

The Science and Psychology of Music Performance:

Creative Strategies for Teaching and Learning

2. Subskills of music performance

PRACTISING

ABSTRACT

Efficient and effective practice is central to the development of musical expertise. Practice is recognized by psychologists, educators, and musicians as an essential aspect of cognitive and motor skill development. Musicians engage in practice for many reasons such as gaining technical proficiency, learning new repertoire, developing musical interpretation, memorising music, and preparing for performance. Fluency is achieved through effective practice with complex tasks eventually becoming automated. Practice is most effective when it is deliberate and mindful. Teachers not only have a crucial role to play in assisting pupils in acquiring musical expertise but also in developing knowledge of appropriate practising and learning strategies and supporting them in becoming autonomous independent learners. Musicians wishing to practise more effectively and teachers wishing to guide their pupils toward greater achievement are advised to engage in metacognition and reflect upon their own thought processes, approach practice systematically, engage in mental practice, invest time in score study and analysis, plan regular practice sessions with several relatively short practice sessions distributed across time, acknowledge the relationship between time spent practising and achievement and set out to invest the time necessary, be aware of the importance of motivation, listen to appropriate musical examples, and facilitate and nurture the

development of the young musician. The old adage "practice makes perfect" may not necessarily be true, because repetition of ineffective practice can yield disappointing results. Research demonstrates the importance of using effective approaches to practice.

SUBSKILLS OF MUSIC PERFORMANCE 2.2

PRACTISING

If I don't practice for one day, I know it; if I don't practice for two days, the critics know it; if I don't practice for three days, the audience knows it.

Ignacy Jan Paderewski, quoted in Shapiro, *An Encyclopedia of Quotations About Music* (1978)

What is practice?

Definition

Practice is defined as “repeated performance or systematic exercise for the purpose of learning or acquiring proficiency” (Cayne et al., 1990, p. 787) and is recognized by psychologists, educators, and musicians as an essential aspect of cognitive and motor skill development. “Almost always, practice brings improvement, and more practice brings more improvement” (Newell & Rosenbloom, 1981, p. 1). The notion that practice is required for skill development has most certainly been around since the dawn of time. (Just imagine an early human refining spear throwing accuracy through repeated trials.) However, scientific interest in the nature of practice and its relationship to the transition from novice to expert performance has only emerged within the past 100 years

or so, with a growing body of studies across diverse disciplines (Hallam, 1997a, 1997b; Jorgensen & Lehmann, 1997).

Time Well Spent: Managing Practice Time

The relationship between time spent practising and achievement

To acquire musical skill it is essential to practise. The question that has concerned researchers is, therefore, not whether practice is necessary but to what extent it is necessary. Some researchers have argued that attainment is monotonically related to practice and, consequently, can directly predict achievement (Ericsson et al 1993; Sloboda, Davidson, Howe & Moore, 1996).

While the research evidence suggests that to achieve high levels of musical expertise requires considerable practise, there is wide individual variation. Typically, 16 years of practise are required to achieve levels which will lead to international standing in playing an instrument. The individual usually begins to play at a very early age, with 25 hours of practise being undertaken weekly by adolescence, and subsequently increases to as much as 50 hours (Sosniak, 1985). However, there is considerable individual variation. A study of current and past levels of deliberate practice in three groups of violinists, potential international performers, good performers, and those who were training to be teachers called upon these violinists to recollect the amount of time that they had spent practising. The violinists deemed of international standing had accumulated 7,410 hours of practice at age 18, the good violinists 5,310 hours and the teachers 3,420 hours (Ericsson et. al, 1993). Another study (Sloboda, Davidson, Howe & Moore, 1996), compared five groups of young musicians of differing capabilities and found greater levels of practice at all ages from the "best" group. This increased over time leading to

large cumulative differences, although there was wide individual variation. Some individuals in all groups managed to attain grade examination passes on very little practice. There were others who did four times as much practice as the average to attain a given grade. The greatest extremes were in the highest achieving group. Recent research (Hallam, 1998a; Williamon & Valentine, 2000) has suggested that while cumulative practice may be a good predictor of the overall level of expertise attained it may not predict the quality of performance at any point in time. There is also evidence that the practice undertaken and required for different instruments varies (Jorgensen, 1997).

