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## Editorial

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The advancement of personal computing devices, from personal computers to mobile devices, has been gradually changing the landscape of the technology-transformed learning. This facilitates the incorporation of one-to-one computing (i.e. one-computer-or-device-per-learner) into education and opens up endless possibilities of the design and enactment of innovative teaching and learning models (or the enhancement of pre-existing models), such as digital classrooms (e.g. Liu and Kao, 2007; Roschelle et al., 2010), ubiquitous learning (e.g. Rogers and Price, 2006; Hwang et al., 2008), personalised learning (e.g. Ogata et al., 2011; Yau and Joy, 2011), social and participatory learning (e.g. De Jong et al., 2008; Tomlinson et al., 2008), informal learning (e.g. Song and Fox, 2008; Santos and Ali, 2012), authentic and contextualised learning (e.g. Kurti et al., 2008; Wong et al., 2010), seamless learning (e.g. Chan et al.,

2006; Wong and Looi, 2011), rapid knowledge co-creation (e.g. Chen et al., 2010), among others. This leads to the further empowerment of the learners in deciding what, where, when, and how they would learn, and with whom they would learn with/from.

After the initial hype, however, there have been voices within the researcher community to reassess the notion of one-to-one computing in classroom and informal learning, such as whether and how one-to-one settings may impact peer collaboration and teachers' roles, the issues of infrastructure, learner, teacher, school and social readiness, as well as the exploration of alternative or hybrid settings of many-to-one, one-to-many, many-to-many, and one-to-one configurations.

This special issue deals with the fundamental concerns and challenges in adopting one-to-one computing in either or both classroom and informal learning settings. Among the five papers published in this special issue, four of them pertain to language learning, namely, 'User and context modelling for adaptive mobile learning interfaces' (by Paredes and Ayala), 'Integrating mobile-based individual activities into the Japanese EFL classroom' (by Ono and Ishihara), 'Towards seamless vocabulary learning: how we can entwine in-class and out-class learning' (by Uosaki, Ogata, Sugimoto, Li and Hou) and 'Towards a seamless language learning framework mediated by the ubiquitous technology' (by Wong, Chai, Chin, Hsieh and Liu). The last paper entitled 'Theoretical and methodological considerations regarding the design of innovative mathematical learning activities with mobile technologies' (by Sollervall and Milrad) deals with mathematic learning. If one treats the two subject matters that these studies were dealing with merely as the application domains of a diversified set of innovative and potentially generalisable learning approaches, these papers are indeed spanning across a variety of entry points, emphases and strategies in tackling the above-stated issues in one-to-one technology-transformed learning.

Ono and Ishihara's reported study aimed to enhance and enrich the learning experiences in formal language classes by developing a digital classroom system with one-to-one setting. Sollervall and Milrad's learning design ('Geometry Mobile' or 'GEM') can be characterised as teacher-facilitated collaborative learning activities, largely in informal (outdoor) settings. Paredes and Ayala's paper offers a technological solution ('Taxere') for integrating user and context modelling to support language learning in informal settings. In contrast, the seamless learning designs as proposed by Uosaki et al. (the 'SMALL' system) and Wong et al. ('MyCLOUD') seek to go beyond the enactment of episodic learning activities by facilitating ongoing, cross-contextual learning experiences with the learners assuming greater ownership of their personal mobile devices.

Context-awareness (which is often associated with augmented reality), one of the killer affordances offered by mobile and ubiquitous learning, is highlighted in and heavily leveraged by both the GEM and Taxere systems, as well as being incorporated as a supporting feature in the SMALL system. Yet the stated technology plays different roles in these systems. In GEM, the combination of the one-to-one mobile setting and the GPS technology is the key to enable the participatory simulation-like learning activity, complemented by a web-based geo-visualisation tool. In Taxere, the adaptive context-aware technology delivers relevant and personalised learning resources just-in-time. In SMALL, learners can share and retrieve geo-tagged learning materials that they or their peers create in authentic situations.

Apart from the more conventional academic studies initiated by scholars from the universities, the scaling up, translation and policy issues have been progressively gaining attendance from the field of technology-transformed learning. Parallel to this is the emergence of design-based research (also known as ‘design research’ and ‘design experiments’) (Brown, 1992; Collins, 1992; Design-Based Research Collective, 2003) where the processes of the research activities (including cycles of design-implementation-evaluation-redesign) themselves are also part of the research objectives which would be analysed and reflected upon. These issues are indeed crucial to the recent endeavours carried out in many countries and regions to bridge the gap between educational research and practice, with the aim of getting practitioners to adopt and adapt researchers’ innovations into their daily ecology of use. Therefore, it is not surprising that the publications on such topics, which do not necessarily follow the conventional structure for academic writing of introduction-literature-method-findings-discussion-conclusion, have been picking up in various prestigious journals (e.g. Roschelle et al., 2010; Wong et al., 2011; Lynch et al., 2012). In this special issue, the papers by Sollervall and Milrad, and Wong et al. respectively, fall into this category.

In summary, this special issue offers various perspectives concerning the trends and challenges in developing and scaling up of one-to-one technology-transformed learning. It is hoped that the studies reported in the five papers will stimulate further intellectual exchanges in the field and inspire more diversified innovative learning designs, thus pushing the boundaries of technology, pedagogy, and the learners’ learning experiences.

