

[HTTPS://WWW.SENSEPUBLISHERS.COM/CATALOGS/BOOKSERIE
S/TECHNOLOGY-ENHANCED-LEARNING-1/THE-ART-AND-
SCIENCE-OF-LEARNING-DESIGN/](https://www.sensepublishers.com/catalogs/bookseries/technology-enhanced-learning-1/the-art-and-science-of-learning-design/)

POZZI F., PERSICO D., EARP J.

1. A MULTI-DIMENSIONAL SPACE FOR LEARNING DESIGN REPRESENTATIONS AND TOOLS

INTRODUCTION

One of the core activities teachers perform as part of their professional practice is conceptual preparation of educational interventions of whatever type and at whatever level of granularity: single learning opportunities and activities, sequences, lessons, units, modules, courses or even whole programmes. A longstanding pillar in the constant quest for didactical efficacy, this preparation and planning is a field of study in its own right that is attracting renewed attention. This is thanks in large part to innovation brought about by the use of digital technologies throughout the educational sphere. The field is known by various names but perhaps the most commonly adopted, at least in Europe, is learning design (LD). This fast evolving field has become quite broad in scope and is now characterised by considerable diversity and complexity. For many, this rapid development is disorienting, making the field somewhat difficult to get to grips with. In an effort to address these challenges, and to contribute to a more systematic view of the field and its multitude of facets, this contribution illustrates and explains learning design in terms of one of its central tenants, namely design representations and tools. The chapter illustrates a set of different representation types and tools and proposes a multidimensional framework for positioning different approaches to learning design.

To this aim, it should be noted first of all that educators adopt a wide variety of methods, processes and tools for planning and preparing the activities they intend to enact for and with learners. However, there is a common thread running through this tapestry: the production of an artifact of some kind, whether it be just a few informal notes or a more elaborate and detailed form of representation. Elucidating, shaping, crystallizing and expressing intentions in this way is a process of design, in the sense that it concerns the formulation of the conceptual basis of an educational intervention in anticipation of its subsequent enactment. Representing one's thinking in a design artefact (of whatever form) can be regarded first of all as having a maieutic function, in that it calls on the teacher/designer to externalize, reflect on and assess her ideas. The design artifact then stands as a record of the author's (or authors') intentions,

serving as a useful reference before, during and after enactment. Indeed, re-examining this record in the light of the experience gained from enactment can yield valuable insights: about initial assumptions, about the processes set in motion, about actors' performance, about outcomes and so on. As well as contributing to the practitioner/designer's professional efficacy and growth, these insights may be utilised for optimising the original design and for refining it for possible reuse, either by the author/s or by others. Indeed a key affordance of design artifacts is that they can be used to share information and knowledge about professional practice, especially among peers. This is a vital factor in a sector where practitioners have traditionally operated in relative isolation, even when working in adjacent classrooms day in day out.

So in the light of the above we can say that the essential role of the design artifact is to capture and communicate ideas, to the benefit of oneself and of others. Of course the advent of Information and Communication Technologies (ICT) has had a profound effect on all aspects of social communication, and the fields of endeavor addressed here are no exception, dependent as they are on reflection and communication processes. The use of ICT has opened up new didactical opportunities within education, while at the same time introducing a heightened degree of complexity both in learning processes and in their management. This in turn calls on practitioners to reconsider and perhaps change the approaches and tools they adopt for design, in a quest for more informed, methodologically sound and effective practice (Conole, 2012; Mor & Craft, 2012; Earp & Pozzi, 2006; Persico, 2006). The result has been increasing interest (and innovation) in the field of learning design, an endeavour that, for the most part, is identified with the employment of digital tools, resources and accompanying methods to support a systematic approach to design (Bottino et al., 2008).

This trend towards computer-supported learning design has helped to enrich, diversify and extend the possibilities for communicating design ideas both at an individual, maieutic level and as part of social processes. Depending on their priorities, practitioners may want to adopt digital tools for various learning design purposes: organising and retrieving design ideas for personal reference/reuse; conveying those ideas to (other) actors engaged in the enactment process (learners, facilitators, collaborating peers); passing them on to other practitioners and designers for discussion and possible adaption/reworking, towards reuse in other settings and contexts; sharing them with researchers as part of pilots devoted to educational innovation of some kind.

