

Tempo - a multi-modal learning game

The Game of Tempo

Tempo is a board game played by anyone, of any age, of any ability, anywhere in the world. Easy to play, Tempo is difficult to master well. For curious minds this requires analysis, choice and a strategy whilst being aware what an opponent might do.

The learning model derives from psychology, pedagogy, experiential learning, logic and critical thinking. This is depicted by a mosaic of nine core attributes shown as a diagram in Appendix 1. Subtle links and differences exist. Used together they provide highly effective tools for deployment. Tempo offers powerful learning in reasoning, analytics and reflection, yet a game takes only ten-fifteen minutes to play. A list of academic references is shown in Appendix 2.

Temptation

The name Tempo is a fusion of temptation and tempo with an enormous temptation to rack up points quickly rather than devise a strategy to earn more later.

Tempo links closely to a famous psychology experiment known as the Marshmallow Test and notion of deferred gratification. In the USA, several decades ago, a group of 4 year olds was tested by a psychologist, William Hirschel, to see if they could delay eating a marshmallow placed in front of each child. The dependent variable was the duration of delayed gratification.

William Hirschel went out of the room - but the children didn't know for how long. If a child held out until return the reward was a second marshmallow. Most couldn't resist the temptation though some did. One enterprising child surreptitiously prised open the marshmallow, licked the cream out and smugly pressed the two halves together, unaware the test was being filmed!

Years later Hirschel checked to see how the participants were doing. He noticed an association between delayed gratification and improved academic performance, and the ability to cope better with life. Whilst the sample size, test conditions, methods and conclusions might be questioned, there appeared to be a positive correlation.

In *The Paradox of Choice*, psychologist Barry Schwartz illustrates the dilemma if faced with extensive choice. He cites supermarket products such as soups and cereals of bewildering varieties and buying a pair of jeans with multiple choice options of slim, easy fit, baggy or extra baggy and stone-washed, acid-washed or distressed. Faced with abundant options do we become overloaded, confused and mentally-freeze or see through the fog of choice to make what we think is the best selection?

Tempo offers many beguiling choice options! These get trickier as a game goes on in selecting best moves to maximise points whilst trying to prevent an opponent from scoring more. That is the ultimate choice. It does not matter how many points your opponent has if, at the end of the game, you have at least one more point - you win!

Tempo

Delayed reward means laying foundations to earn more points later. Tempo requires finely tuned judgement to make the best moves at the right time. It is about impetus which means planning and thinking about an opponent's moves. Using chess as an example, checkmate in three moves is no good if an opponent checkmates in two.

Bonus points are an enticing reward but sometimes tempo is lost with the feeling of being a move behind. A strategy may include a selection of bonus points that adds yet another layer of temptation. The choices are agonising!

The relevance of multi-modal learning

Like most games, such as Sudoku and Codeword, solving is incremental. Get a move wrong and the solution is wrong. This is unlike Tempto. It is far less predictable and provides the opportunity to recover what may seem a lost position.

With many games, the higher the score the greater the chance of winning. This is not always the case with Tempto. You may score more than the previous game you won and yet lose! The reason is offensive and defensive strategies are deployed, often at the same time. This has huge implications for learning and combination of analytical and logic based skills coupled with creativity and intuition too.

Twin objectives of Tempto are to enjoy playing a fun game and to learn. Experiential learning enables more serious players to improve and to apply learning tools to other settings and life in general.

Using multi-modal learning

How we learn to learn is a fascinating subject. Adaptive learning is contextual to the topic and situation. Neural pathways are engaged so that a range of learning styles are used, not just at different points in a game but simultaneously, or sequentially.

In selecting only nine core themes it is inevitable that many learning styles have been omitted, usually because they are less relevant, or have a lower impact on successful achievement of the task; in this case helping a player to win. The nine themes shown below all interlock:

- Scaffolding
- Learning depth
- Critical thinking
- Spatial awareness
- Inferred logic
- Heuristic methods
- Pattern recognition
- Constructivism
- Concept mapping

These are not in any order as sequence and frequency vary. Several themes relate to visualisation, forecasting, sensing, intuition and scenario prediction. A result may be in doubt until the last move of the game.

Four catalysts enrich learning and are intrinsic to learners: the ambience, stimulus of content, motivation and use of knowledge acquired. The learning environment and ambience is represented by an attractive board, tactile pieces and a variety of colours.

There is also the fun of computing scores as the game is played and totting up points at the end. Tempto lends itself for development as an App for self-play which greatly extends the opportunity to play at any time in almost any location.

◆ Scaffolding

Learning potential increases through interaction with peers, own self-reflection and analysis to internalise and scaffold what is learnt. The aim is high cognitive challenge with low performance anxiety. Scaffolding relates to the notion of spiralling to build upon and expand knowledge gained using real experiences. This kick-starts a cyclical process of experiential learning, similar to the model produced by David Kolb.