Organization of practice time

Human performance literature on distribution of practice time suggests (Oxendine, 1968):

1. Practice distributed over time is generally more efficient for learning and performance than massed practice (i.e., a great deal of practice in a limited time frame, such as a student "cramming" just before a lesson).
2. Relatively short practice sessions are generally more effective than longer practice sessions. Of course, this varies with the age and skill level of the musician. However, the amount of time that one can spend in uninterrupted, intense concentration is quite limited even for experts.
3. It is advantageous to decrease gradually the number and frequency of practice periods during the learning period.
4. Learning is more effective when the length of practice periods is progressively decreased during the learning period.

5. Proficiency developed over a long period of time is retained better than proficiency developed within a short time period.
6. A high level of motivation enables one to benefit from longer and more concentrated practice than would be possible with less motivation.
7. Individuals who are more competent in a particular activity can effectively practice that activity for longer periods than individuals who are less competent. Also, older children can practise longer than younger children. However, even very advanced musicians are subject to mental and physical fatigue and are advised to distribute practice over time.
8. Some group activities (such as ensembles) can involve practice for longer periods of time than individual activities because the individual may not be playing the entire time (i.e. bars rest while other sections play, breaks while the conductor rehearses other sections, etc.).

A more recent study of abilities and practice style (Mumford, et al, 1994) also concluded that practice must be distributed across time to allow for deep, higher-level thinking in which the individual actively constructs principles. Distributed practice may be essential when educators work with novices who lack well-developed knowledge structures and when students must begin to generate new concepts and apply those concepts. However, this study also revealed that massed practice may prove useful under two conditions: (a) If the goal of training is a particular behavior rather than understanding, and (b) for experts who already possess the requisite knowledge structures.

Cognitive Strategies

Mental practice

Mental practice involves cognitive rehearsal of a skill without physical activity. Oxendine (1968) described three different forms of mental practice: (a) review immediately preceding, following, or coinciding with the performance, (b) formal or informal rehearsal between periods of physical practice, and (c) decision making relating to the strategy making phases of the activity occurring during (or between) periods of physical practice or performance. Reviews of the mental practice literature (Johnson, 1979; Weinberg, 1982) reveal the following principles of mental practice for motor skill acquisition:

1. The learner must have some prior experience with the task or with a similar task.
2. Mental practice is most effective during the early stages of learning when the student is just beginning to formulate ideas about the task and during later stages when more complex strategies have developed. It does not seem to be as effective during the middle stages.
3. The learner must be able to express the task verbally.
4. The learner must be taught proper techniques of mental practice such as focused concentration and visualization.
5. Mental practice is most effective when used in combination with physical practice.
6. Mental practice sessions should be brief, generally not more than five minutes in length.
7. When imagining themselves performing, individuals should try to “feel” themselves going through the movements.

8. Mental practice seems to be associated with muscular responses in the muscles that would actually perform the movement.

Other studies in music learning also support greatest advantages for participants when mental practice techniques are combined with physical practice (Coffman, 1990; Ross, 1985; Rubin-Rabson, 1941c).

Analysis

Time invested in thoughtful analysis of the music one is practising is well spent. Analytical study of the music prior to physical practice in which aspects such as key, meter, and familiar patterns are noted may increase performance accuracy (Barry, 1992) and reduce the number of physical trials required to achieve technical proficiency (Rubin-Rabson, 1941b). Studies of sight-reading support the notion that pre-playing analysis helps musicians to play more accurately (e.g., McPherson, 1994). The evidence suggests that pre-playing analysis should form part of regular practice, particularly in the early stages of learning a new piece.

