

The development of metacognition in musicians: Implications for education

Abstract

Recent research on musical practice has focused on metacognition and the strategies that musicians adopt in their preparations for performance. This study explored the development of metacognition and performance planning strategies in musicians from novice to professional level. 22 professional musicians and 55 novices were interviewed about their practising. The novices were also tape recorded learning and performing a short piece. The professional musicians demonstrated extensive metacognition in relation to their preparations for performance encompassing technical matters, interpretation, and issues relating to learning itself, e.g. concentration, planning, monitoring and evaluation. Although there were similarities in the strategies adopted there was considerable variation because of individual need. In the novice musicians, there was a complex relationship between the development of expertise and the use of planning strategies.

Introduction

There is considerable evidence that practice plays a crucial role in the acquisition of expertise on a musical instrument (Ericsson et al., 1993; Sloboda et al., 1996; Sosniak, 1990), although there is considerable debate regarding the degree of importance (Hallam, 1998a; Sloboda and Howe, 1991). One factor which may influence the amount of practice required to learn a piece to performance standard may be the effectiveness of the practice undertaken.

Much of the research relating to effective studying has been carried out in relation to students in Higher education. Early work focusing on approaches to learning and learning styles is reviewed by Ford (1981). Since then a number of multi-dimensional models have been developed which attempt to account for the many factors which contribute towards learning outcomes in learners of all ages (e.g. Entwistle et al, 1992; Biggs 1993). There have also been attempts to develop students capacity to "learn to learn" (e.g. Dansereau, 1978; Ford, 1981; Howe, 1991) which particularly stress the importance of metacognitive activity. Central to the concept of metacognition is thinking about one's own thoughts. It can be 'thinking of what one knows (i.e. metacognitive knowledge), what one is currently doing (i.e. metacognitive skill) or what one's current cognitive or affective state is (i.e. metacognitive experience)' (Hacker, 1998. p. 3).

This is mirrored by recent developments in professional training which increasingly make use of the notion of reflective learning (Kolb, 1984) and conceptualise the professional as a "reflective practitioner " (Schon, 1983; 1987). Each of these perspectives share in common a view that educators should be concerned with enabling students to learn to learn. Within a musical context there has been little research exploring these issues, although Jorgensen (1997) advocates the view that practice should be seen as a "self-teaching" activity, with training in conservatoires designed to develop reflective learning. This view is supported by Nielson (1999) who studied the practising strategies adopted by conservatoire music students. Similar conclusions are reached by da Costa who explored ways of improving practice in younger students (da Costa, 1999).

Research on the development of expertise suggests that experts have extensive knowledge in their subject area, which helps them in perceiving meaningful patterns quickly. It improves their analysis of problems, which are represented at a deeper level enabling them to 'get to the heart of

the matter' speedily. They also have improved short and long term memory skills and strong self monitoring skills (Glaser & Chi, 1988). Holyoake (1991) suggests that the strategies adopted by experts are dependent on the context within which they find themselves. He cites Dorner & Scholkopf (1991) who suggest that successful problem solvers have to continually adjust the processes of planning, gathering information, forming hypotheses, making choices and reconsidering decisions. To summarise, they know how to do the right thing at the right time. There is no single "expert" way to perform all tasks. Effective musical practice might therefore be seen as "that which achieves the desired end-product, in as short a time as possible, without interfering negatively with longer-term goals" (Hallam, 1997b). This assumes that effective practice might take many forms depending on the nature of the task to be undertaken; the context within which the task is to be learned; the level of expertise already acquired; and individual differences. It also suggests that the musician requires considerable metacognitive skills in order to be able to recognise the nature and requirements of the particular task; identify particular difficulties; have knowledge of a range of strategies for dealing with these problems; know which strategy is appropriate for tackling each task; monitor progress towards the goal, if progress is unsatisfactory acknowledge this and draw on alternative strategies; evaluate learning outcomes in performance contexts and take action as necessary to improve performance in the future. The musician must also have well developed metacognitive skills including knowledge of and how to utilise skills for supporting practice, e.g. managing time appropriately to be able to meet deadlines, maintaining concentration, maintaining motivation, understanding what preparations are needed to ensure high performance standards. The aim of this study is to explore the nature of planning and metacognition in musicians and how these may change as expertise develops.

