

## EDITORIAL

### The medium, the message and the memory

McLuhan, writing in 1964, discussed the power of the medium over the message, the way that the message of any new medium or technology was the “change of scale, or pace or pattern that it introduces into human affairs”. At the time these ideas constructed the foundations of media theory and were both wholeheartedly absorbed and disputed, yet arguably set out a basis for the way we now conduct research in learning technologies.

The notion that the medium was the message, or that what we needed to attend to was the huge impact of new media rather than the content they transmitted, was prescient and as researchers into the use of interactive technologies or media in relation to learning, we should not forget McLuhan’s legacy. In this journal, we are in the process of re-discovering the impacts of media on learning, on social and collaborative development as well as individual content acquisition. We are also aiming to construct new connections between the learner, the environment and knowledge through behaviours, intentions and feedback. The media we discuss are not hidden in the background but foregrounded as we experiment with combinations of media and activities to determine their influence on the changes we call learning.

In one sense, therefore, we are quite immersed in communications theory. We can identify sender or source – the instructional designer or teacher or software developer. We can identify the encoding of messages through HTML in a literal sense, or learning design and authorship of multimedia items. We can identify the messages or the content which fills our virtual learning environments and ebooks and apps. We can identify the range of media (videos, text, images, podcasts, graphics, conversations, scenarios, screenshots, augmented reality, virtual worlds, kinetic relationships as well as the ubiquitous slideset in the classroom). We can identify the decoding processes which learners undertake as they surf, web search, watch, listen and question, sometimes making notes ... We can identify the recipient or receiver as learners, peer groups, cohorts and the diverse range of attendees to publicly available MOOCs, blogs and websites. We can identify feedback in the communications system particularly in blended or Web 2.0 transactions where recipients are encouraged to post messages, respond to or ask questions, complete quizzes or in a wider sense create new artefacts online.

Does this mean that we can use the parallel of communications theory to improve the way online learning works? Only if we understand what it is for, what it is intended to do. Sometimes this seems to be the last thing researchers worry about. The job of teachers is seen by many as improving learner performance in terms of grades, a regular feature of pre and post-test case studies. Just as innovators in educational technology are so often just focused on how satisfied learners are with their innovation. But of course there are other outcomes of learning at every level including practical skills, competence, reflective transformation, mastery of threshold concepts, as well as relearning and unlearning to achieve. What value does educational research add if we are unclear about the objectives?

The other component of communications theory is “noise”. This is seen by media specialists not as sound but as interference or impedance in the communications process. This is another area often hidden in educational research, sometimes just because it opens too wide a variable map for rigorous consideration. Yet this kind of noise, which might be the silence of non-participation and lurking, is the less explored dark matter of the learning universe. Going back to McLuhan, he wrote of hot and cold media. Like noise not being about sound, hot and cold did not relate to temperature

but to degree of participation invited by the medium. Cold or cool media invite a lot of participation from users, simply because there are a lot of gaps in what they offer, which must be filled in by the receiver. So McLuhan saw television as a cool medium, because of the noise, the unexplained gap between what the programme offered and the response of the receiver. They may be knitting, talking, halfattending, eating, and they may bring to the understanding of the programme a wide variation of previous experience and meaning-making which is not dictated by the television offer. Their involvement is key. Whereas film was seen by McLuhan (admittedly in a cinema rather than on a TV screen) as a hot medium, where the viewer was completely captivated and one main sense, the visual sense, was occupied in high definition.

We could debate McLuhan's definitions at some length – TV and film have moved on greatly since the sixties – and this would certainly affect his examples. But could his definition of hot and cold media be helpful? We could surely identify hot and cold online courses? Ones which offer a very limited palette of activity and which could be described as cold, where the learner had to bring much determination, or a stark learning objective (for example a mandatory online course requirement) in order to complete and achieve the course. And there are hot online courses, which involve the key ingredients of clarity and variation: clarity to enable navigation and direction of travel, clear on what the learning is about and what it is for, and variation of activity, involving different key senses, aural, visual, kinetic, to engage the learner as they travel through the learning experience. Our understanding of cognitive load is vital here as we negotiate rules of engagement online. Being aware of the limitations of working memory and processes of developing and transferring information to long-term memory help us to avoid overload and bring some sanity to educational innovators who love to cram in the latest bits of software, sometimes to the detriment of enjoyment as well as learning.