Deliberate practice

In recent literature, the term deliberate practice is often used to specify the type of practice associated with the development of expert skills in a variety of areas such as computers, sports, and music (Ericsson, et al., 1993, 1997; Pranger, 1999). Deliberate practice requires a specific goal at an appropriate difficulty level for the individual, meaningful feedback, and opportunities for repetition and correction of errors (Ericsson, 1997). Deliberate practice is very focused and requires great effort and concentration. Some research in music suggests that because deliberate practice is so effortful, it is not necessarily enjoyable (Ericsson, et al., 1993).

Metacognition

The importance of metacognition in learning has only recently been recognised. Metacognition refers to the learner's knowledge about learning itself (i.e. thinking about thinking). In the context of instrumental music this clearly is central to practice. Metacognitive skills are concerned with the planning, monitoring and evaluation of learning. For effective learning to take place the deployment of metacognitive skills is essential. These include knowledge of personal strengths and weaknesses; available strategies, task oriented and person oriented; and domain knowledge to assess the nature of the task and evaluate progress towards the goal (Hallam, 2000).

The level at which a musician is able to engage in metacognition seems to be a function of musical expertise. A study comparing professional and novice musicians (Hallam, 1997c) revealed that the expert musicians had well developed metacognitive skills, including self-awareness of strengths and weaknesses, extensive knowledge regarding the nature of different tasks and what would be required to complete them satisfactorily, and strategies which could be adopted in response to perceived needs. This not only encompassed technical matters, interpretation and performance but also questions relating to learning itself, concentration, planning, monitoring and evaluation. On the other hand, the novice musicians demonstrated less metacognitive awareness, the amount and structure of their practice tending to be determined by external commitments (e.g. examinations). A detailed study of two conservatoire students (Nielson, 1999) supports these findings, identifying what are described as primary strategies (selection; organising and integration) and support strategies (directing attention; mastering achievement anxiety; securing efficient use of time).

If metacognition is important in practice, can we teach metacognitive skills to novice musicians? Two studies which have examined changes in practice as expertise develops shed some light on this (Gruson, 1988; Hallam, 1997c). Taken together the

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studies revealed that novice musicians often appear to be unaware that they are making errors, perhaps because they do not have the appropriate internal aural schemata to identify when they have made a mistake. When they reach a stage of expertise where they begin to identify errors they initially correct them by repetition of the single wrong note. As they become more experienced, small sections (half bar or a bar) are repeated when errors are made. Error correction gradually changes to a focus on "difficult sections" which are then worked on as units. In the early stages of learning, novices have problems in identifying difficult sections and tend to practise by simply playing through the music. This has been confirmed in a range of settings (Gruson, 1988, Hallam, 1997c, Renwick & McPherson, 2000). Beginners demonstrate little or no self-regulation in their practice (McPherson & Renwick, 2000). Initially, they tend to focus on playing notes which are at the correct pitch, but as their expertise develops, attention is then directed to rhythm, other technical aspects of playing and later dynamics, interpretation and the expressive aspects of playing (Hallam, 1992).

The use of specific strategies for practice is reported before they are actually adopted. This reflects findings from research in memory development, where it is known

as a "production deficiency" (Flavell et al., 1966). Changes in strategy use seem to be more closely linked to developing expertise than age. Correlations suggest a closer relationship between developing expertise and strategy use than specific performance outcomes. The level of expertise, rather than general development, is more important in the practising behaviour adopted (Hallam, 1997b, 1997c). It seems as if strategies depend for their utilisation on the development of appropriate schemata and skills. Prior to the development of these, learning about the nature of particular strategies and how to adopt them is not productive. Once a certain level of expertise has been attained it is possible to identify similarities among professionals' use of strategies. There is a greater concern with interpretation, and individual differences emerge in approaches and orientations to practice (Hallam, 1997c).