The study

A semi-structured interview technique was adopted to enable an in depth analysis of the practising modes of the musicians. In the early stages of the research, to validate the content of the interviews, each musician was shown a piece of music and asked to describe the activities he or she would undertake during the initial stages of learning that work.

For ethical reasons, and the difficulties inherent in classifying professionals in terms of levels of expertise, all of the musicians interviewed were chosen on the basis of peer evaluations of their high levels of technical competence and their sensitivity in performance. Only those musicians whose performances were consistently referred to as being of a high standard, both technically and musically, were included in the study.

Twenty-two professional musicians were interviewed, 11 female and 11 male with an age range of 22 to 60. They were selected to represent differing spans of time in the music profession, differing instrumentation, and a broad range of musical experience. Representatives of most instruments of the modern symphony orchestra were included, as well as an organist and a conductor. All were practising freelance professionals working within a range of musical environments.

The novice sample consisted of 55 string players, with standards ranging from beginner to music college entrants, aged 6 - 18. They were recorded for a period of ten minutes practising a short piece of appropriate standard, which they then performed. The task was part of normal examination procedure for the students. The taped performance was assessed by two independent judges, marks being awarded out of ten for overall impression, rhythmical accuracy, steadiness of

pulse, notational accuracy, intonation, sense of tonality and observation of marks of expression. Inter-rater reliability ranged from .82 to .96 ($p=.0001$). The students were also interviewed using the same schedule as that used for the professionals regarding their approaches to interpretation, practice, memorisation, and performance.

Each interview was transcribed in full. The content of the tapes from the recordings of the novices was also transcribed to give a detailed account of their activities while they were practising. This included information about errors, their correction, stops, starts, poor intonation, inaccurate rhythm, faltering, repetitions, etc. The data was then analysed considering the similarities and differences between the activities of the professional musicians and the novice musicians.

Objectivity was established by insisting on agreement between three independent judges on the categorisation of statements. The judges were:-

- 1) a local authority music adviser, who also had 20 years experience as a professional musician.
- 2) a professor of educational psychology.
- 3) the researcher, who had 15 years experience as a professional musician and qualifications in educational psychology.

Each judge examined the statements independently. Where there was disagreement about the categorisation of statements they were discussed. Only where complete consensus was reached that a statement supported a particular categorisation was it included in the analysis.

Despite the fact that all the professional musicians interviewed exhibited great sensitivity in

performance and had considerable technical skills, it became evident that there were indeed clear differences in the way that practising was undertaken. Initial analysis of the data from the interviews and tapes of the novices also indicated qualitative changes in the nature of expertise as it developed. This was particularly marked at advanced levels, i.e. Grade 8 and above. The data from these students was therefore examined separately in a manner similar to that of the professional musicians.

Findings: Professional Musicians

What emerged clearly from the data was the extensive metacognitive skills of the professional musicians. They demonstrated acute self-awareness of their own strengths and weaknesses, extensive knowledge regarding the nature of different tasks and what would be required to complete them satisfactorily and had a range of strategies which could be adopted in response to their needs. This not only encompassed technical matters, interpretation and performance but also questions relating to learning itself, e.g. concentration, planning, monitoring and evaluation. Although there were similarities in some aspects of their practice there was also considerable variation because of individual need. This was well illustrated by statements from two musicians relating to their teaching.

“My pupils are very different from each other. Some are incapable of playing with any kind of freedom at all, they are so rigid....their fingers go down like machines and so I encourage them to get away from that. Others are incapable of playing a simple melody with the right note values, they distort everything. There are two extremes. My pupils sometimes ask me whether they can come and sit in

on other lessons I give. I say, you are most welcome, there's no secret in what I'm trying to do but I don't think you'll gain because I am only trying to help that particular pupil at that moment”.

“I think we all have our little idiosyncrasies in fingering because of the shapes and sizes of our hands and the way we approach it. When I'm teaching I find out what suits them.”

This acknowledgement of individual needs in relation to practice appeared throughout the analysis. It demonstrates metacognitive activity as central in determining the nature of the practice undertaken by these musical “experts”. Differences in the regularity of practice, its content, the extent to which it was felt necessary to warm up and the type of technical work undertaken were identified (Hallam, 1995a). These depended on what each individual musician felt was necessary to maintain their standards of performance. There were wide differences in the ways in which musicians prepared for performance. Some adopted an intuitive serial approach to developing interpretation which evolved as they learnt the music, others planned in advance, listening extensively to recordings to develop their ideas (Hallam, 1995b), some were prepared to make spontaneous changes in performance if they felt it was musically appropriate, even to the extent of creating technical difficulties (Hallam, 1995b). Metacognitive skills were also demonstrated in relation to memorisation (for details see Hallam, 1997a).

