A DIFFERENT WAY TO DEVELOP OUR LEARNERS' SKILLS:

A CONSTRAINTS LED APPROACH

"I never teach my pupils. I only attempt to provide the conditions in which they can learn"
Albert Einstein

In our coaching do we pay heed to the wise words of Einstein, are we really creating the optimum conditions to develop our learners into skillful performers? A constraints led approach to skill acquisition is a way to help us create those optimum conditions, whilst at the same time perhaps prepare our learners better for the dynamic environment in which they aspire to perform.

TWO APPROACHES TO SKILL ACQUISITION

A traditional approach to skill acquisition:

In our coaching language this could be looked at as 'chaining' or sequencing'. A task is broken down into manageable components, organized into a linear progression and then gradually built up stage by stage. This is known as 'motor programming information processing' and I am sure is an approach we are all familiar with. The question is how well does this 'linear' and 'structured' approach to skill development prepare us for the real world, which is dynamic, changeable and requires constant adaption?

A non-linear dynamic approach to skill acquisition:

This approach takes into consideration that perhaps in the real world skills are not sequential or linear in their make up. The environment often presents disorder and movement skills (made up of many interacting parts, all moving between phases of stability and instability) need to be able to react to this, within this environmental disorder we look for patterns and predictability to help us do this. An analogy could be a river, as the water rises it may well vary a lot with plenty of disorder and have many interacting flows and obstructions (parts), however we could still predict how it will flow due to our experience. To learn this it is about recognizing the relationship between the component parts and understanding patterns and predictability.

Food for thought

Perhaps a traditional view of skill acquisition is too simplistic, outdated and not the most useful for understanding complex skills in complex environments! Perhaps we should consider a non-linear dynamic systems approach…

A CONSTRAINTS LED APPROACH:

If we agree that everybody is different, then surely we cannot impose the same process of learning on all individuals and try to program everyone the same way. If this is the case then I cannot expect somebody to 'copy' my demonstration exactly and expect it to work for them as it works for me; can I? In performance there are always constraints that influence how we achieve an outcome, each individual will inevitably come up with their own slightly different way to overcome these constraints. As coaches surely we want to identify these constraints to performance and then support our learners in developing 'their' way to overcome them and maximize their performance. In that support we may want to allow the learner to explore and generate specific, functional movement solutions to satisfy the unique combination of interacting constraints being imposed on them. A constraints led approach does just that:

THE CONSTRAINTS TO PERFORMANCE:

Individual Constraints

- Structural (physical aspects of learner; size, shape, flexibility, fitness etc)
- Functional/Behavioural (psychological aspects of learner; motivation, anxiety etc)

Environmental Constraints

- Physical (water, wind, terrain, tide etc)
- Socio-cultural (group, peers, expectations etc)

Task Constraints

- Activity (goal to be achieved, degree of challenge, appropriateness etc)
- Equipment (suitability of equipment for the chosen goal, familiarity with etc)

CONSTRAINT MANIPULATION 'A WAY TO DEVELOP LEARNING':

Instead of 'deconstructing' (breaking down) skills we perhaps need to look at 'simplifying' them (doing the whole skill but in an achievable way). From this then developing them through gradual challenge progressions by manipulating the constraints (shaping the whole skill). The easiest way to think about simplifying them is to look at the 'constraints' that are limiting the success of the whole skill, then manipulating these to allow success, gradually building up challenge to promote adaption of that whole skill. Here's some examples:

Individual Constraint Manipulation:

We can't manipulate the structural constraints here, but we do need to check they are not a limiting factor to the chosen goal e.g. a small person in a boat that is too big, a goal that requires good flexibility if the person is not flexible. We can manipulate the behavioural constraints though, perhaps making it less 'scary' if the learner is over aroused or making it a bit more 'scary' if the learner is under aroused. Perhaps a beginner learning forward paddling, first in shallow water and then in deeper water, or maybe eyes open then eyes closed would change their state of arousal thus challenge the skill and strengthen it.

Environmental Constraint Manipulation:

Here we could perhaps develop someone's forward paddling by starting with a straight line target in very sheltered water to work out how to achieve success (us giving guidance to support), this achieved we could do the same exercise but change the environmental constraint by doing it with a slight head wind, then perhaps a cross wind, then perhaps some waves and so on. Each time the learner is practicing the same skill but adapting the whole of it to achieve the outcome – shaping it for adaptability.

Task Constraint Manipulation:

If we stay with forward paddling then here we could set a progression of challenges by way of altering the task constraint, thus requiring the learner to adapt and develop their forward paddling. Perhaps starting with the task of paddling a straight line for a short distance, then for a longer distance, then faster, then slower, then with minimum strokes and so on. This way the learner is again adapting their forward paddling to achieve the new task set.