Individual differences

There has been a tendency in research on practice to assume that musicians are a homogeneous group who are similar in the ways in which they undertake practice. This may not be the case. Several researchers have identified differences in learning styles and approaches to practice. A recent study found differences in orientation to practice, approach to detailed practice, and interpretation (Hallam, 1997c). Similar diversity was observed in an investigation of the problems experienced by professional woodwind specialists who played several instruments and were required to transfer from one to another during the same performance. The research concluded that there was no single method by which the musicians adapted when transferring embouchure control, air support, tonguing and vibrato production from one woodwind instrument to another (McLaughlin, 1985). Within the "approaches to learning" paradigm, researchers studied

the practice of six 14-year-old students and identified deep and surface approaches to learning. Those adopting a deep approach defined the practice task in musical rather than technical terms, although they were aware of the need to achieve fluency in technical matters. Surface approach students adopted rote learning strategies and sought external support (Cantwell & Millard, 1994). Whether these styles and approaches are relatively fixed individual characteristics or processing strategies adopted in relation to the nature of the particular task being undertaken is open to question. What is important is that musicians are different and if their practice is to be effective they need to be aware of these differences and how best to optimise their own practice. A later study (Sullivan & Cantwell, 1999) analysed the relationships between high level of planning, strategy use, and deep and surface approaches to learning. In two different tasks, one with traditional notation, the other with a non-traditional graphic score, a deep approach was consistently linked with high level cognitive strategies and a high level of planning.

Research also suggests that different individuals may require different types of structure or practice organization for optimum skill development (Kane, 1984). One study explored the effects of individual differences in cognitive style, gender and practice condition (structured practice vs. practice with no special structure) upon the technical accuracy and musicality of student instrumental music performance. Students following a detailed practice procedure (structured practice) made more improvement in the accuracy and musicality of their musical performances than did those students practising without benefit of a specific structure. The most striking differences, however, were observed in field-dependent (students having difficulty identifying an image embedded within a

complex visual field) males with those individuals showing markedly greater improvement under structured practice (Barry, 1992).

Practice Activities

What is the purpose of practice?

In music, practice is necessary to enable musicians to acquire, develop or maintain aspects of technique, learn new music, memorise music for performance, develop interpretation, and prepare for performance. One of the main purposes of musical practice is to enable complex physical, cognitive and musical skills to be performed fluently with relatively little conscious control, freeing cognitive processing capacity for higher order processing (e.g. communicating interpretation). This requires that many performing skills are undertaken relatively automatically. Three stages are generally recognized in the development of a motor skill (Fitts & Posner, 1967). In the initial stage, the cognitive-verbal-motor-stage, learning is largely under cognitive, conscious control, requires effort, is deliberate and may require verbal mediation. During the second stage, the associate stage, the learner begins to put together a sequence of responses to produce a desired outcome. This becomes more fluent over time. In the final stage, the autonomous stage, the skill becomes automated and appears to be carried out without conscious effort. (See Chapter 2.2, Motor Control and Instrumental Technique for more information.)

Learning new music

A second purpose of practising for all musicians is to learn new repertoire. Several studies have addressed the issue of how musicians learn new music. These

studies (Chaffin & Imreh, 1994; Hallam 1995a; 1995b; 1997c; Miklaszewski, 1989; 1995;

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Wicinski, 1955) taken together suggest that:

1. Most musicians tend to acquire an overview of the music they are to learn in the early stages of practice of a new work. The way that this is acquired depends on their ability to develop an internal aural representation of the music from examination of the score alone;
2. The structure of the music determines how it is divided into sections for practice.
3. The more complex the music the smaller the chunks which are dealt with.
4. As practice progresses the units become larger.
5. As practice on a work nears completion the length of the passages worked on tends to become more similar.
6. A hierarchical structure appears to develop, in which the performer's notions about the ideal performance are gradually integrated into a coherent whole. This plan is guided by musical rather than technical considerations.
7. There is considerable individual diversity in the ways that musicians practise. The detailed progression of practise on a particular piece may differ as a result of this.