Learning new music

When learning new music all but one of the musicians initially acquired an overview of it, either

by playing it through or by careful examination of the score. Getting an overview of the work served technical and musical purposes. It enabled the identification of difficulties, an assessment of tempo, which had musical and technical implications, and a consideration of the structure of the work and the thematically important material.

Difficulties identified

The difficulties identified by the musicians were varied. This variability was in part due to their own individual strengths and weaknesses.

“I would be looking for areas which I know to be my own weaknesses and therefore areas that I have got to look out for particularly carefully”.

“For me personally, semiquavers, fast passages, low notes are never any problem. If it’s got high notes in, it means I have to put in extra practice to build up strength to play it”.

Some general trends did emerge, although there were exceptions. Passages that required performance at the extremes of the instrument, high and low for wind players, high for string players were often seen as problematic. Particular technical tasks relating to specific instruments e.g. double stopping, triple tonguing, position changing, particular hand shapes for pianists were frequently mentioned. Generally, fast technical passages were seen as requiring practice although, for some, once learned they posed no difficulties and one reported:-

“I don’t use the metronome for speeding things up, if anything I’ve had to use it for slowing down”.

What was clear was that all the musicians knew what for them was difficult and would in their initial examination of a piece be looking to identify those passages for practice. They also had a range of strategies available for that purpose.

Strategies

After the identification of technical difficulties, practice was undertaken to overcome problems. The musicians had a repertoire of strategies which they were able to utilise as necessary to master differing technical passages. To some extent these depended on the nature of the instrument itself. However some general trends emerged. All of the musicians emphasised the importance of either cognitive analysis or slow meticulous playing in the early stages of learning a new work. After this initial stage one of two main strategies was adopted, repetitious or analytic. These are reported in detail in Hallam (1995a). Practice was goal oriented but in some cases this did not focus on learning a particular piece but rather ensuring that technique was of a sufficiently high standard to deal with difficulties as they arose. Where this strategy was adopted it tended to reflect the nature of the repertoire of the instrument which tended to be limited in scope.

Marking the part

The musicians varied in the extent to which they marked things on the music. This depended on perceived need. Some were reluctant to write anything.

“I try and remember.....I tend not to write much on the music”.

“I don't like writing....I find if it is covered in marks I'm looking at the marks instead of the rhythm and the notes. I find that very upsetting”.

“I never mark in accidentals, I never mark in semitones, I don't go in for that at all. It doesn't mean anything to me”.

In contrast some relied heavily on marking parts.

“I write things in to help, very much so.”

“I write a lot of things on the music. I have a memory like a sieve.”

Others sometimes write things in the part.

“Eventually, the day before the show I eventually get round to scribbling a few things, maybe”.

Eleven of the musicians reported extensively marking information on their music, 2 reported making moderate use of marking, 7 reported using it very little and 2 said that they did not mark things on the part at all.

Organisation of practice

As with the other aspects of practice there was considerable variability in the level of organisation reported. Some musicians reported being very well organised.

"I don't have time to waste sitting for hours hammering away ineffectively. If I know I've got to do something I will do it as fast and as efficiently as possible. If I haven't got anything to work for I will obviously be a lot more selective in what I'm motivated to practise. Whatever I practise will be done efficiently and really properly".

"I can achieve a lot in a comparatively short time."

"I try and take a passage. I try and be systematic about it so that I don't always start in the same place. I decide that today I'm going to take this chunk and work at it".

In contrast some musicians felt a lack of "natural" organisation.

"I don't think I've ever been a very organised practiser.....I wasn't very efficient

"If I don't have a routine its just a waste of time for meI fritter the time away".

Some musicians appeared to be aware of their lack of organisation and had taken steps to adopt

strategies to help.

"Well in the past what I would do is just, sort of toy with this bit and that bit and do the same thing every day in the hope that eventually everything would gradually get better but I've realised that that is not a very good way to do it. That you've really got to decide from the word go which of the bits are really going to be the ones that need all the work and get down to those straight away and that's what I try to do now".

"I would start working on it a month in advance and two weeks before the concert I would learn it from memory.....which never works out because it tends to be a week before....I tend to do most of my practice when I'm learning it from memory".

