

The Materiality of Learning

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Sometimes more effort is put into predicting the revolutionary futures of digital technologies than in actually studying how the same technologies are being incorporated into daily life. The introduction of digital technologies has therefore from time to time led to a certain *hybris* (Hetland & Meyer-Dallach, 1998; Karlsohn, 2009). The present collection of contributions is an attempt to study how digital resources participate in specific learning practices, as they may teach us about the materiality of learning (Sørensen, 2009). The materiality of learning also allows us to undertake a more ecological approach by focusing on both intended and unintended effects, as well as the interplay between learners, teachers, digital resources and policy. The four selected contributions discussed in this editorial present the co-evolution of hybrid minds and external memory systems. They show how learning from multiple digital resources requires additional, diverse skills and competences than those required for learning from textbooks. They show how feedback clickers can be used to overcome some challenges lecturers have in large plenary lectures. They also highlight the relationships between teachers' experiences with ICT-supportive school leaders, ICT-supportive colleagues, the perceived usefulness of computers, the perceived learning outcomes for students and teachers' use of computers in their teaching.

Säljö addresses issues of literacy from an interest in sign making, sign reading and materiality from a sociogenetic perspective. Literacy is a prerequisite for institutional remembering (Bowker, 2005). The invention of writing and the increasing dependence on the written text therefore signifies 'the modern mind'. Säljö uses the concept of hybrid minds to capture how human cognitive and communicative activities depend on increasingly complex and powerful symbolic and material cultural tools. Therefore, the question of associations of humans and nonhumans is important if we are to understand the dramatic changes occurring in the external memory field.

The next three articles study specific examples of the materiality of learning.

Rasmussen, Lund and Smørdal have as an important stepping-stone, the idea that learning from the use of multiple digital resources requires additional and different skills and competences than those that are required for learning from textbooks. Their point of departure is that digital technologies have challenged the historical stable relationship between teachers, textbooks, tasks and tests. They respond to the call for developing new assessment practices. How shall teachers provide productive feedback and conduct valid evaluation when working in networked activities? Their study rests on principles of design-based research where interventions are iterative, theory-informed and aim to capture the ecology of the learning situation. Digital resources make what students are doing visible, both in the form of snapshots and even capturing longitudinal processes. This, in turn, can be used to understand what and how students are learning, and to develop new assessment practices.

Krumsvik and Ludvigsen have studied how feedback clickers can be used to overcome some of the challenges lecturers have in large plenary lectures. They approach the question of feedback by designing an experiment to explore how a technological innovation affects student learning and educational practice. The feedback clickers provide feedback for students and teachers. The use of feedback clickers has an impact on the overall interactivity compared to other methods. Use of feedback clickers also allows those involved to create ‘moments of contingency’ and foster effective discussions that elucidate evidence of learning.

Hatlevik and Arnseth have taken a different approach when studying the factors that influence teachers’ use of computers in their teaching. They interviewed 386 teachers from more than 220 primary and lower secondary schools. The results from this study indicate that teachers experiencing ICT-supportive school leaders are more likely to experience ICT-supportive colleagues and are more likely to believe that computers can be useful in the classroom. They are spending more time and effort on using computers as part of their classroom than teachers who do not have ICT-supportive leaders.

The materiality of learning is constantly changing. However, technological change is neither additive, subtractive nor substitutive - it is ecological. If one adds, subtracts or substitutes one significant factor then the whole system undergoes a change that affects many other factors. Innovation within the materiality of learning may therefore open up new landscapes through experimentation. The study of Rasmussen, Lund and Smørðal, and the study of Krumsvik and Ludvigsen have used experimental approaches to study learning phenomena when digital technologies are introduced. Experimental approaches are also an important element in transforming lessons into policy and practice. However, when entities connect to form a chain or network of action or things, they ‘translate or change it to become part of a collective or network of coordinated things and actions’ (Fenwick & Edwards, 2010:9). The experimental activity is therefore best understood as a translation process building networks. The durability and extension of those networks are essential for the success or failure of an experiment and the forthcoming dissemination process (Hetland, 2011). The four contributions provide important knowledge about how to proceed from research to further studies, policy and practice.

As the editor of this volume of NDJL, I will argue for a more ecological approach to the materiality of learning. We need to understand how the ‘modern mind’ has developed without being ‘binary and ethnocentric’ (Goody, 1977, p. 1). Design experiments are an important methodological contribution to the standard toolbox, and they might help us to build bridges between research, policy and practice. Finally, without the active involvement of school leaders and teachers, new learning technologies may never be used for improved learning environments.

References

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