Design artefacts can be expressed in languages and forms of different kinds, ranging from simple outline sheets to machine-readable representations that automatically configure a digital learning environment in which the design is deployed and activities enacted. Currently, there exists a wide variety of representational forms conceived for different purposes, users and contexts, and this may make it difficult for non-specialist practitioners, especially novices, to get to grips with the learning design field. This paper is an attempt to provide a systematic view of existing design representations, even though the borders between the various categories proposed can be rather blurred.

A MULTI-DIMENSIONAL SPACE FOR LEARNING DESIGN REPRESENTATIONS AND TOOLS

There are a number of dimensions along which it is possible to classify existing representations, tools and approaches in the field of design for learning. Gibbons et al. (2008) identify 7 continuums along which it is possible to position the various design languages: complexity – simplicity; precision – non precision; formality – informality; personalization – sharedness; implicitness – explicitness; standardization – non standardization; computability – non computability.

... OMMISS ...

REFERENCES/BIBLIOGRAPHY

- Agostinho, S. (2008). Learning Design Representations to Document, Model, and Share Teaching Practice. In L. Lockyer, S. Bennett, S. Agostinho, & B. Harper (Eds.), *Handbook of Research on Learning Design and Learning Objects: Issues, Applications, and Technologies* (pp. 1-19). Hershey, PA: Information Science Reference.
- Agostinho, S. (2011). The use of a visual learning design representation to support the design process of teaching in higher education. *Australasian Journal of Educational Technology*, 27(6), 961-978.
- Anthony, D. L. (1996). *Patterns for classroom education*. Retrieved November 2012 from: <http://ianchawriting.50megs.com/classroom-ed.html>
- Bergin, J. (2002). Fourteen Pedagogical Patterns. *Pedagogical Patterns Project*. Retrieved November 2012 from: <http://www.pedagogicalpatterns.org/>
- Bottino, R.M., Earp, J., Olimpo, G., Ott, M., Pozzi, F. & Tavella, M. (2008). Supporting the design of pilot learning activities with the Pedagogical Plan Manager. In Kendall M. and Samways B (eds), *Proc. IFIP, Learning to live in the knowledge society*, 281, 37-44, Springer Sci.Business Media, N.Y.
- Botturi, L., & Stubbs, T. (2008). *Handbook of Visual Languages for Instructional Design: Theories and Practices*. Hershey, New York: Information Science Reference.
- Britain, S. (2007). Learning design systems: current and future developments. In H. Beetham, & R. Sharpe (Eds.), *Rethinking pedagogy for a digital age* (pp.103-115). New York: Routledge.
- Conole, G. (2010). An overview of design representations. In L. Dirckinck-Holmfeld, V. Hodgson, C. Jones, M. de Laat, D. McConnell, & T. Ryberg (Eds.), *Proceedings of the 7th International Conference on Networked Learning 2010*. Retrieved June 2013 from: http://celstec.org/system/files/file/conference_proceedings/NLC2010_Proceedings/abstracts/PDFs/Conole_2.pdf
- Conole, G. (2012). *Designing for learning in an Open World*, New York: Springer.
- Conole, G., McAndrew, P., and Dimitriadis, Y. (2011). The role of CSCL Pedagogical Pattern as Mediating Artifacts for repurposing Open Educational Resources. In Pozzi, F. & Persico D. (Eds.), *Techniques for fostering collaboration in online learning communities: Theoretical and practical perspectives*. Hershey, New York: Information Science Reference.

POZZI F., PERSICO D., EARP J.

Dalziel, J. R. (2003). Implementing learning design: The learning activity management system (LAMS). Paper presented at the *ASCILITE 2003 Conference*, Adelaide, Australia.

Earp, J., & Pozzi, F. (2006). Fostering reflection in ICT-based pedagogical planning. In R. Philip, A. Voerman, & J. Dalziel (Eds.), *Proc. First Int. LAMS Conference 2006: Designing the future of learning*. (pp. 35-44). Sydney: LAMS Foundation.

Eckstein, J., Bergin, J., and Sharp, H. (2002). Patterns for Active Learning. Paper presented at the *9th Conference on Pattern Language of Programs*, Monticello, Illinois.

E-LEN project team (2004). Design expertise for e-learning centres: Design patterns and how to produce them. E-LEN project under the EU Socrates Programme.

Engeström, Y., Punamäki-Gitai, R. L., and Miettinen, R. (1999). *Perspectives on Activity Theory*. Cambridge University Press.

Falconer, I., Beetham, H., Oliver, R., Lockyer, L., and Littlejohn, A. (2007). *Mod4L Final Report: Representing learning designs*.

