

The Learning Curve



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Motor Learning

Don't panic - *Tail End* has not developed an obsession with car maintenance. Last December, Pip Penney wrote *The Sense of Learning to Ring* (RW 2002 p 1279) describing some of the physiological aspects involved in ringing. Bell control is an exacting task that depends critically on the performance of that rather complex machine, the human body. Yet to most ringers, and even ringing instructors, its workings are largely unknown. Pip has agreed to write for *The Learning Curve*. In this first of two articles, she talks about 'motor learning' - the technical term for how we learn skills related to tasks involving movement. In it, she explains factors that affect developing bell control - not just initial bell handling, but subsequent mastery of a bell in change ringing - with advice based on them. She also explains a different sort of 'learning curve'.

The concept of motor learning

Bell ringing is a skill that has to be learned virtually from scratch. Sometimes when you learn a new skill, you can build on skills you already have, but learning to ring draws very little on the re-organization of existing fragments of previous motor learning. It is a complex skill, which is learned on what is known as a 'positive acceleration learning curve' (see Figure 1). Progress is very slow to start with but then rises more sharply as the learner approaches full mastery, which in some cases might take years.

Obviously there is very limited satisfaction in the early stages which can sap motivation. This might explain why we keep so few of our learners.

Simple skills such as ball sports follow a 'negative acceleration learning curve' where progress is greatest at first and then slows up as you approach full mastery. Here there is a lot of satisfaction almost immediately that can augment motivation.

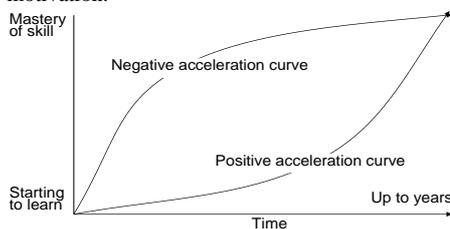


Figure 1: Two different learning curves

In any learning activity there will be times when the learning curve flattens into one or more of what are known as plateaux at intermediate stages. This happens more when learning a complex skill, and the plateaux are more likely to occur when an entirely new piece of behaviour has been added to ones previously learned. In bell ringing this might apply to such things as dodging differently in Grandsire after becoming reasonably proficient in Plain Bob, leading wrong

in methods such as Stedman or London, or simply moving at every stroke when learning to hunt after only ever changing at handstroke in call changes. Plateaux can occur for other reasons, eg loss of interest with the learner just going through the motions, or preoccupation with problems at work or home.

As a learner moves towards mastery of a skill she starts to monitor her own performance against an internal standard and external factors (see below) become less important to her making progress. As she becomes more objectively aware of her own performance, she will also develop the ability to correct her own performance. The adjustments are likely to be quicker and applied more often, more rapidly, and more often (which means that they will also be less drastic and more effective).

Each response that is more successful than the last (measured against the internal standard) gives instant re-enforcement. It is this feedback of success that causes 'positive acceleration' and rapid progress in the learning curve for ringing, shown in Figure 1.

At this point, the learner is no longer a 'learner' needing active teaching, but a self motivated ringer, capable of improving his performance alone. You might have observed this effect, when someone who has been ticking along unspectacularly for a while suddenly 'takes off' and makes rapid progress.

Factors that affect the learning curve

As an instructor in charge of a practice, you will have a strong advantage if you can understand the learning processes that underlie what happens in the practical setting. Some factors can ease the learning process while others can inhibit it. Sports instructors and coaches use these principles all the time, and they also apply to learning to ring. They are:

- Cognition (understanding)
- Emotional
- Stress
- Interpersonal
- Goal setting
- Motivation

Cognition - having a correct understanding of what is required - is a most basic requirement, so basic that it is easy to take for granted, but have you ever considered whether your learners understand everything you tell them? One of our learners was ringing the 5th in rounds when his instructor said, "Ring closer to the 4th". The learner promptly took a step to his right. He hadn't understood. In another example, in a west country tower that only rings call changes, an experienced ringer was learning to plain hunt. He hunted out to the back alright but he just could not get the hang of hunting down until he was told "Pretend you are being called down at every stroke as in call changes", whereupon he did it perfectly first time.

Emotional factors can be complex, especially for an 'advanced learner' in the later stages of developing bell control, when improved motor skill dove-tails with learning the cognitive skills for more advanced methods. He must be prepared to move out of the 'comfort zone' that comes with satisfaction at any level of achievement. To make progress (more bells, heavier bells, more complex methods, ...) he must expose himself to ringing where he can no longer perform so well as in the comfort zone. Doing that requires the right emotional attitude. Attitude to handling problems

can also be a barrier - it can be emotionally tough to go back and correct the steps in motor skill development that are usually associated with an earlier stage of learning.

Stress affects most performance, but it is a complex relationship. Method ringing uses fine motor skills and the methods themselves can be cognitively complex. With fine motor skills (ie precision and accuracy) performance peaks at fairly low levels of stress, and deteriorates rapidly at higher levels of stress, as shown in Figure 2. This differs markedly from activities requiring gross motor skills (eg power lifting) that require high levels of stress to develop maximal performance, also shown in Figure 2.

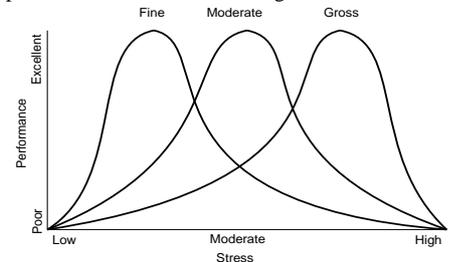


Figure 2: Effect of stress on performance

It is often assumed that all stress is bad, but in fact zero stress does not produce the best performance for any motor skill. One might consider zero stress as being 'completely laid back' - not a condition associated with top performance.. See diagram.

Interpersonal issues can affect the learning curve more - some teachers and learners click better with each other. As tower captain, you should seek to exploit this on practice nights.

Goal setting matters. You might know the joke about the employee who 'sets low standards and consistently meets them'. Goals do affect performance, and overall should be set high.

Motivation is extremely important, in fact the amount of intrinsic motivation (built into the learner) is arguably the most important factor of all. It needs supplementing though, either with 'extrinsic motivation' (from outside) or 'achievement motivation' (extra motivation acquired by success).

Extrinsic motivation needs approval from the teacher or someone else. Achievement requires the opportunity to succeed. Constant failure is demotivating. Any good trainer will tell you that it is important to give opportunities for success at all stages, especially at the lower levels, and to give approval when that success is achieved. Familiar examples include setting a bell 10 times consecutively at backstroke or handstroke. It is a non trivial task (even to an experienced ringer) requiring concentration, yet it should be within the grasp of a learner in the early stages.

Trying to provide too much extrinsic motivation, can lead to a fear of failure, the avoidance of which might lead to absenteeism or physical problems such as feigning illness.

In her next article, Pip will apply some scientific knowledge to the question of perfection versus holism, ie whether when teaching bell handling it is better to get every step completely right before moving on, or whether there is merit in moving rapidly to give an experience of the whole action, and then sorting out any problems.

Tail End