We have two great models to guide our thinking on educational innovation: Puentedura's SAMR model and the TPACK framework. SAMR (Substitution, Augmentation, Modification and Re-definition) helps us to work out the extent to which technology is integrated or simply added to our teaching, giving us a goal which can be mapped against Bloom's taxonomy. The TPACK framework ([www.tpack.org](http://www.tpack.org)) to which many have contributed (Shulman, Mishra, Koehler and others) looks at the different kinds of knowledge teachers need in order to develop online learning which fits their discipline. With these models we can reflect more deeply on the kinds of communication we might want in our online and blended learning. Do we want "cold" media which invite participation? Are they too predictable and boring so that participation palls? Or do we want "hot" media, which are highly attractive but also leave less to the imagination and sense-making of the learner?

If we look at today's organisational communications theory, we might find the reverse of McLuhan's tenet. With so many media at their disposal, today's communications specialists redefine the power of the medium by focusing on how the message fits the medium chosen. This helps us think about the environment we offer online for learning, the key role of the context. We need to understand better the balance of learner background, digital skill and content understanding and how that fits with the moving carpet of digital wallpaper which decorates the rooms inhabited by those learners. In collaborative learning we need to understand better the notions of opinion leading and opinion forming among learner groups, as well as cultural norms affecting both the technologies or media available and behaviours and "noise" within those media.

The papers presented in this issue bring us different insights into the communications process between learner, teacher, designer, knowledge and context. There is one paper which gives an overview of the field, a 10-year review of technology enhanced learning in UK Higher Education by Walker, Voce and Jenkins, which notes enterprise-wide solutions dominating the field, as well as the

development of focus on collaborative and active student learning. Collaborative learning is also a feature of papers by Sadeghi and Kardan, Mercier, Higgins and Joyce-Gibbons, and Sung, Hwang and Chang. If we apply the filter of communications terms, we have sender or teacher-focused papers from Song which explores sequencing of tasks on cognitive load, and Rienties, Giesbers, Lygo-Baker, Ma and Rees who look at technology acceptance among teachers and find little impact from the factor of perceived usefulness. We have a focus on the medium from Randolph, Kangas, Ruokamo and Hyvönen looking at technologically enriched playgrounds for school children, Novak, Johnson, Tenenbaum and Shute who present a paper on gaming used in the teaching of statistical skills, and Hong, Hwang, Wu, Huang, Lin and Chen who also use gaming in a blended learning context. A further focus on the medium is provided by Chen and Lin who explore the effects of a context-aware ubiquitous learning environment for astronomy education. We could suggest decoding is the subject of research by Chin, Hong, Huang, Shen and Lin whose animated pedagogical agents are designed to support learner motivation, and Chen and Lin who review the effects of text display types in a mobile learning environment. Then we have a focus on the receiver or learner from Wang, Wen and Jou who take receiver measurement literally with wireless sensing devices on learners of technical skills, and Verpoorten and Westera who study the impact of reflection breaks on the learner and Liaw and Huang who explore learner attitudes to the medium of ebooks. Feedback is the principal field for work by Kazanidis, Theodosiou, Petasakis and Valsamidis who propose a new methodology to extract meaning from the huge volumes of data in learning management systems. Finally we find what we might call “noise” focused investigations in Szeto and Cheng’s study of social presence and emotional adaptation in a blended engineering course and Bahreini, Nadolski and Westera’s development of a framework for improving learning through webcams and microphones for emotional recognition in e-learning.

Whether or not you consider communications theory a helpful analogy for research in interactive learning environments, these papers take us through a rich exploration of media, messages and memory as society continues to be changed by the media or technologies we use for learning and teaching. McLuhan’s point that the medium was the message, or the key thing to which we should pay attention, seems to make more sense as we seek to redefine learning tasks in the context of the technologies in which they reside (SAMR) and contribute to knowledge relationships between technology, pedagogy and content (TPACK).