In the move-testing phase, all of the children played patterns on the paper, and in addition, standard durational symbols were introduced for sixteenth, triplet eighth, pairs of eighth notes, quarter, half, dotted half and whole notes, as well as quarter, half and whole rests. The exercise was modified for different meters (e.g., three papers for 3/4 time, two papers for 6/8 time). Move-testing continued throughout the year, as more complex patterns were introduced, and movement as well as speech was used to emphasize the more difficult durational relationships.

Hypothesizing was usually limited to one-on-one interactions between student and teacher, where the teachers explored difficulties experienced by individual children in using standard notation. Here the teacher would often compare the child's spontaneous notation with standard notation, verbally and through movement. Using the described techniques, the teacher would try to ascertain where the discrepancies between the two forms arose, both to help the child use the standard form and to elucidate the relationship between figural and metric rhythm organization.

The rhythm notation skills of the students who were involved in the experimental music program at the end of the study were compared with their skills at the beginning of the study, as well as with a control group. While there were no differences at the beginning of the study between the control and experimental groups on a pencil-and-paper test (adding barlines to patterns of varying durations for different meters), the differences at the end of the year were remarkable. The students in the experimental group performed significantly better at the end of the year ($p < 0.001$) and significantly better than their peers in the control group ($p \ll 0.001$). Further, and more importantly, the students in the experimental group were able to use rhythm notation effectively in their own compositions (see Figure 2).

Insert Figure 2 about here

Concluding Remarks

The present paper draws on reflective classroom work to propose strategies for teaching standard rhythm notation. The results reported are important because they show how young children can make sense of rhythm notation beginning with the knowledge of rhythm that they bring to the learning situation, including motor and symbolic knowledge. Perhaps even more importantly, this study shows how classroom teachers, even those with extensive musical training and teaching experience, are able to develop new techniques based on reflective classroom practices.

References

Abramson, R.H. (1978). *Rhythm Games for Perception and Cognition*. New York: Volkwein Bros., Inc.

Bamberger, J. (1979). Music and cognitive research: Where do our questions come from; where do our answers go? *Presented at the American Educational Research Association, 1979 Annual Meeting*, April 8 - 12, 1980, San Francisco, California.

Bamberger, J. (1982). Revisiting Children's Drawings of Simple Rhythms: A Function for Reflection in Action. In S. Strauss (Ed.) *U-Shaped Behavioral Growth*. New York: Academic Press.

Clarke, E.F. (1982). Timing and performance of Erik Satie's "Vexations". *Acta Psychologica, 50,* 1 - 19.

Fleshner, E.A. (1958). Psychology of the Mastery and Application by Schoolchildren of Some Concepts in Physics. In N.A. Menchinskaia (Ed.),*Proceedings of the Symposium on the Psychology of Applying Knowledge in School Work*, Moscow.

Henderson, M.T. (1936). Rhythmic Organization in Artistic Piano Performance. *University of Iowa Studies in the Psychology of Music, 4*, 281 - 306.

Kalmykova, Z.I. (1955). Psychological Prerequisites for Increasing the Effectiveness of Learning in Problem Solving in Arithmetic. *Symposium on Ways of Improving Children's Work in the Primary School.* Academy of Educational Sciences of the R.S.F.S.R., Moscow.

Kantowski, M.G. (1979) Another view of the Value of Studying Mathematics Education Research and Development in the Soviet Union. In Davis, R.B., Romberg, T.A., Ruchlin, S., and Kantowski, M.G. (Eds.), *An Analysis of Mathematics Education in the U.S.S.R.* ERIC Clearing House, SMEAC.

Lerdahl, F. and Jackendoff, R. (1983). *A Generative Theory of Tonal Music.* Cambridge, Mass: MIT Press.

Miller, G.A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information, it Psychological Review, 63, 81 - 97.

Mozart, L. (1756). *A Treatise on the Fundamental Principles of Violin Playing* (transl. E. Knocker) London: Oxford University Press.

Schon, D. (1983). *The Reflective Practitioner: How Professionals Think in Action.* New York: Basic Books.

Smith, J.E. (1983). *Memory for Musical Rhythms: The Effect of Skill.* Unpublished doctoral dissertaion. Macquarie University, Sydney, Australia.

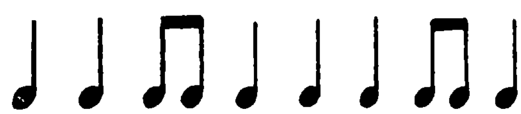
Upitis, R. (1985a). *Children's Understanding of Rhythm: The Relationship between Development and Musical Training.* Unpublished doctoral dissertation, Harvard University, Cambridge, Mass.

Upitis, R. (1985b). *Musicland in the Classroom: Teaching Children the Elements of Music Composition.* A report prepared for the Ministry of Education, Ontario (Research Grant 1206-04-767).

Figure 1. Examples of Standard and Spontaneous Notations for a Simple Rhythm

Standard Music Notation

Standard Rhythm Notation (Metric)



Spontaneous Figural Rhythm Notation

Spontaneous Metric Rhythm Notation

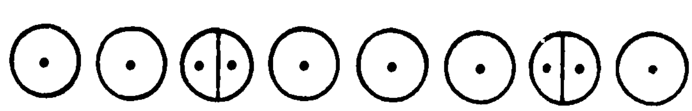


Figure 2. Examples of Children's Compositions Using Standard Rhythm Notation