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### References

- Brown, A.L. (1992) ‘Design experiments: theoretical and methodological challenges in creating complex interventions in classroom settings’, *Journal of the Learning Sciences*, Vol. 2, No. 2, pp.141–178.
- Chan, T-W., Roschelle, J., Hsi, S., Kinshuk, S.M., Brown, T., Patton, C., Cherniavsky, J., Pea, R., Norris, C., Soloway, E., Balacheff, N., Scardamelia, M., Dillenbourg, P., Looi, C-K., Milrad, M. and Hoppe, U. (2006) ‘One-to-one technology-enhanced learning: an opportunity for global research collaboration’, *Research and Practice in Technology-Enhanced Learning*, Vol. 1, No. 1, pp.3–29.
- Chen, W., Looi, C-K. and Tan, S. (2010) ‘What do students do in a F2F CSCL classroom? The optimization of multiple communications modes’, *Computers & Education*, Vol. 55, No. 3, pp.1159–1170.
- Collins, A. (1992) ‘Towards a design science of education’, in O’Shea, E.S.T. (Ed.): *New Directions in Educational Technology*, Springer, Berlin, pp.15–22.
- De Jong, T., Specht, M. and Koper, R. (2008) ‘A reference model for mobile social software for learning’, *International Journal of Continuing Engineering Education and Life Long Learning*, Vol. 18, No. 1, pp.118–138.

- Design-Based Research Collective (2003) 'Design-based research: an emerging paradigm for educational inquiry', *Educational Researcher*, Vol. 32, No. 1, pp.5–8.
- Hwang, G-J., Tsai, C-C. and Yang, S.J.H. (2008) 'Criteria, strategies and research issues of context-aware ubiquitous learning', *Educational Technology & Society*, Vol. 11, No. 2, pp.81–91.
- Kurti, A., Spikol, D. and Milrad, M. (2008) 'Bridging outdoors and indoors educational activities in schools with the support of mobile and positioning technologies', *International Journal of Mobile Learning and Organisation*, Vol. 2, No. 2, pp.166–186.
- Liu, C-C. and Kao, L-C. (2007) 'Do handheld devices facilitate face-to-face collaboration? Handheld devices with large shared display groupware to facilitate group interactions', *Journal of Computer Assisted Learning*, Vol. 23, No. 4, pp.285–299.
- Lynch, S.J., Pyke, C. and Grafton, B.H. (2012) 'A retrospective view of a study of middle school science curriculum materials: implementation, scale-up, and sustainability in a changing policy environment', *Journal of Research in Science Teaching*, Vol. 49, No. 3, pp.305–332.
- Ogata, H., Li, M., Hou, B., Uosaki, N., El-Bishouty, M. and Yano, Y. (2011) 'SCROLL: supporting to share and reuse ubiquitous learning log in the context of language learning', *Research and Practice in Technology Enhanced Learning*, Vol. 6, No. 2, pp.69–82.
- Rogers, Y. and Price, S. (2006) 'Using ubiquitous computing to extend and enhance learning experiences', in van Hoofik, M. and Swan, K. (Eds): *Ubiquitous Computing in Education: Invisible Technology, Visible Impact*, Lawrence Erlbaum Associates, Inc.
- Roschelle, J., Rafanan, K., Estrella, G., Nussbaum, M. and Claro, S. (2010) 'From handheld collaborative tool to effective classroom module: Embedding CSCL in a broader design framework', *Computers & Education*, Vol. 55, No. 3, pp.1018–1026.
- Santos, I.M. and Ali, N. (2012) 'Exploring the uses of mobile phones to support informal learning', *Education and Information Technologies*, Vol. 17, No. 2, pp.187–203.
- Song, Y. and Fox, R. (2008) 'Using PDA for undergraduate student incidental vocabulary learning', *ReCALL*, Vol. 20, No. 3, pp.290–314.
- Tomlinson, B., Baumer, E., Yau, M.L. and Black, R. (2008) 'A participatory simulation for informal education in restoration ecology', *E-Learning and Digital Media*, Vol. 5, No. 3, pp.238–255.
- Wong, L-H., Boticki, I., Sun, J. and Looi, C-K. (2011) 'Improving the scaffolds of a mobile-assisted Chinese character forming game via a design-based research cycle', *Computers in Human Behavior*, Vol. 27, No. 5, pp.1783–1793.
- Wong, L-H., Chin, C-K., Tan, C-L. and Liu, M. (2010) 'Students' personal and social meaning making in a Chinese idiom mobile learning environment', *Educational Technology & Society*, Vol. 13, No. 4, pp.15–26.
- Wong, L-H. and Looi, C-K. (2011) 'What seems do we remove in mobile assisted seamless learning? A critical review of the literature', *Computers & Education*, Vol. 57, No. 4, pp.2364–2381.
- Yau, J. and Joy, M. (2011) 'A context-aware personalised m-learning application based on m-learning preferences', *International Journal of Mobile Learning and Organisation*, Vol. 5, No. 1, pp.1–14.