However, the learning outcome, the integrated performance plan, appears to be similar

for all. The routes to achieve it seem to be different depending on the preferred automated and conscious strategies adopted.

The way that practice progresses also depends on the nature of the task. Research has shown that musicians approach the task of learning contemporary music differently and tend to find it more difficult. They also place greater emphasis upon cognitive strategies (specific strategies about how to approach the task) (Miklaszewski, 1995; Hallam, 1992).

Developing interpretation

There has been relatively little research on the way that musicians go about developing interpretation. There are two main approaches, intuitive and analytic. If an intuitive approach is adopted, interpretation evolves during the course of learning to play the piece and is based on intuitive feelings and instincts. When an analytic approach is adopted interpretation is based on extensive listening to music, comparison of alternative interpretations and the analysis of the structure of the music. Here, interpretation can be developed with little actual physical practice taking place. Some musicians adopt both approaches to developing interpretation, although they tend to exhibit a preference for one (Hallam, 1995b).

Memorising music

A further purpose of practice is to memorise music for performance. The evidence suggests that while much memorisation takes place as practice proceeds musicians may have to adopt additional strategies towards the end of the learning process to consolidate their learning (Chaffin & Imreh, 1994; Miklaszewski, 1995). The strategies adopted depend on the nature of the task and the context within which the music is to be

performed (Hallam, 1997a). Musicians report being more likely to rely on automated aural memory without resort to cognitive analysis if the piece is short, simple and to be performed in a relatively unthreatening environment, e.g. an informal concert. The evidence also suggests that changes in memorisation practice strategies occur as expertise develops (Hallam, 1997a; McPherson, 1995/6). (See Chapter 2.6 for a detailed discussion of this topic.)

Preparing for performance

Skill acquisition by musicians differs from that in many other domains because performance is in the presence of an audience, usually at a predesignated time. This requires specific preparation over and above being able to complete task requirements. Musicians adopt a variety of practice strategies to prepare for performance (Hamann & Sobaje, 1983). Research has identified a range of life-style coping strategies, but one particular group of strategies seems to relate specifically to being technically and musically well prepared. This includes playing warm ups, rehearsal to mastery, slow practice, listening to recordings, practising more difficult materials than those required, sight reading new works, and ensuring that instruments are in excellent condition. Some musicians practise performance by playing for peers. Musical preparation is one of the most effective strategies for coping with stage fright, although it is often adopted in conjunction with other strategies (Bartel & Thompson, 1994). Another study found considerable individual diversity in perceived levels of performance anxiety and the adoption of a range of learning strategies to overcome them. A novice sample exhibited a similar range of perceived anxiety in relation to performance but their coping strategies were less well developed. Their focus was reducing the feelings of fear rather than

alleviating detrimental effects on performance. This had clearly not developed the same significance as for the professional group (Hallam, 1992).

Teaching Pupils to Practice Effectively

The teacher

Music teachers acknowledge the importance of practice and report that they discuss specific practice techniques with their students. A survey of 94 applied music teachers found that most teachers encouraged students to use different approaches to practice, to begin a piece slowly and gradually increase the tempo, and to analyze a new piece before playing it. Teachers also tended to encourage students to mark their music, set specific practice goals for each practice session, have two or more short daily practice sessions instead of one longer session, and practice with the metronome. Responses of these teachers regarding other aspects of practice, however, were quite varied. It seems that a systematic pedagogy for music practice was not in place, or at least not agreed upon by these teachers (Barry & McArthur, 1994).

Music teachers wishing to instill effective practice habits within their students must pay careful attention to the manner in which practice is addressed during the lesson. A qualitative research project examined the relationship between student-teacher interactions in the college applied music lesson and subsequent individual student practice behaviors. Lessons and student practice sessions were videotaped and both students and teachers completed questionnaires. This study revealed that student practice habits were influenced to a limited degree by their teacher's advice, but the most powerful influence was the teacher's teaching style. In other words, what the teachers actually did during the lessons (e.g., the teacher demonstrating a particular technique or

having the pupil try a particular approach) had a more profound influence upon their pupils' practice than what the teachers merely told the students (Barry, 2000).