"I'm not terrible self-disciplined that's why I have these little schemes of time schedules and building up towards the point of performance because in fact I'm very unself-disciplined. A person who practised easily and more naturally wouldn't need this kind of organisation. So I do find that my practice isn't always as I would desire it to be. I would like to start every practise session with slow scales. And in fact I used to start when I did the Dvorak concerto some three or four years ago, I practised for an hour to three quarters of an hour of slow scales a day in four different keys which I found very satisfying, very pleasurable, but it's difficult to get into a routine like that".

It seems as if these musicians are trying to compensate for some degree of natural disorganisation by imposing schedules on themselves. Others reported difficulties with concentration while they were practising.

"I get the metronome out. I'm a great believer in the metronome. Well it's a discipline. When...if you're not feeling like practising.....the metronome concentrates your mind in a way that nothing else seems able to do, because you've got to concentrate on it.....you can't be thinking wouldn't it be nice to be in the garden, or what am I going to do with my life."

Of the 22 musicians, 7 appeared to be low in "natural" organisation, 10 were moderately organised in their practice and 5 considered themselves to be highly organised and efficient in their practice.

When concentration was considered, 14 reported no problems or good concentration, 5 reported considerable difficulties, 3 reported some difficulties. When the relationships between reported organisation and concentration in practice were examined, those musicians who were well organised (5) also exhibited high levels of concentration, those who reported low levels of organisation (7) had either low or moderate levels of concentration. While the moderate planners (10) tended to have high levels of concentration (9). It seems that there is some relationship between level of organisation in practice and level of concentration.

Preparing for performance

There was considerable individual diversity in relation to the level of preparation perceived as necessary for performance itself beyond mastery of the work. Some musicians experienced considerable stage fright but had developed strategies to cope:-

"I'm not a natural performer. I never was any good at it. Partly because I was pushed far too young. I know that if I haven't done enough practice I am going to be scared out of my wits so I try to make sure nowadays that I prepare for it properly so that I can have a reasonable hope of getting through it. If it is a very big event I take a beta blocker".

"I used to think it would be worse for having psyched myself up but having read a book on tension and these issues where they suggest that you actually should think of it and also being aware that when the adrenalin comes on suddenly you're doing yourself more harm than if you've got it gently.... it's been going for a couple of days or whatever".

"I regard that first playing through as practice for the occasion. Because on the occasion you've got to play it through from cold".

"I have found that if I practise immediately before it that helps. I try and breathe deeply, you know the usual things to try and calm nerves, the ordinary straight forward things."

In contrast others felt that they needed an audience to "psych" themselves up, improve

concentration and give the performance a "spark". Nervousness can have positive as well as negative effects.

"I don't do any particular preparation for performance. I tend to feel that some kind of automatic response comes into operation. I enjoy playing to an audience in public and this engenders its own enthusiasm, its own spark of creativity or whatever and there is no need to "psych" oneself up in any way. On the occasion of the performance it is simply a matter of being prepared, practice, technique and then the music will come by itself providing you have done the groundwork. I find I don't need any special preparation for the performance situation".

Others have a relative level of unconcern regarding performance to an audience.

"I'm too worried about actually playing the right notes. That's what I'm worried about, the rhythm.....the audience is the last thing to worry about".

"I think the important thing if you are performing is to make your audience happy."

One musician described her relation with performance as love/hate. She is frequently physically ill before performances but says that there is nothing she likes doing more.

The interviews also revealed that stage fright can be transient and unpredictable. One musician reported:-

"For a time I was afraid of being afraid".

Others indicated that stage fright was unpredictable and that even when playing the same programme in a series where everything had previously been successful one could be overcome by nerves. Of the twenty two musicians 4 reported low arousal levels feeling the need for an audience to enable them to perform better. Twelve experienced moderate levels while six experienced high levels of arousal which created problems for them in performance. Table 1 illustrates the relationships between arousal levels in performance and levels of concentration and organisation of practice.

Table 1 about here

The evidence from the interviews suggests that there are relationships between levels of "natural" organisation, concentration, and arousal in performance. Those for whom the planning of practice seems to be highly automated tend to concentrate easily but they also tend to experience higher levels of arousal in performance. Those with low levels of automated planning tend to have problems with concentration in practice but find performance stimulating rather than over arousing. To explore these relationships in greater depth more sensitive measures would need to be developed.