Kohls, C. and Wedekind, J. (2010). *Investigations of E-Learning Patterns: Context Factors, Problems and Solutions*. IGI Global.

Koper, R. (2006). Current research in learning design. *Educational Technology & Society*, 9(1), 13-22.

Gibbons, A. S., Botturi, L., Boot, E., & Nelson, J. (2008). Design languages. In M. Discoll, M. D. Merrill, J. v. Merrienboer & J. M. Spector (Eds.), *Handbook of research for educational communications and technologies*. Mahway, NJ: Lawrence Erlbaum Associates.

Hernández-Leo, D., Asensio-Pérez, J. I., Dimitriadis, Y., Bote-Lorenzo, M. L., Jorrín-Abellán, I. M., & Villasclaras Fernández, E. D. (2005). Reusing IMS-LD formalized best practices in collaborative learning structuring. *Advanced Technology for Learning*, 2 (4). DOI: 10.2316/Journal.208.2005.4.208-0865

Laurillard, D. (2012). *Teaching as a design science: Building pedagogical patterns for learning and technology*. Taylor & Francis/Routledge, New York.

Martel, C., Vignollet, L., Ferraris, C., and Durand, G. (2006). LDL: a language to model collaborative learning activities. Paper presented at *EDMEDIA2006 - World Conference on Educational Multimedia*, Orlando.

Mor, Y. (2011). Design Narratives: An intuitive scientific form for capturing design knowledge in education. *6th Chais Conference - Learning in the Technological Era*, (pp. 57-63), Open University, Israel.

Mor, Y. (2013). SNaP! Re-using, sharing and communicating designs and design knowledge using scenarios, narratives and patterns. In: Luckin, Rosemary; Puntambekar, Sadhana; Goodyear, Peter; Grabowski, Barbara L.; Underwood, Joshua and Winters, Niall eds. *Handbook of Design in Educational Technology*. London, UK: Routledge, pp. 189–200.

Mor, Y., & Craft, B. (2012). Learning design: reflections upon the current landscape. *Research in Learning Technology – Supplement ALT-C 2012 Conference Proceedings*. Retrieved June 2013 from: <http://www.researchinlearningtechnology.net/index.php/rlt/article/view/19196>

A MULTI-DIMENSIONAL SPACE FOR LEARNING DESIGN REPRESENTATIONS AND TOOLS

- McAndrew, P., Goodyear, P., Dalziel J., (2006). Patterns, designs and activities: unifying descriptions of learning structures. *Int. J. Learn. Technol.* 2, 2/3 (August 2006), 216-242. DOI=10.1504/IJLT.2006.010632 <http://dx.doi.org/10.1504/IJLT.2006.010632>
- Olimpo, G., Bottino, R.M., Earp, J., Ott, M., Pozzi, F., Tavella, M. (2010). Pedagogical plans as communication oriented objects. *Computers & Education*, 55, 476-488.
- Paquette, G., Léonard, M., and Lundgren-Cayrol, K.(2008). The MOT+ visual language for knowledge-based instructional design. In L. Botturi and S.T. Stubbs (Eds.), *Handbook of Visual Languages for Instructional Design: Theories and Practices*, (pp. 133-154), Hershey, New York: Information Science Reference.
- Persico, D. (2006). Media selection from the teacher's point of view. In Cartelli A. (Ed.) *Teaching in the Knowledge Society: New Skills and Instruments for Teachers*, (pp.286-301), Hershey, PA USA: Information Science Publishing.
- Pozzi, F., Persico, D., Sarti, L. (2014). METIS D5.2: Report on first formative evaluation round, http://metis-project.org/resources/deliverables/METIS_D5-2.pdf
- San Diego, J.P., Laurillard, D., Boyle, T., Bradley, C., Ljubojevic, D. (2008). Towards a user-oriented analytical approach to learning design. *Research in Learning Technology, ALT-J*, 16(1), 15-29.
- Tim Neumann and Darren PearceSanagustin, M.P., Emin, V., and Hernandez-Leo, D., (2012). Considering the Space in the Design of Learning Activities: The ISIS and 4SPPIces Models Applied to Science Inquiries. In: *Proc. of the 2012 IEEE 12th International Conference on Advanced Learning Technologies (ICALT)*, pp.159-163.

AFFILIATIONS

Francesca Pozzi, Donatella Persico, Jeffrey Earp
Istituto Tecnologie Didattiche,
Consiglio Nazionale delle Ricerche – Italy.