Smart Learning: A New Paradigm of Learning in the Smart Age

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Keywords: Smart Learning; Adaptivity; Personalisation; Social Learning; m-Learning; u-Learning; Information and Communication Technology.

Extended Abstract

Introduction

Education is undergoing a tectonic shift. The hitherto dominant traditional “one size fits all” teaching paradigm is shifting to student-centred learning paradigms which emphasise personalised and individualised learning (TEAL, 2012) in a social and collaborative learning environment (Simonson, Smaldino, Albright & Zvacek, 2000) which extends beyond the classroom walls. Correspondingly, technology has evolved to become personal and mobile with properties (such as social interactivity, context sensitivity, connectivity, or individuality) which produce educational affordances (Klopfer & Squire, 2008) that support new concepts of learning. An important convergence is therefore occurring between the new conceptions of learning (as a personalised, learner-centred, collaborative, situated, etc. activity) and new mobile technologies (which are personal, user-centred, networked, mobile, etc.) (Sharples, Taylor & Vavoula, 2010).

The convergence between learning and technology is opportune given that learners’ profiles have also changed significantly (Handal, MacNish & Petocz, 2013). The majority of today’s college students, like the non-traditional learner, work full- or part-time (Wilen-Daugenti, 2011), and hence spend less time on campus (as cited in Handal et al., 2013). They are constantly on the move and tend to cram their learning into the gaps of daily life; rather than treat learning as an isolated endeavour (Wilen-Daugenti, 2011), they integrate their education into the myriad personal and professional responsibilities they hold. Fortunately, the mobile and smart technologies which these tech-savvy students are dependent on and find appealing can help them juggle these obligations (Wilen-Daugenti, 2011). To facilitate their effective learning in diverse mobile environments, however, learning services delivered via the learners’ mobile devices must be tailored to their situations, characteristics and needs. Additionally, it is imperative that the learning occurs in a technological environment that is social to cut down geographical distance between learners, thereby making learning more local and personal (Wilen-Daugenti, 2011). To this end, we introduce Smart Learning; an innovative approach which provide adaptive and personalised learning experiences within a social learning environment leveraging on the capabilities and affordances of smart mobile devices (e.g: smartphones, tablets, etc.) which are sensor-equipped and programmable.

Emergence of Smart Learning

Over the years, new technologies have revolutionised education, yielding new learning delivery methods. Figure 1 shows the technologically-powered paradigm shifts in the technology-enhanced learning environment (TeL). E-learning extended the reach and support of education but relied on tethered computers, and hence was bound by location and time. M-learning extends e-learning by breaking these tethers, allowing learning to occur anytime and anywhere. With the emergence of low-cost embedded sensors and more importantly, sensor-equipped smart mobile devices with the capacity to accumulate and analyse information about the learner and his environments, the exploitation of the learner’s contextual information to provide adaptive and personalised learning services has become central to learning, orchestrating the context-aware “ubiquitous learning” (u-learning) approach.

![Figure 1. Evolution of technology-enhanced learning: From e-Learning to smart learning.](image)

Recently, the educational paradigm shift to student-centred learning is stimulating interest in social learning besides u-learning. Consequently, educators are exploring the potential of social technologies (e.g., web 2.0 social network services [SNS] and mobile web 2.0) for educational purposes. Resultant studies (e.g., Cochrane & Bateman, 2010) have generally shown that these technologies support social constructivism. We therefore contend that a new learning paradigm—smart learning—is emerging as a convergence concept of u-learning and social learning.

Concept of Smart Learning

Learning occurs within smart learning spaces as both a contextual and social activity mediated by technology. Two essential defining attributes of smart learning contribute to this.

First, the provision of adaptive and personalised learning experiences. Adaptivity and personalisation remain critical functions of a smart learning system (SLS). They enable the system to fit its behaviour to the context of the individual learner or a group of interconnected learners. Adaptivity concerns providing appropriately designed learning experiences depending on the learner’s context. This may include delivering appropriate learning content/services or enabling learners find the right helpers/collaborators at the moment of need. Personalisation, however, is a more general term which includes adaptivity but can also be user-driven. That is, a learner can provide explicit input (e.g.: preferred language, current mood, etc.) to tailor the services/features of an SLS to suit his unique learning needs and preferences.

Context, widely defined in TeL as the current situation of a person related to a learning activity, is central to adaptive and personalised learning provision. In the literature, context has been modeled into two parts: the learning context and the mobile context (Sampson & Zervas, 2013). Table 1 provides their respective characteristics.
Table 1. Characteristics of learning and mobile context.

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learning Context</strong></td>
<td></td>
</tr>
<tr>
<td>Learning design</td>
<td>Learning objectives, learning activities, pedagogical models, etc.</td>
</tr>
<tr>
<td>Learning Profile</td>
<td>knowledge, skills, learning style, learning needs and interests, etc.</td>
</tr>
<tr>
<td><strong>Mobile Context</strong></td>
<td></td>
</tr>
<tr>
<td>Learner</td>
<td>Temporal personal information (mood, preferences, needs, interests, etc.).</td>
</tr>
<tr>
<td>People</td>
<td>Role, relationship, contributions and constraints.</td>
</tr>
<tr>
<td>Place</td>
<td>Location, zones, interactive space, learning setting, etc.</td>
</tr>
<tr>
<td>Artifact</td>
<td>Technological: physical &amp; digital properties, and non-technological.</td>
</tr>
<tr>
<td>Time</td>
<td>Task duration, task scheduled, action happens, availability.</td>
</tr>
<tr>
<td>Physical conditions</td>
<td>Illumination level, noise level, weather conditions.</td>
</tr>
</tbody>
</table>

Second, the provision of adaptive and personalised learning occurs in a social learning environment. Smart learning offers a social networking platform where students, teachers and experts create and share knowledge, as well as collaborate and learn formally and informally on the go. Thus, learning takes place in a social context where knowledge construction occurs not only at the level of the individual, but also through collaborative group work and sharing of knowledge and information with members within one’s social networks.

**Conclusion**

In the course of reviewing the relevant literature, we have introduced smart learning as a supportive learning paradigm for the convergence between mobile technologies, the emergent educational paradigm centred on the learner need satisfaction, and the changing learning needs of learners in an increasingly mobile society. The benefits of this learning paradigm are that learning services are tailored to the learners’ context which help maximise their satisfaction and learning effectiveness, and that learners develop diverse personal and social skills, besides knowledge acquisition, through these social and collaborative activities.
References