Findings: Novice musicians

Analysis of the data from the novices revealed six advanced students whose practice was

qualitatively similar to that of the professionals, although these students adopted a rather "taken for granted" conception of performance, none raised the issue of spontaneity in performance and there was little evidence of specific "performance" preparation. The novices ranged in standard from beginners to Grade 7 standard. A detailed account of their approaches to practice and memorisation and the relationships of this with their level of expertise is provided in Hallam (1994; 1995a; 1997a). This paper focuses on issues relating to metacognition and planning.

Planning

There was an increase in the practice undertaken by advanced students and novices as examinations approached. 92% reported an increase in practice in the weeks preceding examinations, with greater organisation of practice and more concentration on technical aspects, e.g. scales. Some also memorised pieces for examinations.

At other times the amount of time spent practising tended to depend on task requirements. Not even those students contemplating a career in music felt that daily practice was necessary to maintain standards. The number of days spent practising was correlated with Grade .12 and age -.02, both non-significant. Total amount of practice did increase with expertise correlating with age .56 ($p=.0001$) and grade .51 ($p=.0001$). The length of the individual practice sessions increased.

On the basis of reported planning in practice and planning undertaken in relation to the recorded practice criteria were set out which would distinguish high, moderate and low levels of planning. High levels of planning in the prepared practice were identified by evidence of the

completion of task requirements; speedy identification of difficulties; concentration of effort on difficult sections; and integration of the sections practised into the whole for performance. Moderate levels of planning were identified by completion of task requirements; evidence of on task behaviour but repetition of large sections of the work rather than a focus on difficulties; and no integration specifically towards performance. Low levels of planning were ascribed when the task was not completed; the first part of the music was practised but not the remainder; and considerable amounts of time were spent off task. All of the advanced students exhibited high levels of planning in their recorded practice, while 5 (12.5%) of the novices did so. 28 novices (70%) showed moderate levels and 7 (17.5%) low levels.

Table 2 sets out the criteria for considering levels of planning in daily practice. A high level of planning was characterised by specified aims of practice; a consistent order of practice; self-imposed organisation of when practice was undertaken and a tendency to mark things on the part. 4 novices (10%) and 2 advanced students (33%) were classified as having high levels of planning in their daily practice. Moderate planning was categorised on the basis of some organisation of when practice was undertaken; a planned order of practice when taking examinations and evidence of some time organisation. 26 novices (65%) and 4 advanced students (66%) fell into this category. Those categorised as having low planning skills in relation to daily practice reported practising when they had time; constantly having to be reminded to practise, wasting time practising unnecessary material and being disorganised in their work. 10 novices (25%) fell into this category. The nine beginners were excluded from this analysis. The advanced students demonstrated considerable task planning in their prepared sight reading regardless of their normal planning of practice. This level of planning may therefore be a feature of increased expertise.

Table 2 about here

Table 3 sets out the relationships between planning in recorded practice and organisation of daily practice. The novices exhibited different levels of each kind of planning. As was demonstrated in the professional group there may be a need for conscious cognitive planning to over ride what are perceived as more “natural” planning characteristics and those that evolve as expertise develops.

Table 3 about here

Performance

The advanced students exhibited a similar range of behaviours to the professional sample. Some were excited at the prospect of performance, others realised that nervousness marred their performance. Unlike the professionals the advanced students had generally not developed successful coping strategies.

Amongst the novices, 90% reported being nervous on the day of the examination but a minority

(38%) of these reported nervousness occurring for several days in advance, some experiencing extreme headaches. Others (10%) reported no nerves at prospective performance, some were excited.

69% of the novices adopted some kind of strategy (or more than one) to overcome nerves. The most used strategy was to play to someone else prior to the examination (21 students). The second most popular strategy was practising itself (8 students) followed by doing a mock examination (7 students) or arranging to be tested (6 students). These strategies were all part of performance preparations. Other strategies were utilised during performance. These included treating the examination as if it were a lesson (3 students), avoiding thinking about it (3 students) and actively concentrating on the music (1 student). 38 students (69%) adopted some kind of strategy. Some adopted more than one.

For the novices examinations were considered more important than public performances. An advanced student suggested that this might be due to their concrete outcome, i.e. a mark. Although strategies were adopted in relation to stage fright the strategies tended to be focussed on reducing the fear rather than as a positive means of alleviating any detrimental effects on performance. This had clearly not developed the same significance as for the professional group.

