In the first part of this article I pointed out that technology enhanced learning (TEL) can only play a supporting role in learning, and that the key factor is always the human mind. In this second part, I explore the key factors in making such support successful.

When considering learners, we need to note that when the learning material is simply presented to them, they are passive and so learning is minimal. In contrast, when learners are active and motivated, engaged, and interacting with the material, then learning is maximised. It is maximised because it activates and correctly taps the cognitive mechanisms of learning, such as attention, depth of processing, and other cognitive processes.

Given the great importance of achieving the active participation of the learners, can TEL help accomplish this? The answer depends on utilising technology to promote what I call the three C’s of learning: Control, Challenge, and Commitment. Each of these is not easily achieved, but if technology can support them, then it can offer great gains and benefits that make TEL worthwhile.

The shift from merely exposing the learners to the material to utilising the
three C’s transforms the learning, leading it to a higher level and quality. This new level of learning is more sophisticated, superior, and can achieve short and long term objectives that otherwise are not possible. In what follows, I discuss each of the three C’s, not only pointing out why they are crucial, but also elaborating on how technology can be constructed to incorporate them.

COMPLETE CONTROL?
The learners’ control can take many forms and can be viewed as a continuum. At one extreme, control is totally surrendered to the learners, giving them full freedom to do (or not do) as they please. At the other extreme of the continuum, the learners have no control at all; they blindly (and passively) follow what is determined and dictated by the learning programme. Since giving the learners control supports and promotes learning, it follows that TEL should maximise the learners’ control.

However, giving them control can also be detrimental to learning. Thus, it is important to understand why and how it fits (or not) your learning programme. Before explicating practical ways in which technologies can help shift control from the learning developers to the learners, I want to draw attention to some potential problems in giving the learners more control.

If the learners control the learning (or even part of it), this adds another cognitive task to their system. In addition to actually acquiring the learning material and encoding it properly so it is easily retained and used, the learners will need to exercise control over the learning itself. This control may involve understanding and considering alternatives, making decisions (and sometimes needing to remember them), taking actions, and so forth. These processes are an additional burden on the cognitive system, which is (should be) involved and focused on the actual learning material; the result is an increase of the overall cognitive load.

Furthermore, the learning material may have an inner structure, a logical way and flow in which it can be best learned. Therefore giving the learners control may also interfere and even conflict with the optimum way of delivering the learning. Nevertheless, shifting control to the learners is an excellent way to enhance learning and should always be maximised, whenever possible.

However, as discussed above, one must achieve the correct balance, and consider when, where, and how it can have the greatest benefit, and how technologies can play a role. This brings me to examine some of the practical ways in which control can be given to the learners via technologies.

PUTTING LEARNERS IN CONTROL WITH TECHNOLOGY
The ultimate way of giving the learners control is letting them determine if and what they need to learn via technology such as an LMS (learning management system).
At a more basic level, rather than giving learners control of what they learn, technology can more easily give the learners control over the order in which topics are covered. Sometimes this order is rigid because of inter-dependencies whereby one concept/content must be covered before the other.

However, many times there are degrees of freedom that allow different sequences of learning. This flexibility can be used to increase the scope of control that is provided to the learners. The learners can also receive more control, via technology, over the presentation format of the material.

Because learners have different experiences, cognitive styles, etc., they may have preferences for the way the material is delivered (for example, visual vs. auditory, text vs. diagrams, etc.). Giving them control over the format of presentation not only gives them control but also optimises and tailors the learning to the individual learner. Finally, at the most basic level, learners can control the pace of learning (e.g., when to move on to the next item/page, and whether to repeat a section before moving on to the next).

Even the more basic levels of control give the learners some ownership of the learning process. This significantly improves learning, both in terms of achieving the learning objectives and in terms of the learners’ positive affect. Even the mere illusion of control (i.e., giving the learners a feeling that they control the learning when in fact they do not) can be a step in improving the learning outcomes. TEL can be an aid in this area.

RISING TO A CHALLENGE

For the learners to be further motivated, engaged, involved, participating, and interacting, the learning must be challenging. If the learning is deemed boring, as simply going through the motions, then learning is minimised. Learning is drastically enhanced when the learners find it challenging. Challenging does not mean making it unduly complicated and complex. Learning can be made challenging in a number of ways and on different fronts.

First, regarding the learning material itself, the learning material can be made challenging if it is presented in an interesting way that requires the learners to think about it, to reflect and figure things out. If the learning feels more like a puzzle, a mystery that the learners solve, then it is challenging. If the learners feel that they have accomplished something, if they feel good about themselves, if they are proud, then the learning is challenging.

Can technology enhance all this? Yes, of course, but only if used properly. For example, using gaming technology can really make the learning fun, challenging, and interactive. Many times, getting people to take formal learning courses is like ‘beating a dead horse’; however, when you introduce a computer game the ‘dead horse’ transforms itself to a ‘racing horse’.

TEL can present learning via a gaming framework, which offers a wide range of benefits. For instance, learning can be made challenging not only by modifying how the material is presented and the role of the learners, but also by providing clear signs, measurements, and feedback about the learners’ advancement and progression. These should be clearly laid out throughout the learning game so the learners can see how well they are doing.

As they advance and progress, they should be provided with a clear measurement of their success and receive positive self-enhancing feedback. The learners should not merely be provided with a progression measurement (e.g., how much they have gone through or/and how much they still need to do), but they should be given challenges to achieve certain levels of performance, or they should be encouraged to generate their own goals.

These types of challenges can be further encouraged and supported by external recognition and awards. Furthermore, depending on the context and the organisational culture, this type of challenge can also be extended across learners whereby different learners compete for the best performance achieved.

COMMITTED TO LEARNING

If the learners are not committed to the learning, then it is an uphill struggle (or a lost battle...). Commitment to the learning underpins many aspects of learning; however, getting the learners to commit is not easy. As discussed, control and challenge contribute to commitment, but commitment is elusive and difficult to achieve. Some learners come committed, others are only loosely committed, if at all.

Technology can enhance learning by helping to promote and achieve them. The three C’s are not independent or exclusive, they affect one another and there are additional ways to support active learning.
Although commitment is a personal trait to some extent, it can be enhanced by using TEL. Our example of gaming is one way to help achieve this.

The three C’s of learning: Control, Challenge, and Commitment, help to establish active and motivated learners. They bring about engagement, involvement, participation, and interaction. These are all critical ingredients for achieving effective and efficient learning because they maximise many cognitive mechanisms. Otherwise, passively exposing the learners to the material undermines the very objectives of learning.

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The three C’s are an illustration of a way of thinking, of an approach to how technologies can be utilised to enhance learning. Having active and motivated learners will better achieve learning objectives and learning technologies should be constructed to incorporate them as much as possible.

As I have tried to illustrate, the issues surrounding the use of technology for learning are complex. They are intertwined with human cognition, how people learn, store information and use it. We must consider TEL in light of, and subservient to, the human cognitive system. Only then can we construct effective TEL and start to consider the effects it has on the cognitive system itself. It is a broad issue, but one of significant practical, as well as psychological and cognitive importance.

The title of this paper is TEL: the good, the bad, and the ugly. I have provided material and thoughts for the readers themselves to determine what the good, bad, and ugly aspects of TEL are.