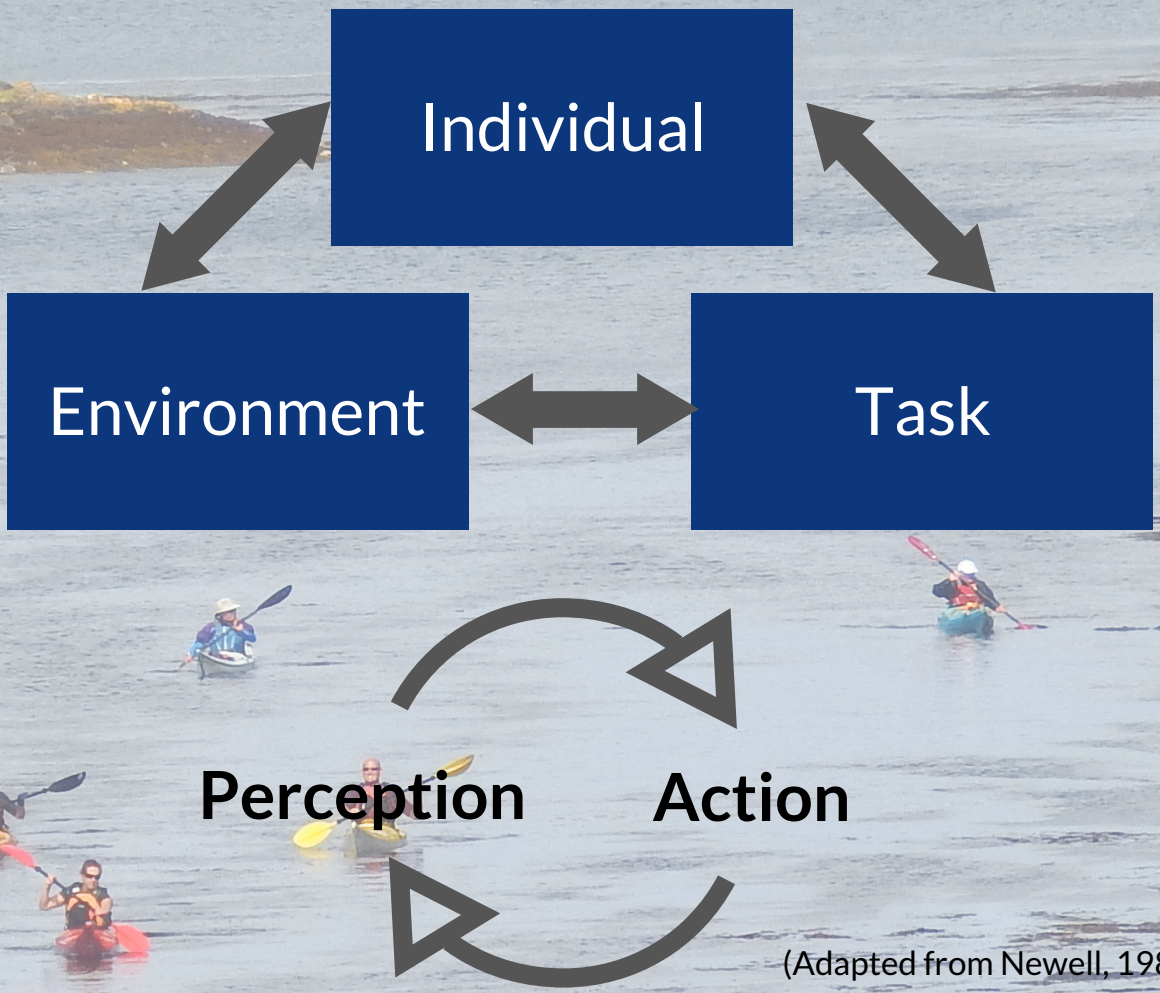
With all of the above the key thing is the learner being practically challenged, making adaptations to achieve an agreed outcome and then the coach asking the questions to help them understand the adaptations made. By manipulating the constraints we have developed the skill in an individualized way that has exposed the learner to the need to make adaptations. Think of your own forward paddling, is it always exactly the same for all outcomes? If not how did you learn to adapt it so as you can keep going in straight line whatever the environment or task? – not by breaking it down I would guess!

WHO IS DOING THE THINKING?

The fundamental part of manipulating the constraints is ensuring that the learner is developing their own thinking and understanding. With our help they should be able to anticipate and perceive what they need to adapt in order to achieve a task or an action when one of the constraints has changed. They should be able be able to state; "If I do 'x' then 'y' will happen. They are making the link between the three constraints and understand the impact they will have on their performance. When this link is not there then performance will break down, they will not have anticipated the adaptations required to stop the kayak going off course, then when it has gone of course not have understood why.

Final thoughts:

Use the model below to get to grips with the constraints led approach, challenge yourself in your coaching – don't break it down just look for ways to shape it and develop adaptability and understanding.



(Adapted from Newell, 1986)

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