Providing examples

One cannot assume that student musicians have conceptualized an appropriate ideal for musical performance. It seems logical, therefore, that hearing high quality examples of musical performance could prove beneficial in guiding the practice of the novice musician. Music educators have pointed out the importance of teacher demonstration to provide students with aural examples. Providing an aural example in the early stages can be very useful for beginning pupils who are still attempting to develop a characteristic tone. At a later stage, however, the provision of a single example could force pupils into stereotypical performances and deter them from developing their own interpretations (Hallam, 1998b).

Teacher demonstration can certainly provide a useful resource for pupils, but many music teachers may lack the skills necessary to demonstrate on every instrument that they are called upon to teach (Kohut, 1973). Teachers also may not have sufficient time to demonstrate every instrument during every class, and cannot be available to demonstrate during students' home practice sessions (Linklater, 1997). Therefore, there is considerable interest in the effects of providing students with taped performance models (examples) to use in conjunction with individual practice. One experiment provided beginning instrumentalists with cassette tapes containing instructions, reminders, and model "play along" performances of the music. Model-supported practice was significantly more effective than traditional practice on gross pitch discrimination, pitch matching, rhythmic discrimination, and time spent in practice (Zurcher, 1972).

Additional studies (Dickey, 1992; Kendall, 1990) also support the use of aural models as an aid to musical development. In contrast, a study of tape-recorded aural examples for home practice failed to reveal any significant differences between sight reading and performance skills of young clarinet students using taped examples and those with no taped examples (Anderson, 1981).

A more recent study (Linklater, 1997) investigated the effects of home practice using three different types of examples (model videotape, model audiotape, audiotape with nonmodeling/accompaniment only) on the performance achievement of beginning clarinet students. Results indicated that the videotape group students scored significantly higher on visual/physical performance criteria immediately after practising with examples and also scored higher on tone quality/intonation performance criteria in subsequent delayed longitudinal assessments than did students in the non-modeling group.

Motivating students to practise

There are complex relationships between motivation, achievement and practice (Hallam, 1997b; 1998a). McPherson, Bailey, and Sinclair (1997) found that students who reported higher levels of daily practice were more likely to improvise, play music by ear, compose, and elect to take music classes at school. Likewise, O'Neill (1997) observed that higher achieving beginning instrumental music students practised more during a two-week diary period than lower achieving students. She also found a relationship between children's motivational processes and effective music practice. Achievement is related not only to the length of time spent practising but also to the quality of that practice.

Given that increasing the amount of time engaged in practice can contribute to an increase in musical achievement, musicians and researchers have investigated a number of different motivational approaches. A study (Rubin-Rabson, 1941a) comparing the effects of verbal encouragement or cash payment with a control group (with no special incentive to practice), found no significant differences among the three conditions in the amount of students' practice time. On the other hand, Wolfe (1984) found that behavioral contracts in which students enter into a formal agreement with parents and the teacher could be an effective way to motivate students to practice.

Student motivation to practice may be increased by allowing students to make certain choices. One project allowed piano students to set their own goals regarding improvement, repertoire, and time. These university students also engaged in self-evaluation of the same three elements through written comments and reflections. Project evaluation indicated that most of the students held favorable attitudes about the project, believing that they had become better pianists and had developed greater independence and planning ability (Brandstrom, 1995). Greco (1997) found that using student-selected repertoire arranged in appropriate keys and tessitura resulted in an increase in practice time and a decrease in attrition rate for second and third-year instrumental music students in grades 5-6. (See Chapter 1.3 for a more comprehensive discussion of motivation.)