Lack of concentration in practice was not reported by the novices or the advanced students. Perhaps young people are generally less aware of their own internal states except in the case of nervousness which because of its severe physical symptoms is difficult to ignore. Perhaps lack of concentration in practice is perceived as boredom, a reason for terminating practice rather than a study problem. For the professionals with performance deadlines to meet and standards to

maintain, this is not an option.

Discussion

The evidence from this study indicates that professional musicians do indeed “learn to learn”. This may be from necessity in order for them to survive in a competitive profession. They demonstrated considerable metacognitive skills, being able to identify their own strengths and weaknesses, assess task requirements and develop strategies to overcome particular task difficulties and optimise performance. It was possible to identify strategy use in the advanced students and novices but strategies were less well developed and did not have a well defined focus on optimising performance. Evidence from the wider study showed that there were considerable individual differences between the musicians in their approaches to practice, interpretation, memorisation and performance (Hallam, 1995a; 1995; 1997a). Despite these differences, musicians share a common knowledge base which enables them to assess task requirements, identify task difficulties, recognise errors, monitor progress, and take appropriate action to overcome problems. This knowledge base is crucial for practising effectively. Without it knowledge of specific practising strategies or more general support strategies will be of limited use (Hallam, 1994; 1998b).

Students need to acquire this “musical” knowledge base prior to or concurrently with knowledge about specific learning and support strategies. In the early stages of learning to play an instrument the most important requirement may be to develop accurate internal aural representations of the works that are being learned (Hallam, 1994; 1998b). Other representations concerned with technical, cognitive and musical skills may be acquired concurrently. While a basic level of

mastery is acquired and automation is developing, repetition may be the most effective means of practising. Once rudimentary skills are established students can be encouraged to “learn to learn”. This process may be facilitated by the teacher modelling learning processes in the lesson and by discussion of more general metacognitive skills. Such discussions might relate to:-

- * personal strengths and weaknesses;
- * assessing task difficulties;
- * the selection of appropriate practising strategies;
- * setting goals and monitoring progress;
- * evaluating performance;
- * ways of developing interpretation;
- * strategies for memorisation;
- * enhancing motivation;
- * time management;
- * improving concentration;
- * performance strategies.

The aim of the teacher would be to encourage the students to become independent learners who can teach themselves. The evidence from this study suggests that this is a realistic goal once basic skills have been acquired.

Focusing more specifically on planning in learning and performance the evidence from the novice and expert musicians suggests that planning mechanisms operate on three levels. Firstly, planning is related to being able to complete a specific task. This seems to depend, at least in part, on the level of expertise acquired. Secondly, there seems to be an automated aspect to

planning /organisation which may be a relatively consistent characteristic of the individual affecting all aspects of their functioning. Finally, conscious, strategic planning may be undertaken which may compensate for deficiencies in other planning mechanisms. Research, utilising interval level measures is required to elucidate these relationships further.

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Table 1
Comparison of concentration, planning in practice
and arousal in performance

	Organisation of practice	Concentration	Arousal
22 musicians	High 5	High 5	High 3
			Moderate 2
	Moderate 10	High 9	High 2
			Moderate 7
			Moderate 1
	Low 7	Moderate 2	High 1
			Moderate 1
		Low 5	Moderate 1
			Low 4

Table 2
Levels of planning in daily practice

Organisation of practice criteria	Novices	Advanced students
<p>High planning</p> <p>Specified aims of practice</p> <p>Consistent order of practice</p> <p>Self-imposed organisation of when practice occurs</p> <p>Tends to mark things on the part</p> <p>Evidence of systematic work</p>	4 (10%)	2 (33%)
<p>Moderate planning</p> <p>Some organisation of when practice occurs</p> <p>Planned order of practice when taking examinations</p> <p>Evidence of some time organisation</p>	26 (65%)	4 (66%)
<p>Low planning</p> <p>Practises when has time</p> <p>Constantly has to be reminded to practice</p> <p>Wastes time practising unnecessary material</p> <p>Practice is disorganised</p>	10 (25%)	

Table 3

**Comparison of novices and advanced students
overall approaches to planning**

	Planning in recorded practice		
Organisation in daily practice	High	Moderate	Low
High	2 (4%)	3 (7%)	1 (2%)
Moderate	7 (15%)	18 (39%)	5 (11%)
Low	2 (15%)	7 (15%)	1 (2%)