◆ Learning depth

Surface learning focuses on facts, tasks, signs, symbols, memory and principles. The emphasis is external and is usually tutor led. The process is reactive and the learner compliant in following a sequence. Learning is restricted in applying what has been taught. Points grabbing is an example as actions flow from simple prescribed rules.

Rather than asking 'what do I have to do,' deeper learning asks 'how best may I apply this?' The emphasis is learner-centred and developmental as deep learning:

- focuses on what is significant
- relates previous to new knowledge
- works out relationships between concepts
- applies theory to practice
- organises and structures content into a coherent whole
- distinguishes evidence from argument

The process involves making sense of layers of analysis, inquiry and interpretation to see the whole picture. This entails use of imagination and image reconstruction, and independent learning too. Higher levels of play involve deep learning.

◆ Critical thinking

In following optional pathways, gaps or omissions are identified that may also mean challenging assumptions such as being told, 'that's a bad move!' The process may act as a springboard to explore, conjecture and imagine alternatives that may lead to the phases of evaluation, justification, discovery, ideas generation and optimal strategy. Learning from games lost is an example. That is often how good players improve.

◆ Spatial awareness

This is the ability to identify and use images or objects in two or more dimensions. It includes the interpretation and creation of visual images, pictorial imagination and expression. By so doing the relationship between these images and their meanings is understood and the effect on space. This has significance with changing positions on the Tempto board and the ability to visualise moves ahead- and their consequences.

◆ Inferred logic

Deductive logic has a strong affinity with surface learning. A conclusion follows from a set of premises or hypotheses and is valid or invalid, sound or unsound. In contrast, deeper learning relates to inductive logic to construct and evaluate options. These derive from observations and involve degrees of probability and intuition as complex permutations affecting several moves ahead are difficult to calculate.

◆ Heuristic learning

Self-discovery includes calculations, predictions, forecasting, intuition and sequence generation. Heuristic learning, whilst having a logical basis, is largely intuitive. This helps speed up finding a solution where complexity and time make a comprehensive search impractical or impossible. There is evidence to suggest that both hemispheres of the brain are used in making such judgements.

◆ Pattern recognition

The process is intuitive and involves imagination but doesn't depend on logic as past learning experiences are stored as information templates. They are then matched to characteristics sought to identify common elements and components. The incoming stimuli are broken down into features to process information by detection, dissection of patterns, factor comparison and recognition such as the shape of certain positions.

Pattern recognition is top down by processing from past information 'case law' and is bottom up in drawing generalisations from observation and own experiences.

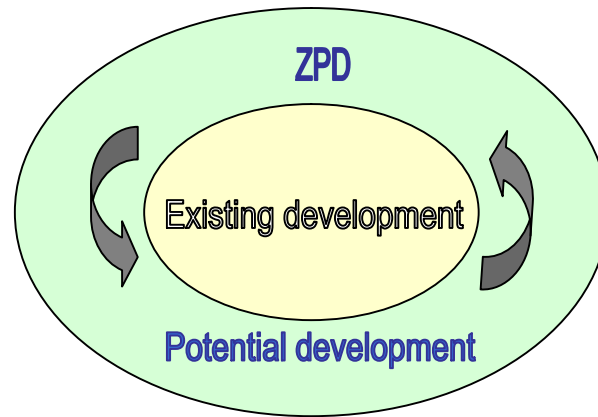
◆ Concept mapping

A diagram in concept mapping shows a relationship between all elements in a visual format, similar to mind maps. The technique is useful to explore the range, relevance and relationship of material. For Tempto this means seeing patterns and shapes that, at first sight, might appear unconnected but may be several moves later. Concept mapping helps to see the big picture. In being able to comprehend the whole board, the better our ability to assess what is going on and to evaluate best options.

◆ Constructivism

The baseline is cognitive learning from memory and prior knowledge. These depend on external interactions and influences from which a learner actively constructs new ideas and concepts. Cognitive constructivism emerges through deeper learning and a curious mind, asking: who, how, what, why, which and so on. Learning is an active process involving discovery and knowledge-building. Each game builds on the last.

With personal growth and development comes the concept of the zone of proximal development. It shows an inner core of existing knowledge, surrounded by an outer layer as depicted in the diagram that follows. This represents the capacity to develop further and build on learning experiences. The only boundaries are self-imposed.



Tempo offers rich potential to develop more complex strategies, learn from previous games and spiral knowledge. Thinking, analytical and reasoning processes plus deep concentration can be applied to other fields of learning.

In conclusion

No express mention has been made of the repertoire of more familiar learning styles such as VARK (visual, auditory, read/write and kinaesthetic), or Honey & Mumford's model of activist, reflector, theorist and pragmatist, or the affective and psychomotor learning domains etc.

These and a host of other generic models form a bedrock for deeper, more intensive and strategic learning concepts outlined in this paper. They all underpin the game of Tempo that, as the paper shows, is more concerned with deeper learning and holistic insights and their tailored application rather than mechanical and rote learning.

Appendix 1 - concept of multi-modal learning



Appendix 2 - References

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