Supervised practice

There is evidence suggesting that, for the young or novice musician, supervised practice can be more effective than practice carried out without supervision. The direct involvement of parents and nurturing, supportive teachers can be essential to the musical development of youngsters (O'Neill, 1997; Sosniak, 1985). Studies (Brokaw, 1983;

Davidson, et. al, 1996) have revealed a significant relationship between the achievement of young instrumentalists and the amount of parental supervision of home practice. (Also see Chapter 1.2, Environmental Influences on Musical Development.) While parental supervision of practice is certainly essential, supervision by other adults may also be helpful. A study of adolescent instrumentalists (Barry, 1992) compared the musical performance improvement (melodic accuracy, rhythmic accuracy, and musicality) of students following a structured practice program under adult supervision (musicians hired to serve as practice supervisors) with students practising with no supervision. Although these practice supervisors were not the pupils' parents or music teacher, the supervised group achieved greater gains for melodic accuracy, rhythmic accuracy, and musicality. However, while supervised practice can be quite helpful for some individuals, it is likely that supervised practice becomes less essential as factors such as maturity, motivation, and expertise increase.

Structured practice

Practice is most effective when it is governed by an appropriate framework or structure. However, student musicians may not have sufficient knowledge to determine an optimum framework for practice. One study compared student instrumentalists' performance improvement under three different practice conditions. Students using a structured approach to practice (teacher-designed and self-designed) were able to correct more performance errors than those subjects not employing any structured practice, but students using the teacher-designed approach had the highest scores of all (Barry, 1990).

Summary and Conclusions

Efficient and effective practice is central to the development of musical expertise. Musicians engage in practice for a number of reasons such as gaining technical proficiency, learning new repertoire, developing musical interpretation, memorising music, and preparing for performance. Fluency is achieved through effective practice with complex tasks eventually becoming automated.

Practice is most effective when it is deliberate and mindful. Acquiring metacognitive skills is central to effective and efficient practice. The literature suggests that these skills cannot be developed independently of musical skills and knowledge and that in the early stages of learning the two are irrevocably intertwined.

Teachers not only have a crucial role to play in assisting pupils in acquiring musical expertise but also in developing knowledge of appropriate practising and learning strategies and supporting them in becoming autonomous independent learners. The ways that this can be achieved will depend to some extent on the age of the pupil (Hallam, 1998b). The younger they are the more directed supervision they need. As their expertise increases it is important to encourage autonomy in learning and the acquisition of a range of strategies which will assist in developing effective practice and preparation for performance. The evidence to date suggests that most musicians do not feel that their training has assisted them in developing metacognitive skills (Hallam, 1992; Jorgensen, 1995) and that they had mainly been acquired through trial and error experiences.

To be most successful, practice must be approached deliberately and thoughtfully. Musicians wishing to practise more effectively (and teachers wishing to guide their pupils toward greater achievement) are advised to:

1. Engage in metacognition—become mindful about practising and related physical and mental processes. In other words, one must think about one's own thought processes.
2. Approach practice systematically. Do not go about practice haphazardly. Practice is more effective when it is structured and goal oriented.
3. Engage in mental practice (cognitive rehearsal) in combination with physical practice.
4. Invest time in score study and analysis, particularly when beginning a new piece.
5. Plan regular practice sessions with several relatively short practice sessions distributed across time.
6. Acknowledge the relationship between time spent practising and achievement and set out to invest the time necessary.
7. Be aware of the importance of motivation. When teachers and parents allow students to make some choices about goals and repertoire, student motivation is likely to increase.
8. Listen to high quality models of musical performance. This is particularly important for beginning musicians. Parents and teachers should invest in a library of fine recordings and, if capable, play and/or sing often for their charges.
9. Supervise and nurture young musicians. Parents and teachers should demonstrate keen interest and involvement in music study and practice.

Musicians may take for granted the old adage that “practice makes perfect.”

However, the research indicates that not only the amount of time invested in practice but also the manner in which one approaches practice will have a bearing on an

individual's level of musical development. While this may be stating the obvious, the important element here is that musicians stand to improve greatly their abilities by paying careful attention to improving their own ability to 'learn to learn'.

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